# Grade 8 Math

Course Review

# Chapter 1

## Representing Data

# Types of Graphs and Their Use

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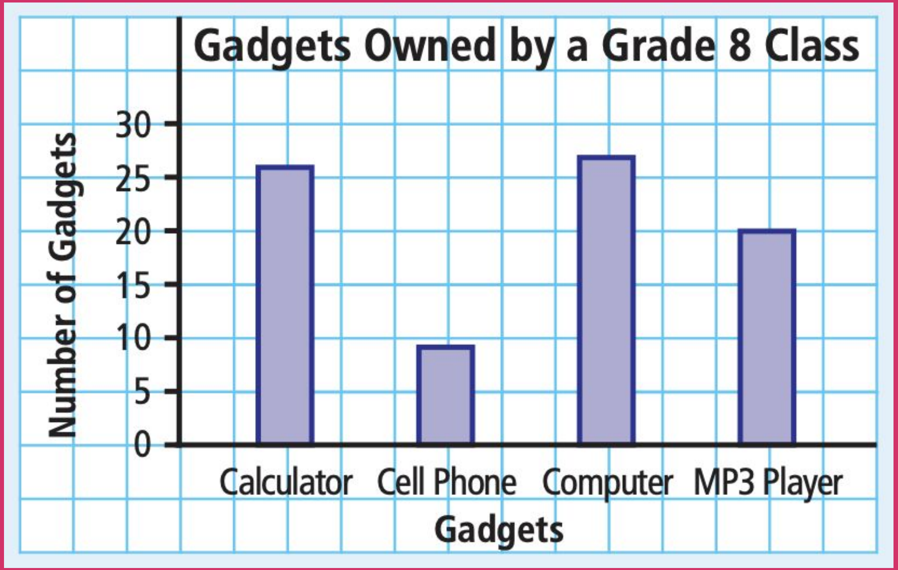
Bar Graphs - What is the best use?



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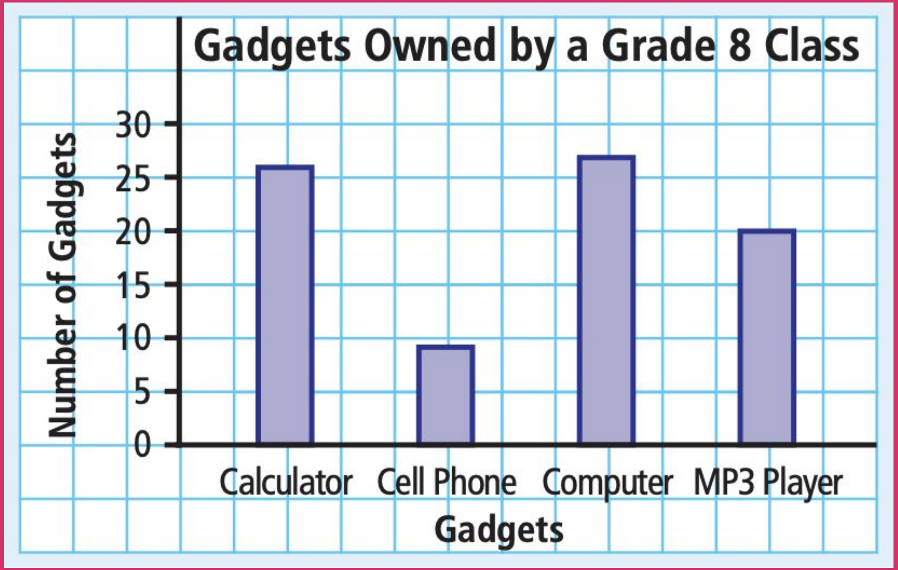


Bar graphs are best for comparing data across categories.

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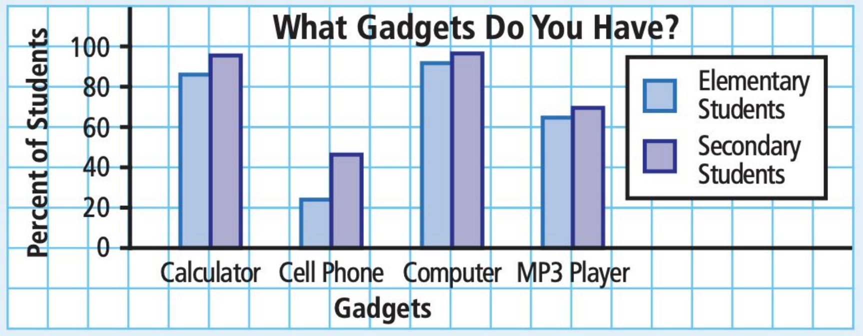

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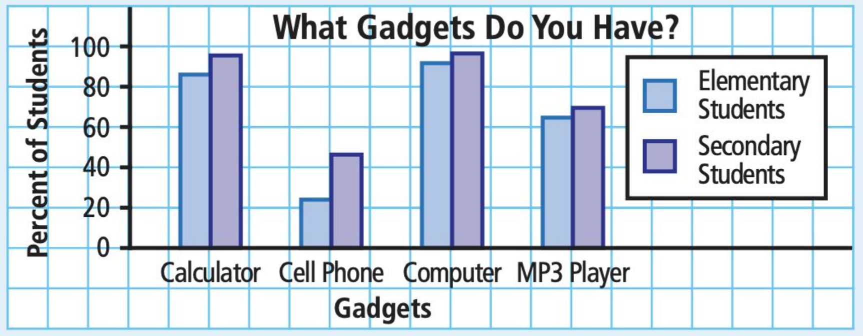
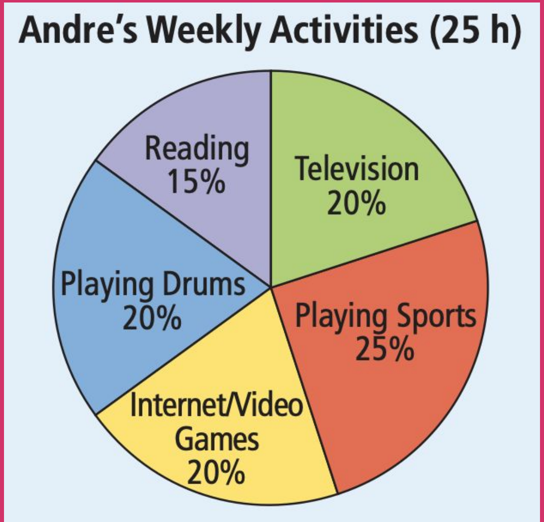



Double Bar Graphs are best for comparing two sets of data across categories.

# Types of Graphs and Their Use

Circle Graphs/Pie Charts - What is the best use?



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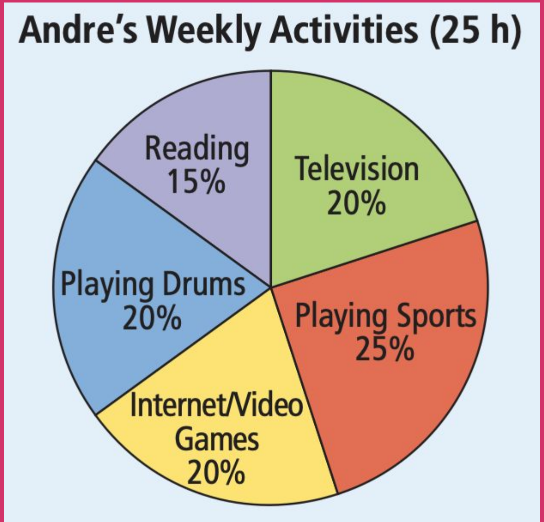
## Circle Graphs/Pie Charts - What is the best use?

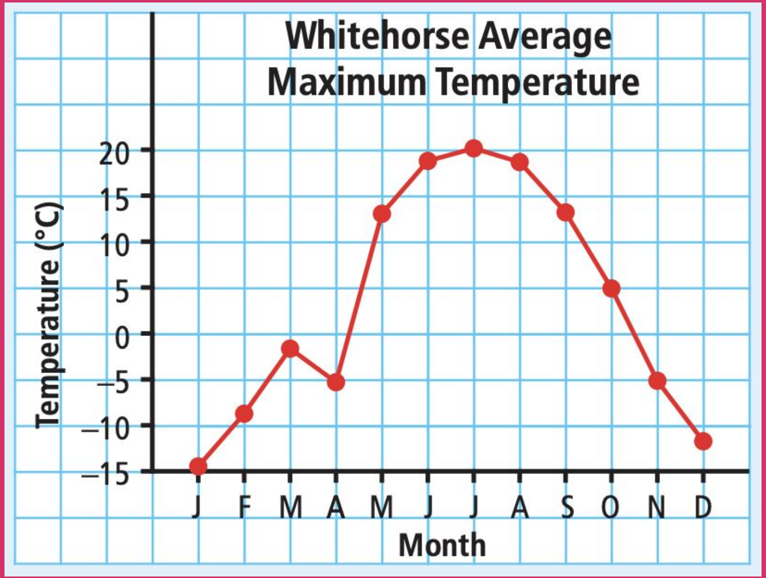



Circle Graphs are best for comparing categories to the whole using percents.

The sum of the percents in a circle graph is always 100%.

# Types of Graphs and Their Use

Line Graphs - What is the best use?



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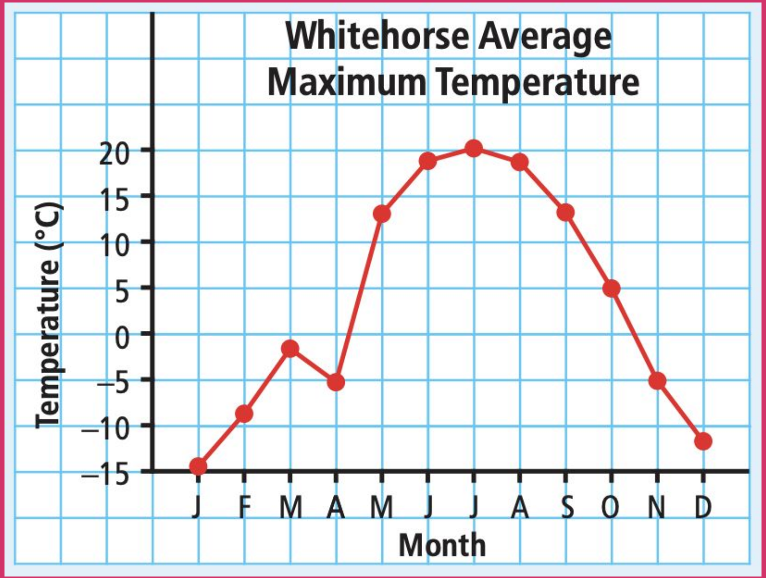


Line graphs are best for showing changes in data over time.

# Types of Graphs and Their Use

Pictographs - What is the best use?

# Types of Graphs and Their Use

## Pictographs - What is the best use?


Pictographs are best for comparing data that can be easily counted and represented using symbols.

# Misrepresenting Data - Ways to Skew Data

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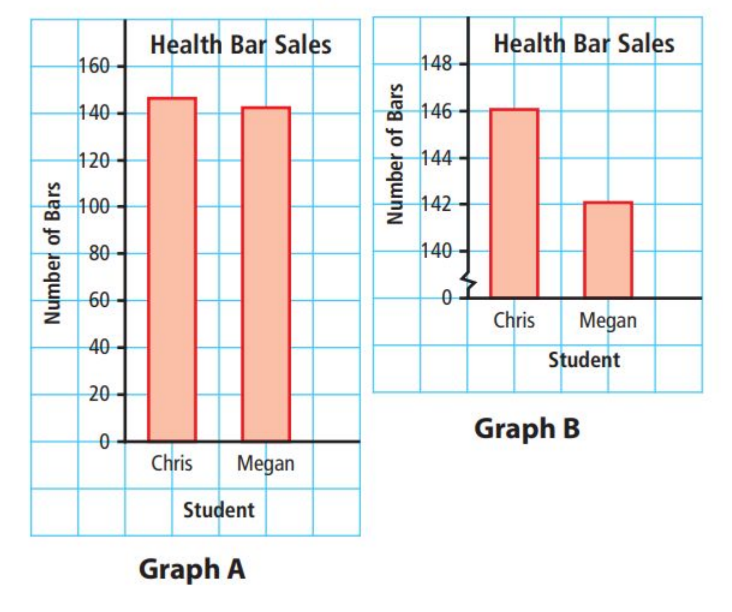
What is distorted about the graph below?



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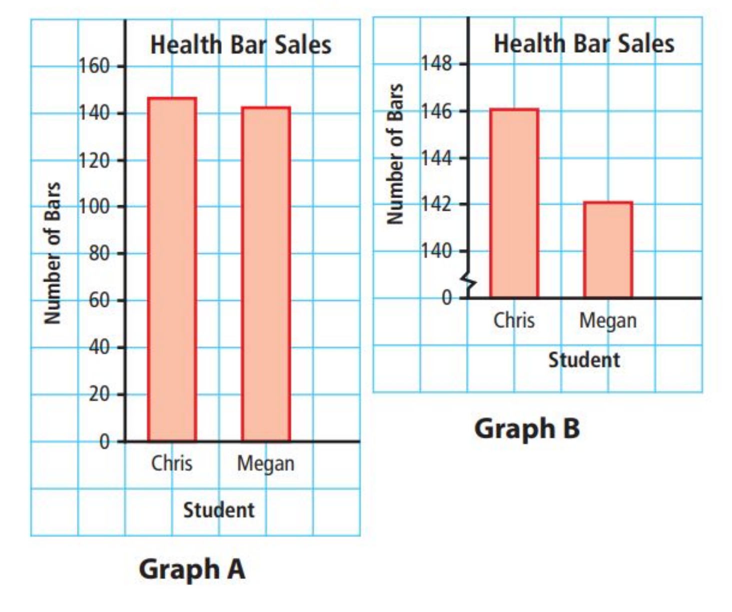


The scale is distorted making it appear that they are further apart in Graph B or more similar in Graph A

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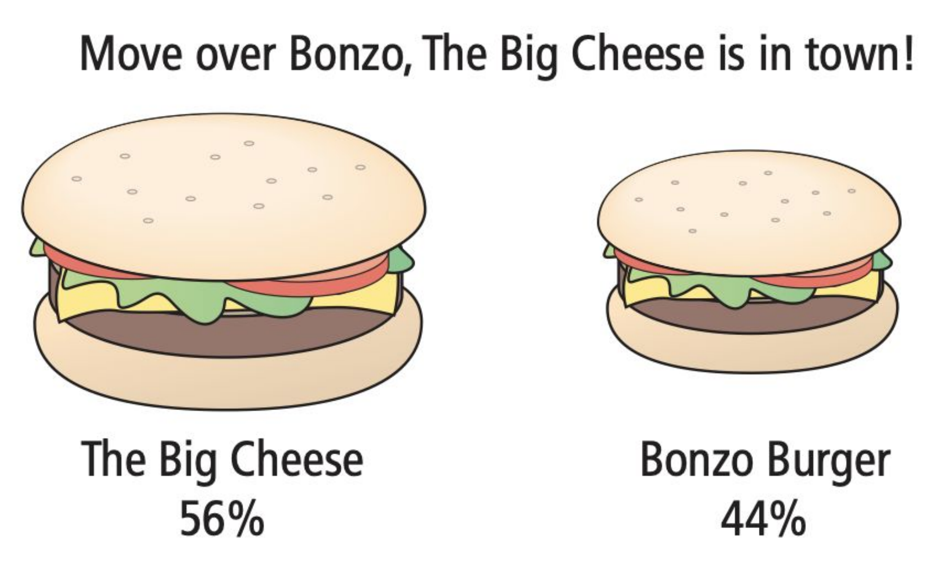

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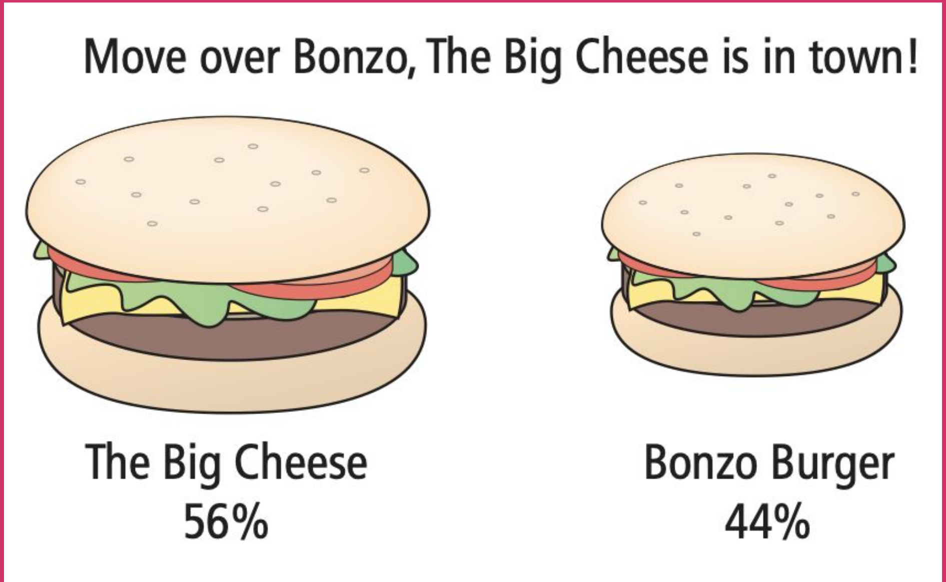


The size of the images are distorted making it appear that The Big Cheese is more popular by a greater margin .

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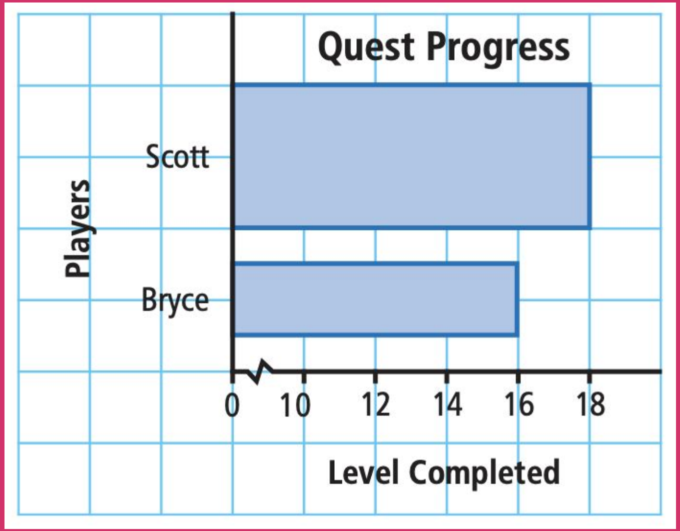

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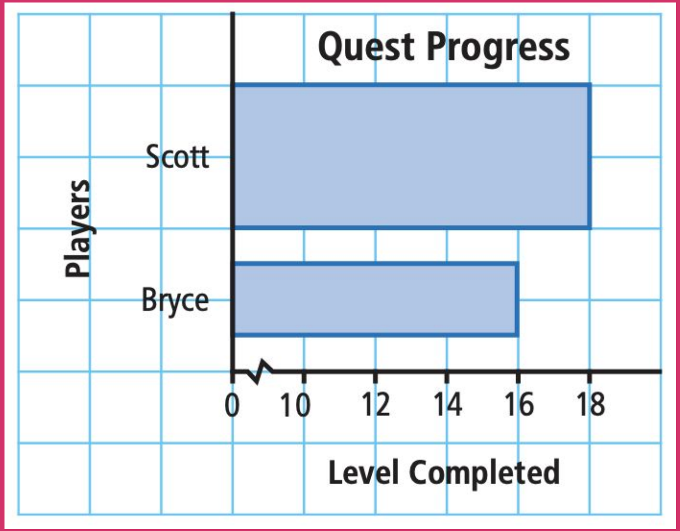


The size of the bars is distorted making it appear that Scott has progressed a lot further than Bryce in the quest.

# Misrepresenting Data - Ways to Skew Data

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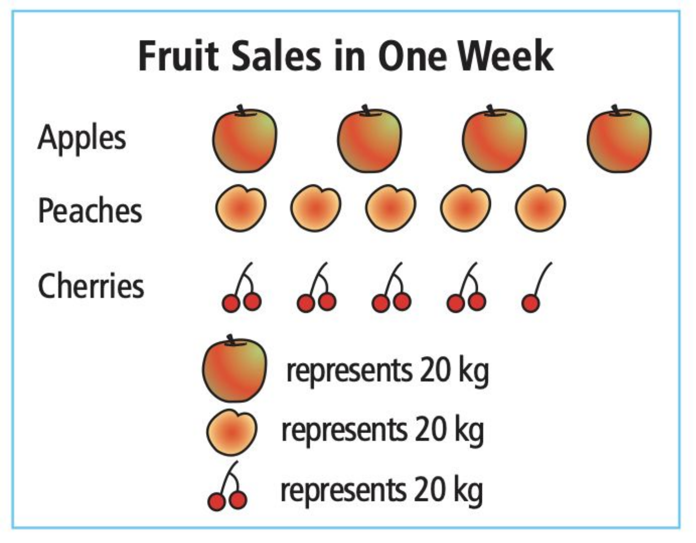

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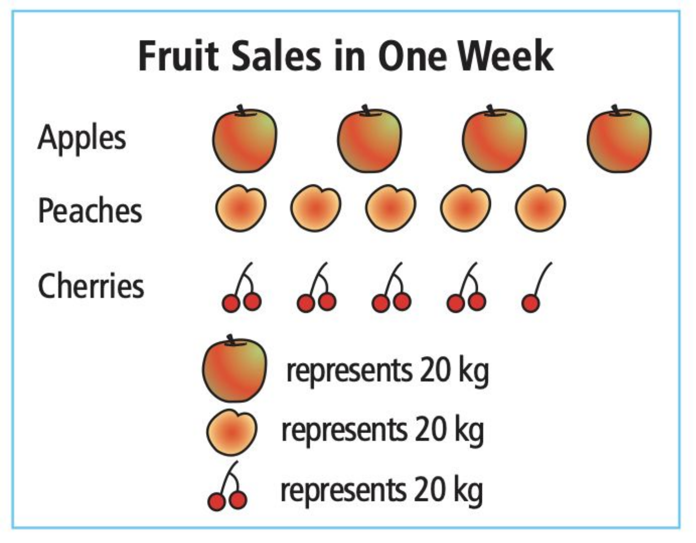


The size of the images are distorted making it appear that Apples had the most sales in the week when in reality they were the smallest sale.

# Chapter 2

## Rates, Ratios and Proportional Reasoning

# Ratios

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What are ratios?

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Ratios are a comparison of like items such as male students to female students in a classroom.

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Ratios are a comparison of like items such as male students to female students in a classroom.

Ratios can be expressed as a fraction or separated by a colon “ : ”

⅔ or 2 : 3

# Types of Ratios

Part to Part:

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Compares two or more parts of a set.

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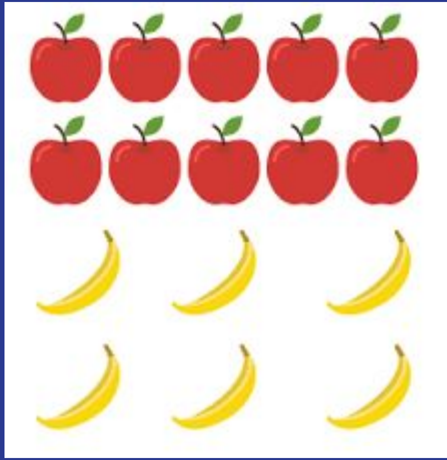
Example:
the ratio of apples to bananas is



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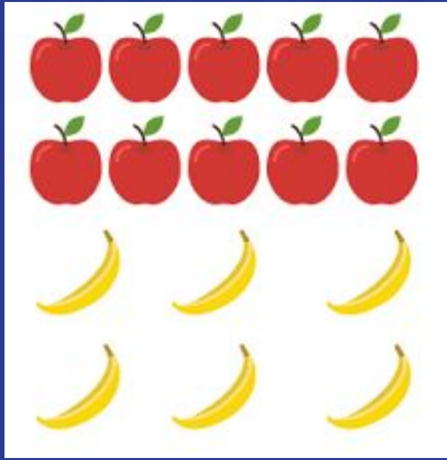
Part to Part:

Compares two or more parts of a set.

Example:
the ratio of apples to bananas is
10:6



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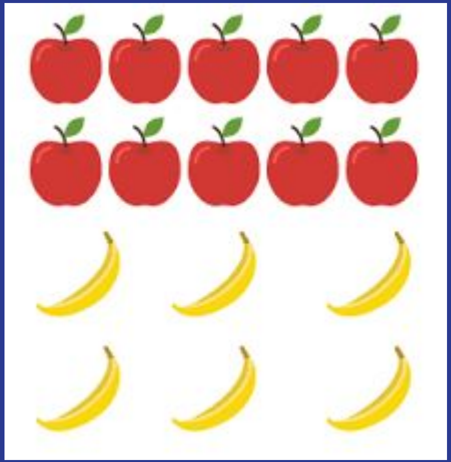
the ratio of bananas to the total is



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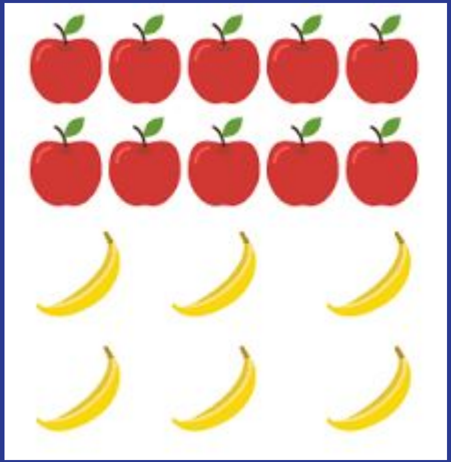

Example:
the ratio of bananas to the total is
$6:16$ or $^{6}/_{16}$

# Rates

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What are rates?

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Ratios are a comparison of two values with different units such as the distance you can travel in a set time (500 km/5 h)

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You calculate rates through division. The desired units show how to divide.

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In this example, you travel 100 km for every 1 hour driven.

You calculate rates through division. The desired units show how to divide.

“km/h” means → km divided by the number of hours

# Ratios vs. Rates

| Ratios | Rates |
|---|---|
| Is a statement | Is a calculation |
| Compares to similar items | Compares different items |
| Has two values with the **same** type of unit | Has one value with the **different** units |
| Ex. 3 cats : 4 pets<br>3 : 4<br>Two values, both animals | Ex. 375 km/day<br><br>One value with two units. |

# Proportional Reasoning

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What is a proportion?

A proportion is a set of equivalent fractions.

You create equivalent fractions through either multiplication or division.

- if the value is getting larger, you need to multiply
- if the value is getting smaller, you need to divide
- Whatever you do to the numerator of the fraction, you do to the denominator

# Chapter 3

## Pythagorean Relationship

# Squares

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What does it mean to “square a number”?

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To find the area of the square.

# Squares

What do you do to “square a number”?

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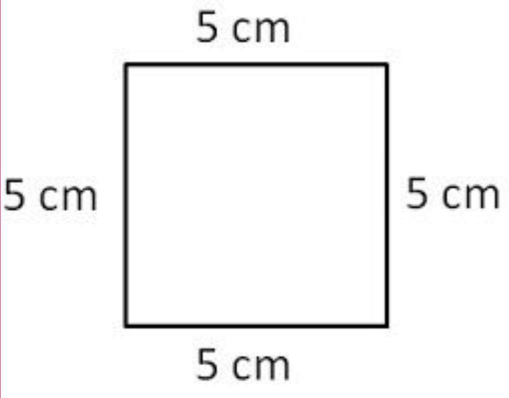

# Squares

What do you do to "square a number"?

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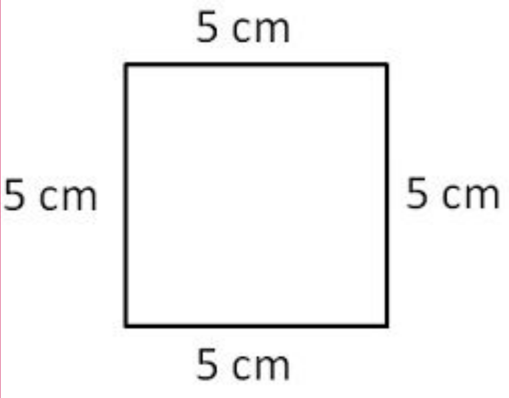
Ex.

$5^2$



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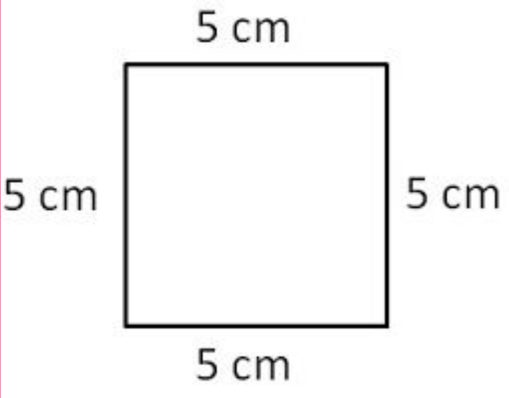


Means 5 x 5 ⇒

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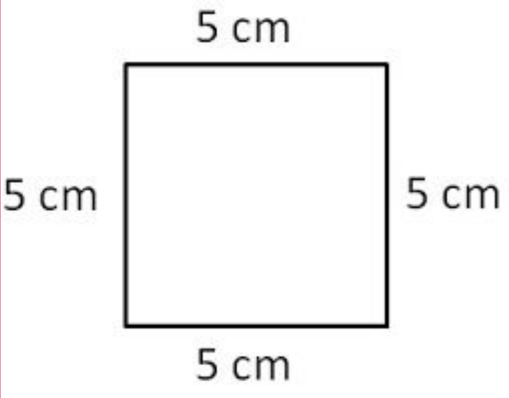


Means 5 x 5 ⇒ 25

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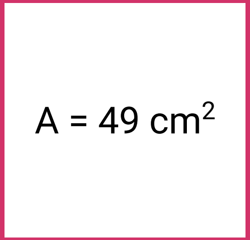

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$A = 49\ cm^2$

$\sqrt{49} \Rightarrow$

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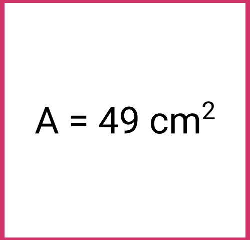


$\sqrt{49} \Rightarrow 7$ cm

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$$a^2 + b^2 = c^2$$

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- where ***a*** and ***b*** are the sides ______________________________
- and ***c*** is the ____________________________________________

# Pythagorean Relationship

What is the Pythagorean Theorem?

$$a^2 + b^2 = c^2$$

- where ***a*** and ***b*** are the sides that create the right angle
- and ***c*** is the ________________________________________

# Pythagorean Relationship

What is the Pythagorean Theorem?

$$a^2 + b^2 = c^2$$

- where ***a*** and ***b*** are the sides that create the right angle
- and ***c*** is the hypotenuse (the longest side)

# Pythagorean Relationship

What does the Pythagorean expression mean?

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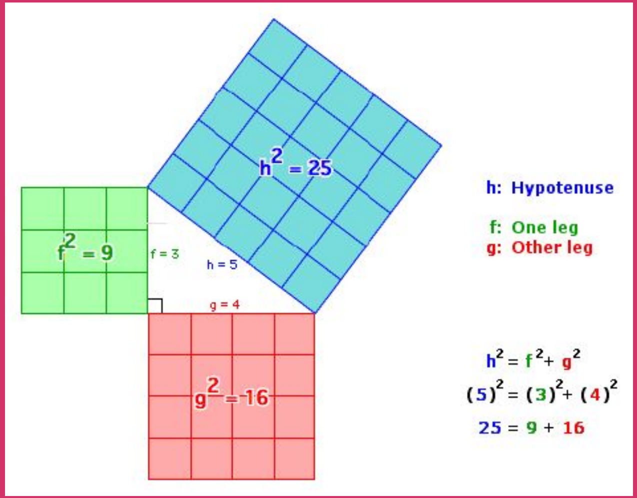
What does the Pythagorean expression mean?

The area of the squares attached to sides ***a*** and ***b*** is equal to the area of the square attached to side ***c***.



# Using the Pythagorean Relationship

# Using the Pythagorean Relationship - Finding the Hypotenuse

What are the steps to using the Pythagorean Relationship to find missing sides?

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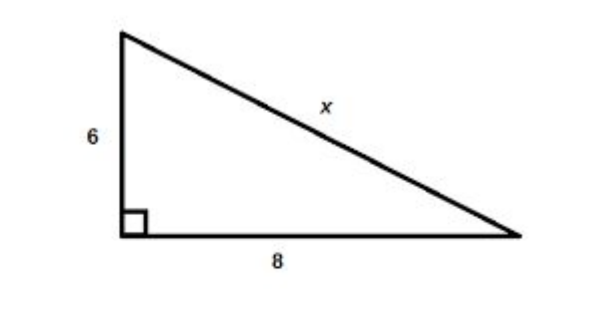
1. Write down the formula. $a^2 + b^2 = c^2$



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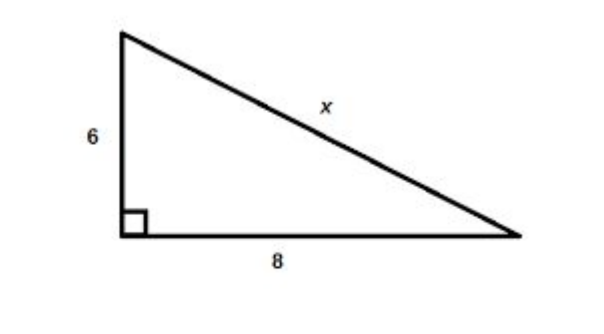



1. Write down the formula. $a^2 + b^2 = c^2$

2. Substitute the known values. $6^2 + 8^2 = c^2$

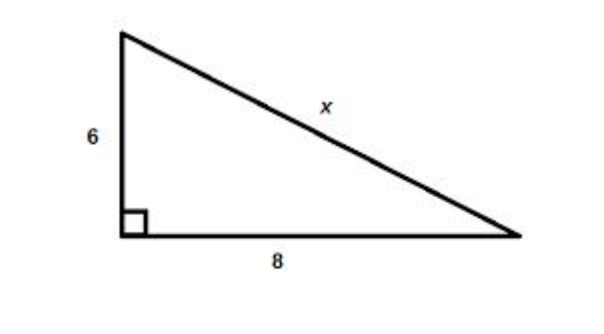
# Using the Pythagorean Relationship - Finding the Hypotenuse

What are the steps to using the Pythagorean Relationship to find missing sides?

1. Write down the formula. $a^2 + b^2 = c^2$

2. Substitute the known values. $6^2 + 8^2 = c^2$

3. Evaluate the squares. $36 + 64 = c^2$



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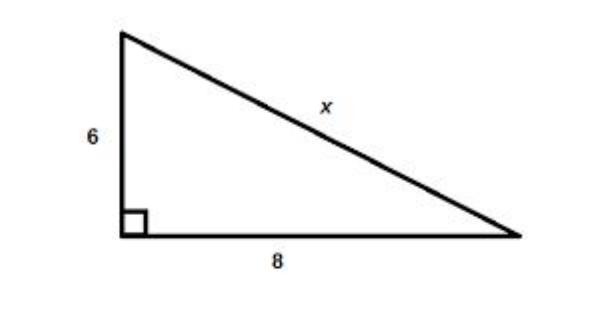


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4. Add the squares. $100 = c^2$

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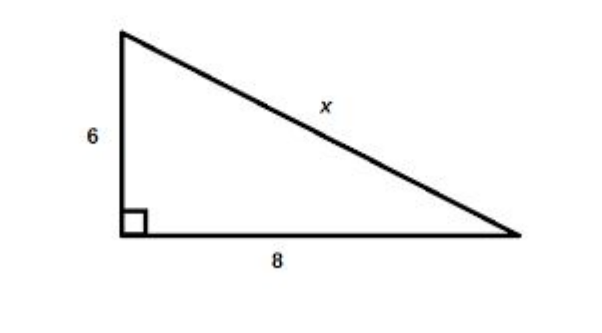


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2. Substitute the known values. $6^2 + 8^2 = c^2$
3. Evaluate the squares. $36 + 64 = c^2$
4. Add the squares. $100 = c^2$
5. Square root the sum to get the side of c. $\sqrt{100} = c^2 \Rightarrow$ $10 = c$

# Using the Pythagorean Relationship - Finding the Leg

What are the steps to using the Pythagorean Relationship to find missing sides?

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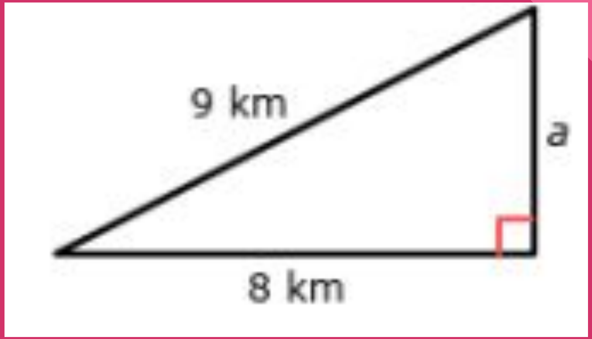

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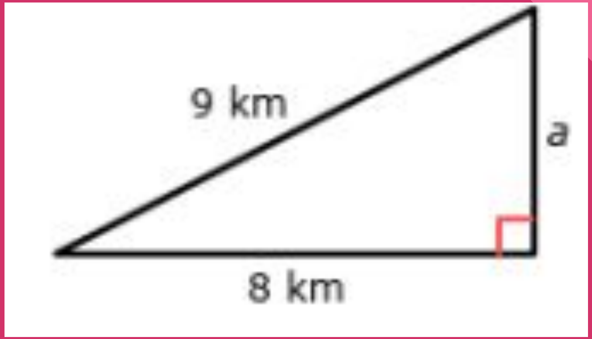


1. Write down the formula. $a^2 + b^2 = c^2$

2. Substitute the known values. $a^2 + 8^2 = 9^2$

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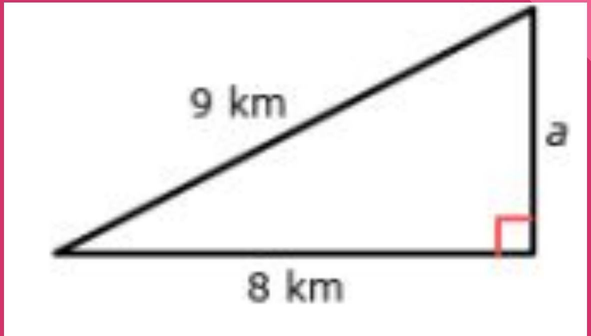


1. Write down the formula. $a^2 + b^2 = c^2$
2. Substitute the known values. $a^2 + 8^2 = 9^2$
3. Evaluate the squares. $a^2 + 64 = 81$

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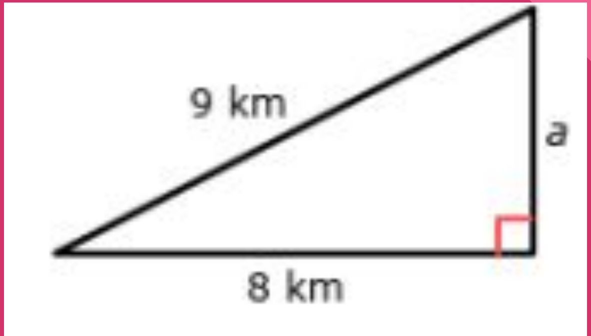
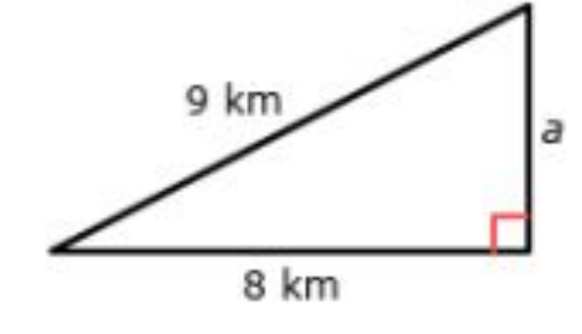



1. Write down the formula. $a^2 + b^2 = c^2$
2. Substitute the known values. $a^2 + 8^2 = 9^2$
3. Evaluate the squares. $a^2 + 64 = 81$
4. Subtract the leg area from the area of the hypotenuse. $a^2 = 81-64 \Rightarrow a^2 = 17$

# Using the Pythagorean Relationship - Finding the Leg

What are the steps to using the Pythagorean Relationship to find missing sides?




1. Write down the formula. $a^2 + b^2 = c^2$
2. Substitute the known values. $a^2 + 8^2 = 9^2$
3. Evaluate the squares. a + 64 = 81
4. Subtract the leg area from the area of the hypotenuse. $a^2 = 81 - 64 \Rightarrow a^2 = 17$
5. Square root the sum to get the side of the leg. $A^2 = \sqrt{17} \Rightarrow a = 4.1$

# Chapter 4

## Understanding Percent

# Decimals, Fractions and Percents

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Converting from Decimal to Percent

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- Multiply the decimal by 100. (move the decimal point two digits right)

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Ex. 0.426

# Decimals, Fractions and Percents

Converting from Decimal to Percent

- Multiply the decimal by 100. (move the decimal point two digits right)

Ex. 0.426 → move the decimal point two digits right...

# Decimals, Fractions and Percents

Converting from Decimal to Percent

- Multiply the decimal by 100. (move the decimal point two digits right)

Ex. 0.426 → move the decimal point two digits right…

42.6 %

# Decimals, Fractions and Percents

Converting from Percent to Decimal

# Decimals, Fractions and Percents

Converting from Percent to Decimal

- Divide the percent by 100. (move the decimal point two digits left)

# Decimals, Fractions and Percents

Converting from Percent to Decimal

- Divide the percent by 100. (move the decimal point two digits left)

Ex. 73.4 %

# Decimals, Fractions and Percents

Converting from Percent to Decimal

- Divide the percent by 100. (move the decimal point two digits left)

Ex. 73.4 % → move the decimal point two digits left...

# Decimals, Fractions and Percents

Converting from Percent to Decimal

- Divide the percent by 100. (move the decimal point two digits left)

Ex. 73.4 % → move the decimal point two digits left...

0.734

# Decimals, Fractions and Percents

Converting from Percent to Fraction

# Decimals, Fractions and Percents

Converting from Percent to Fraction

- Place the percent value as the numerator

# Decimals, Fractions and Percents

Converting from Percent to Fraction

- Place the percent value as the numerator
- Make the denominator 100

# Decimals, Fractions and Percents

Converting from Percent to Fraction

- Place the percent value as the numerator
- Make the denominator 100
- Simplify through division

# Decimals, Fractions and Percents

Converting from Percent to Fraction

- Place the percent value as the numerator
- Make the denominator 100
- Simplify through division

Ex. 25%

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Ex. 25%

$$\frac{25}{100}$$

# Decimals, Fractions and Percents

Converting from Percent to Fraction

- Place the percent value as the numerator
- Make the denominator 100
- Simplify through division

Ex. 25%

$$\frac{25}{100} \Rightarrow \frac{1}{4}$$

# Decimals, Fractions and Percents

Converting from Fraction to Percent

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Converting from Fraction to Percent

- Convert the fraction into a decimal by dividing the numerator by the denominator

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- Multiply the decimal by 100 (move the decimal point 2 spots to the right)

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Converting from Fraction to Percent

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- Multiply the decimal by 100 (move the decimal point 2 spots to the right)

Ex. ¾

# Decimals, Fractions and Percents

Converting from Fraction to Percent

- Convert the fraction into a decimal by dividing the numerator by the denominator
- Multiply the decimal by 100 (move the decimal point 2 spots to the right)

Ex. $\frac{3}{4}$

= 0.75

# Decimals, Fractions and Percents

Converting from Fraction to Percent

- Convert the fraction into a decimal by dividing the numerator by the denominator
- Multiply the decimal by 100 (move the decimal point 2 spots to the right)

Ex. $\frac{3}{4}$

= 0.75

= 75%

# Decimals, Fractions and Percents

Converting from Fraction to Decimal

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Converting from Fraction to Decimal

- Divide the numerator by the denominator

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Ex. $^{8}/_{10}$

# Decimals, Fractions and Percents

Converting from Fraction to Decimal

- Divide the numerator by the denominator

Ex. $^{8}/_{10}$

8 ÷ 10 ⇒

# Decimals, Fractions and Percents

Converting from Fraction to Decimal

- Divide the numerator by the denominator

Ex. $^{8}/_{10}$

$8 \div 10 \Rightarrow 0.8$

# Decimals, Fractions and Percents

Converting from Decimal to Fraction

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Converting from Decimal to Fraction

- Look at the final place value. The name of this place value becomes the denominator.

# Decimals, Fractions and Percents

Converting from Decimal to Fraction

- Look at the final place value. The name of this place value becomes the denominator.
- Drop the decimal point and place the value as the numerator
-

# Decimals, Fractions and Percents

Converting from Decimal to Fraction

- Look at the final place value. The name of this place value becomes the denominator.
- Drop the decimal point and place the value as the numerator
- Simplify

Ex. 0.125

# Decimals, Fractions and Percents

Converting from Decimal to Fraction

- Look at the final place value. The name of this place value becomes the denominator.
- Drop the decimal point and place the value as the numerator
- Simplify

Ex. 0.125 → ones . tenths hundredths thousandths

# Decimals, Fractions and Percents

Converting from Decimal to Fraction

- Look at the final place value. The name of this place value becomes the denominator.
- Drop the decimal point and place the value as the numerator
- Simplify

Ex. 0.125 → ones . tenths hundredths thousandths

→ the final digit is in the thousandths place value, this becomes the denominator

# Decimals, Fractions and Percents

Converting from Decimal to Fraction

- Look at the final place value. The name of this place value becomes the denominator.
- Drop the decimal point and place the value as the numerator
- Simplify

Ex. 0.125 → ones . tenths hundredths thousandths

→ the final digit is in the thousandths place value, this becomes the denominator

$$\frac{\quad}{1000}$$

# Decimals, Fractions and Percents

Converting from Decimal to Fraction

- Look at the final place value. The name of this place value becomes the denominator.
- Drop the decimal point and place the value as the numerator
- Simplify

Ex. 0.125 → ones . tenths hundredths thousandths

→ drop the decimal point → 125, this becomes the numerator

$$\frac{125}{1000}$$

# Decimals, Fractions and Percents

Converting from Decimal to Fraction

- Look at the final place value. The name of this place value becomes the denominator.
- Drop the decimal point and place the value as the numerator
- Simplify

Ex. 0.125 → ones . tenths hundredths thousandths

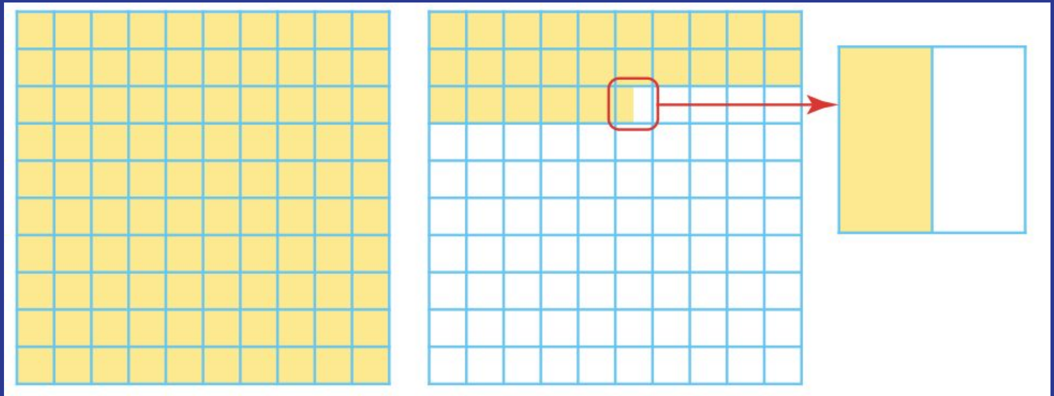
→ Simplify

$$\frac{125}{1000} \Rightarrow \frac{1}{8}$$

# Understanding Percents

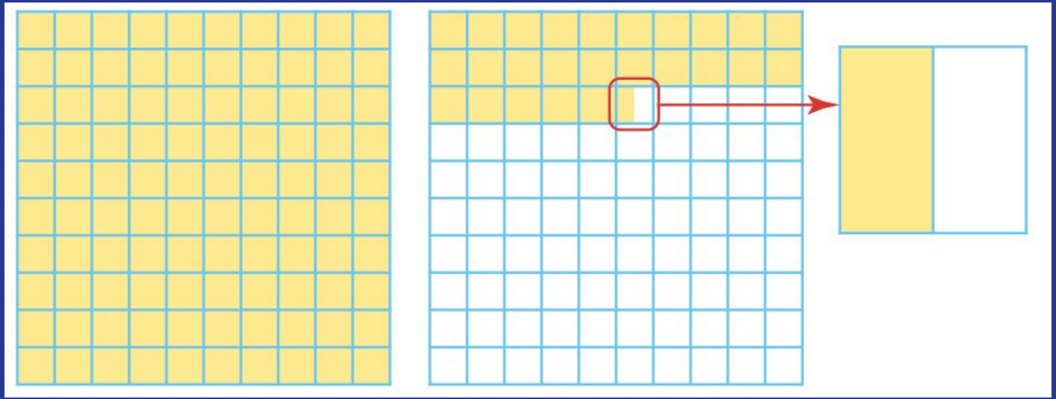
# Understanding Percents

What would the following diagram represent as a percent?



# Understanding Percents

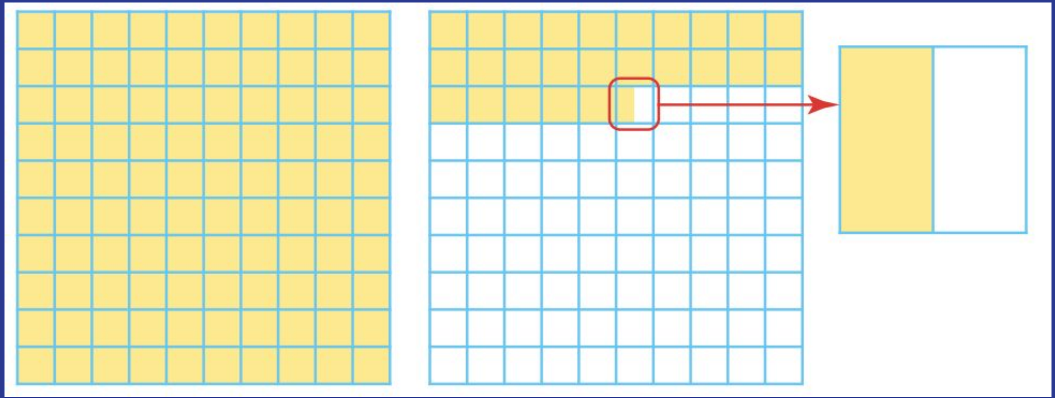
What would the following diagram represent as a percent?



100 squares +

# Understanding Percents

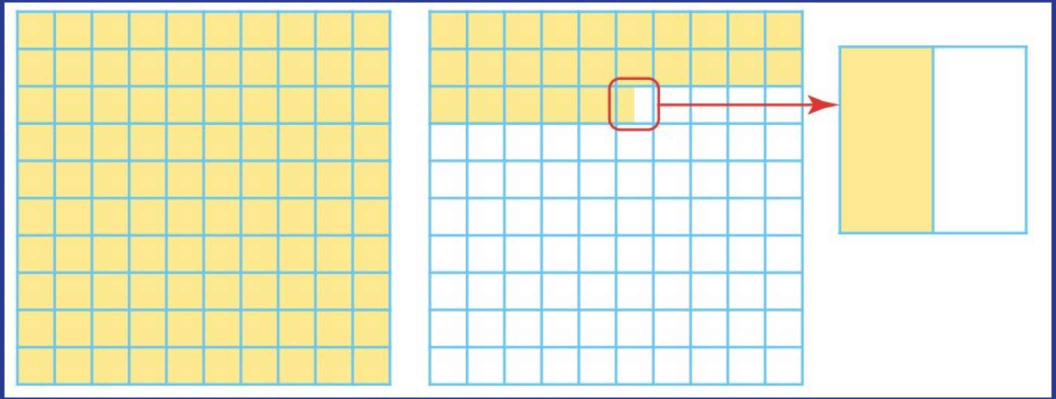
What would the following diagram represent as a percent?



100 squares + 25 squares +

# Understanding Percents

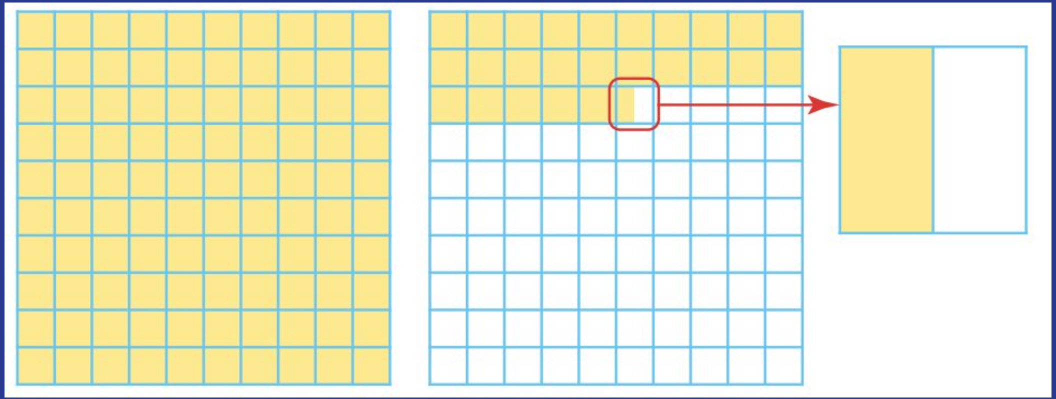
What would the following diagram represent as a percent?



100 squares + 25 squares + ½ square

# Understanding Percents

What would the following diagram represent as a percent?



100 squares + 25 squares + ½ square

= 125.5 %

# Percent of a Number

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How do you find the percent of a number?

# Percent of a Number

How do you find the percent of a number?

- Turn the percent into a decimal by dividing by 100 (move the decimal point 2 places left)
-

# Percent of a Number

How do you find the percent of a number?

- Turn the percent into a decimal by dividing by 100
  (move the decimal point 2 places left)
- Multiply the decimal by the value you are finding the percent of.

# Chapter 5

## Surface Area

# What is surface area?

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Surface area measure the total areas of all outside surface. It tell you how much you would need to completely cover the shape, such as if you were going to paint or wrap it as a gift.

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Surface Area is measured in $units^2$.

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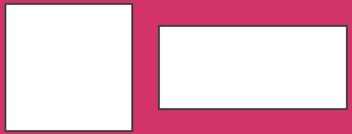
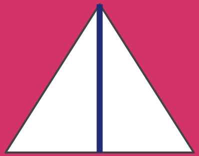
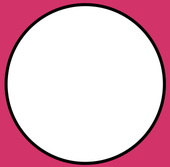
Surface area measure the total areas of all outside surface. It tell you how much you would need to completely cover the shape, such as if you were going to paint or wrap it as a gift.

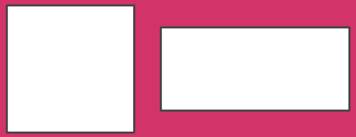
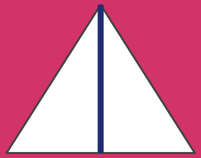
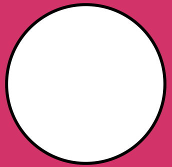
Surface Area is measured in units$^2$.

The formula for surface area is → $SA = (2 \times A_b) + (P_b \times H)$

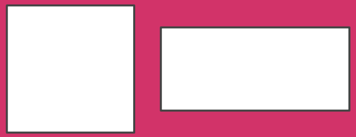
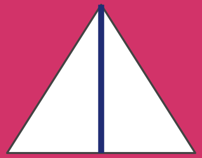
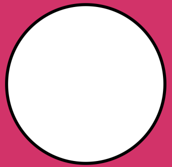
# Area Formulas

| Area Formulas | Shape |
|---|---|
| |  |
| |  |
| |  |

# Area Formulas

| Area Formulas | Shape |
| --- | --- |
| $l \times w$ |  |
| |  |
| |  |

# Area Formulas

| Area Formulas | Shape |
|---|---|
| $l \times w$ |  |
| $\frac{b \times h}{2}$ |  |
| |  |

# Area Formulas

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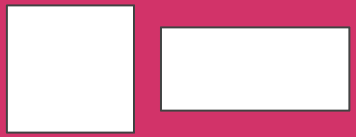
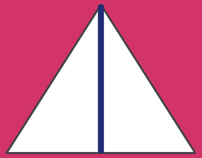
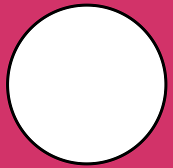
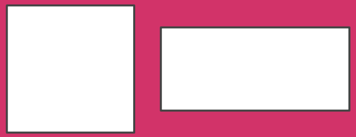
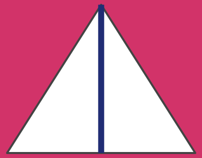
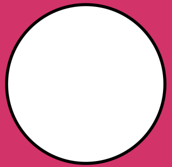
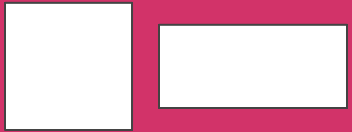
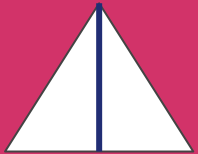
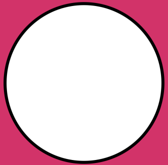
| $l \times w$ |  |
| $\frac{b \times h}{2}$ |  |
| $\pi \times r^2$ |  |

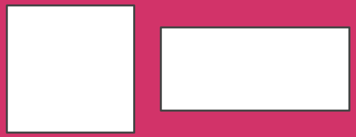
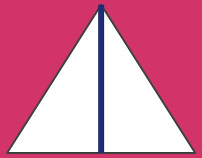
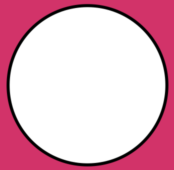
# Perimeter Formulas

| Perimeter Formulas | Shape |
|---|---|
| |  |
| |  |
| |  |

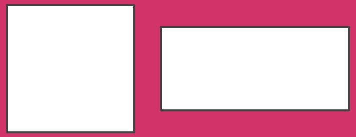
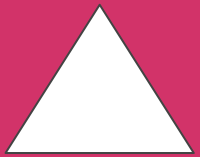
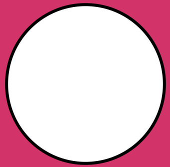
# Perimeter Formulas

| Perimeter Formulas | Shape |
|---|---|
| $l + w + l + w$ |  |
| |  |
| |  |

# Perimeter Formulas

| Perimeter Formulas | Shape |
| --- | --- |
| $l + w + l + w$ |  |
| $S^1 + S^2 + S^3$ |  |
| |  |

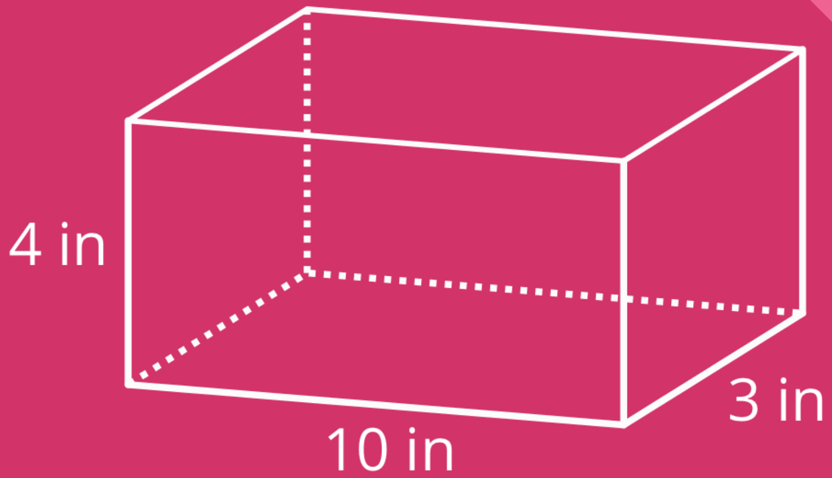
# Perimeter Formulas

| Perimeter Formulas | Shape |
|---|---|
| $l + w + l + w$ |  |
| $S^1 + S^2 + S^3$ |  |
| π x $d$ |  |

# Finding Surface Area - Rectangular Prism

# Finding Surface Area - Rectangular Prism

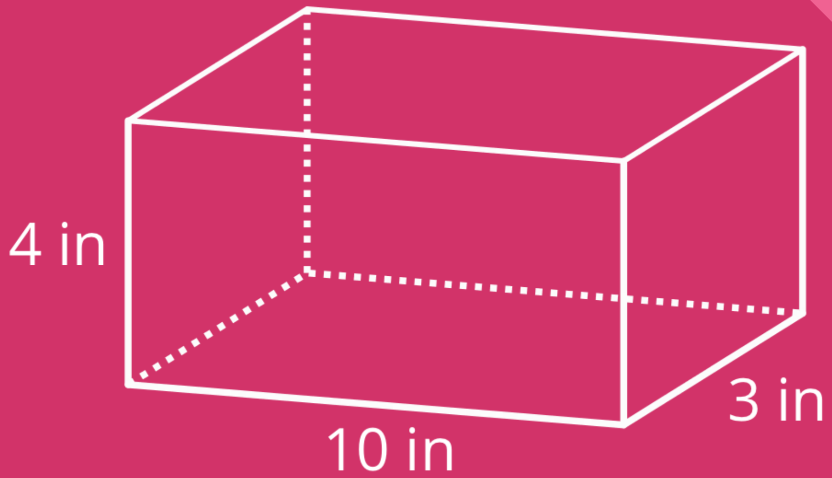
$SA = ( 2 \times A_b ) + ( P_b \times H )$



# Finding Surface Area - Rectangular Prism

$SA = (2 \times A_b) + (P_b \times H)$

The base shape is a rectangle, so use the rectangle area/perimeter formula

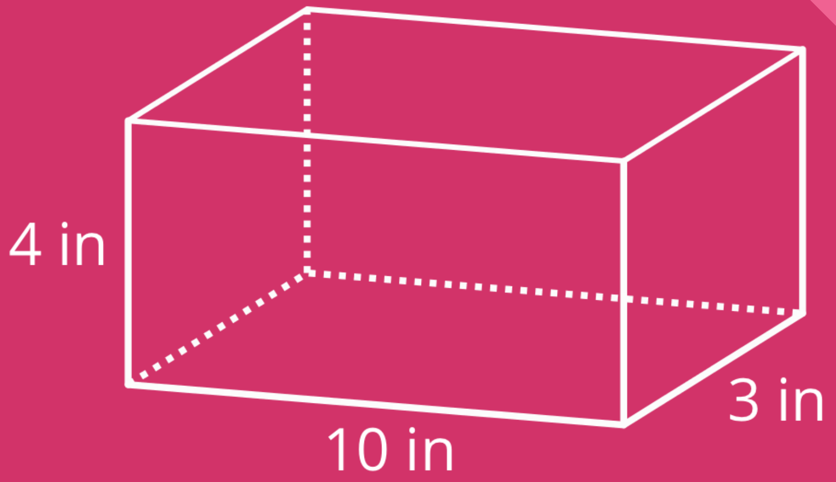


# Finding Surface Area - Rectangular Prism

$SA = (2 \times A_b) + (P_b \times H)$

The base shape is a rectangle, so use the rectangle area/perimeter formula

$SA = (2 \times (l \times w)) + ((l + w + l + w) \times H)$



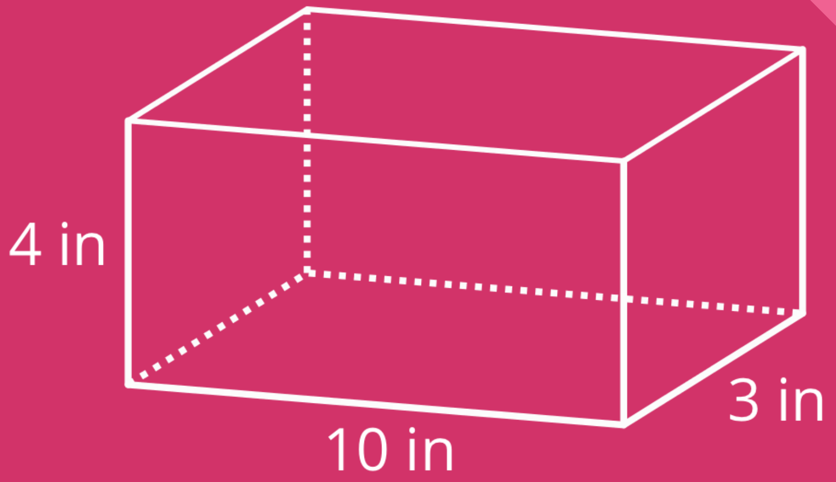
# Finding Surface Area - Rectangular Prism

$SA = ( 2 \times A_b ) + ( P_b \times H )$

The base shape is a rectangle, so use the rectangle area/perimeter formula

$SA = ( 2 \times (l \times w) ) + ((l + w + l + w) \times H )$

$SA = (2 \times 10 \times 3) + ((10 + 3 + 10 + 3) \times 4)$



# Finding Surface Area - Rectangular Prism

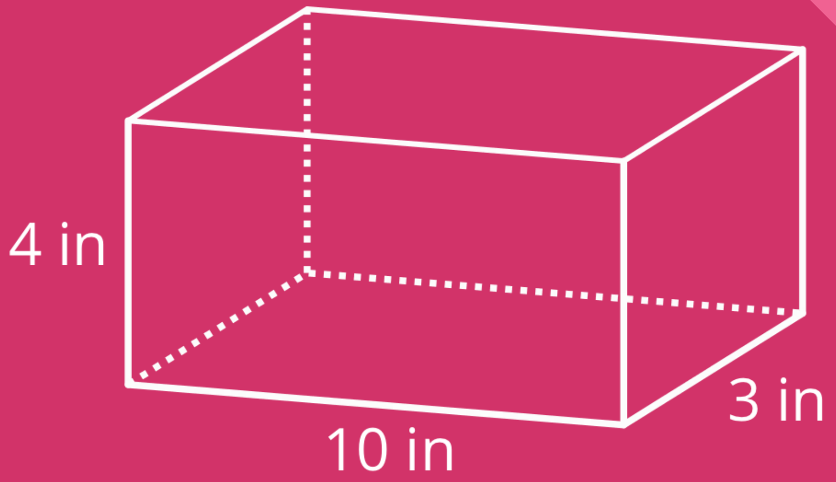
$SA = (2 \times A_b) + (P_b \times H)$

The base shape is a rectangle, so use the rectangle area/perimeter formula

$SA = (2 \times (l \times w)) + ((l + w + l + w) \times H)$

$SA = (2 \times 10 \times 3) + ((10 + 3 + 10 + 3) \times 4)$

$SA = (60) + (26 \times 4)$



# Finding Surface Area - Rectangular Prism

SA = ( 2 x $A_b$ ) + ( $P_b$ x H )

The base shape is a rectangle, so use the rectangle area/perimeter formula

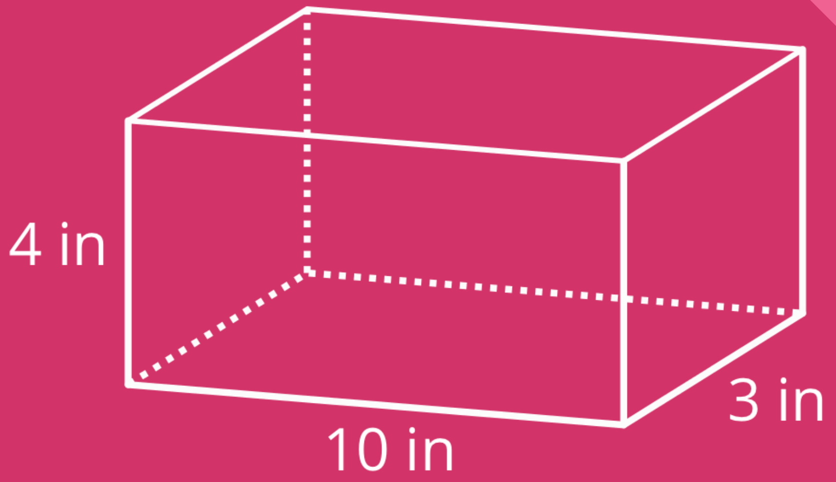
SA = ( 2 x (l x w) ) + ((l + w + l + w) x H )

SA = (2 x 10 x 3) + ((10 + 3 + 10 + 3) x 4)

SA = (60) + (26 x 4)

SA = 60 + 104

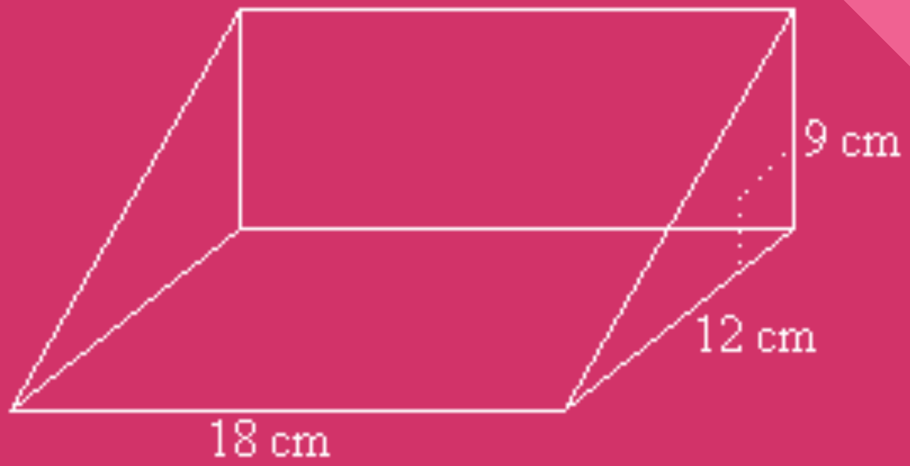
SA = 164 $in^2$



# Finding Surface Area - Triangular Prism

# Finding Surface Area - Triangular Prism

$SA = (2 \times A_b) + (P_b \times H)$

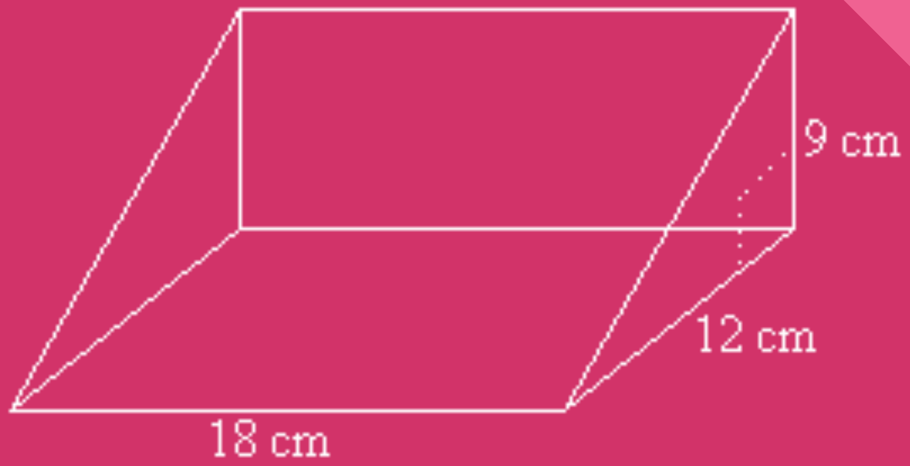


# Finding Surface Area - Triangular Prism

$SA = (2 \times A_b) + (P_b \times H)$

The base shape is a triangle, so use the triangle area/perimeter formula

$SA = (2 \times \frac{b \times h}{2}) + (s_1 + s_2 + s_3 \times H)$



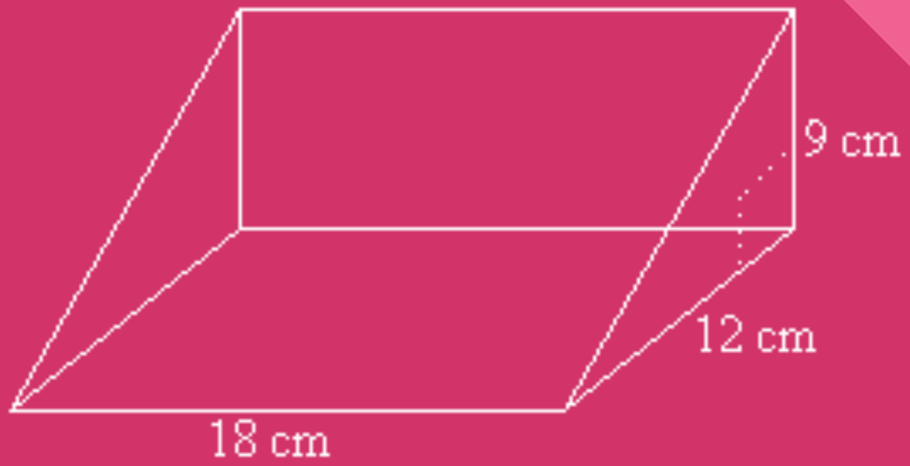
# Finding Surface Area - Triangular Prism

$SA = (2 \times A_b) + (P_b \times H)$

The base shape is a triangle, so use the triangle area/perimeter formula

$$SA = \left(2 \times \frac{bxh}{2}\right) + (s_1+s_2+s_3 \times H)$$

$$SA = \left(2 \times \frac{12x9}{2}\right) + (9+12+s_3 \times H)$$




$$s_1{}^2 + s_2{}^2 = s_3{}^2$$

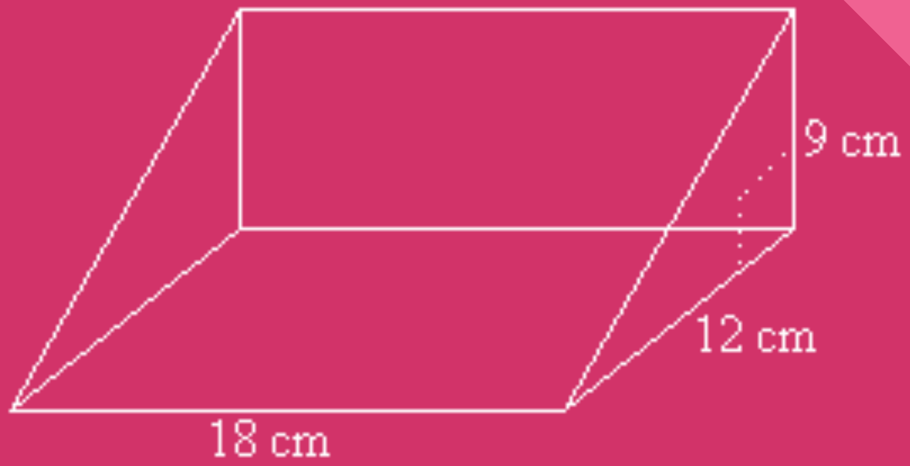
# Finding Surface Area - Triangular Prism

SA = ( 2 x $A_b$ ) + ( $P_b$ x H )

The base shape is a triangle, so use the triangle area/perimeter formula

SA = ( 2 x $\frac{bxh}{2}$ ) + ( $s_1+s_2+s_3$ x H )

SA = ( 2 x $\frac{12x9}{2}$ ) + ( $9+12+s_3$ x H )




$s_1{}^2 + s_2{}^2 = s_3{}^2$

$12^2 + 9^2 = s_3{}^2$

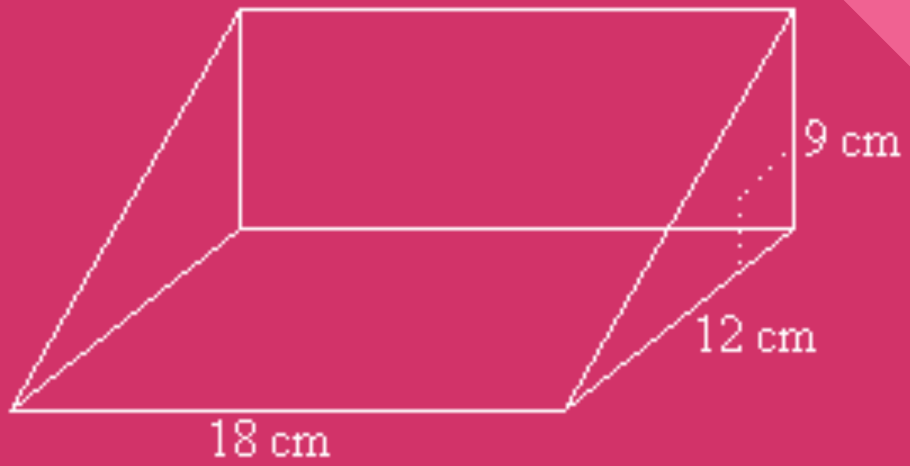
# Finding Surface Area - Triangular Prism

$SA = (2 \times A_b) + (P_b \times H)$

The base shape is a triangle, so use the triangle area/perimeter formula

$SA = (2 \times \frac{bxh}{2}) + (s_1+s_2+s_3 \times H)$

$SA = (2 \times \frac{12x9}{2}) + (9+12+s_3 \times H)$




$s_1{}^2 + s_2{}^2 = s_3{}^2$

$12^2 + 9^2 = s_3{}^2$

$144 + 81 = s_3{}^2$

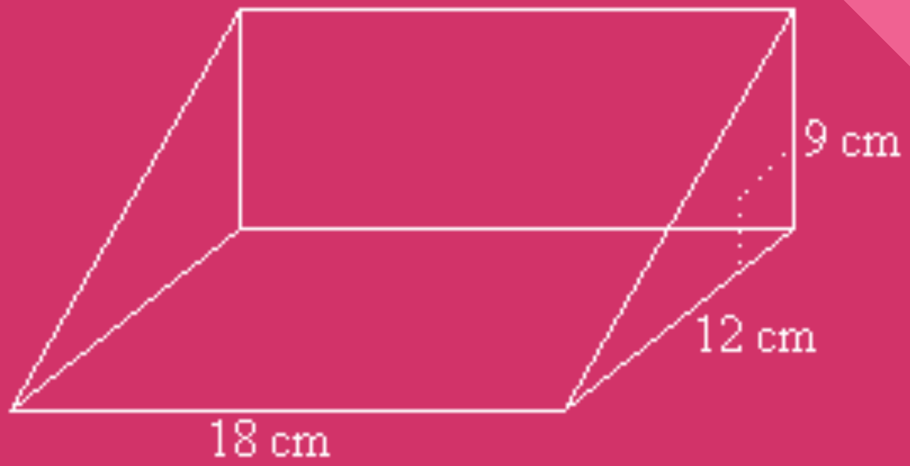
# Finding Surface Area - Triangular Prism

SA = ( 2 x $A_b$ ) + ( $P_b$ x H )

The base shape is a triangle, so use the triangle area/perimeter formula

SA = ( 2 x $\frac{bxh}{2}$ ) + ( $s_1+s_2+s_3$ x H )

SA = ( 2 x $\frac{12x9}{2}$ ) + ( $9+12+s_3$ x H )




$s_1^2 + s_2^2 = s_3^2$

$12^2 + 9^2 = s_3^2$

$144 + 81 = s_3^2$

$225 = s_3^2$

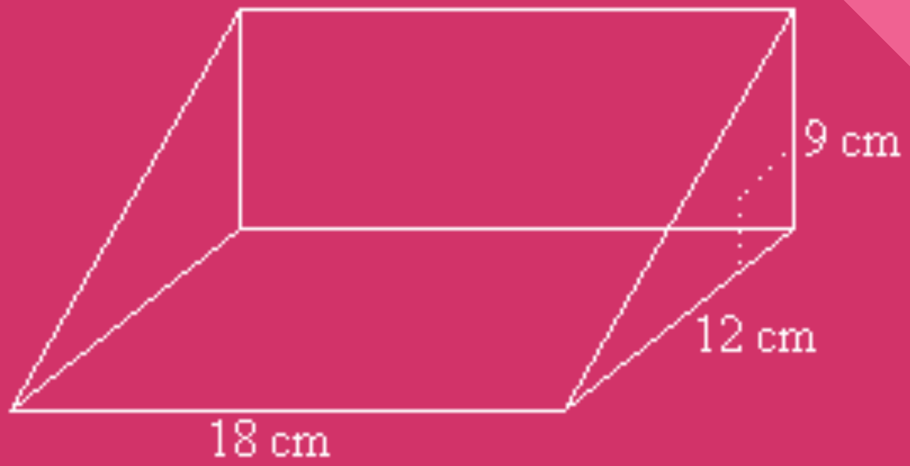
# Finding Surface Area - Triangular Prism

$SA = (2 \times A_b) + (P_b \times H)$

The base shape is a triangle, so use the triangle area/perimeter formula

$SA = \left(2 \times \frac{bxh}{2}\right) + (s_1+s_2+s_3 \times H)$

$SA = \left(2 \times \frac{12x9}{2}\right) + (9+12+s_3 \times H)$




$s_1^2 + s_2^2 = s_3^2$

$12^2 + 9^2 = s_3^2$

$144 + 81 = s_3^2$

$225 = s_3^2$

$\sqrt{225} = s_3^2$

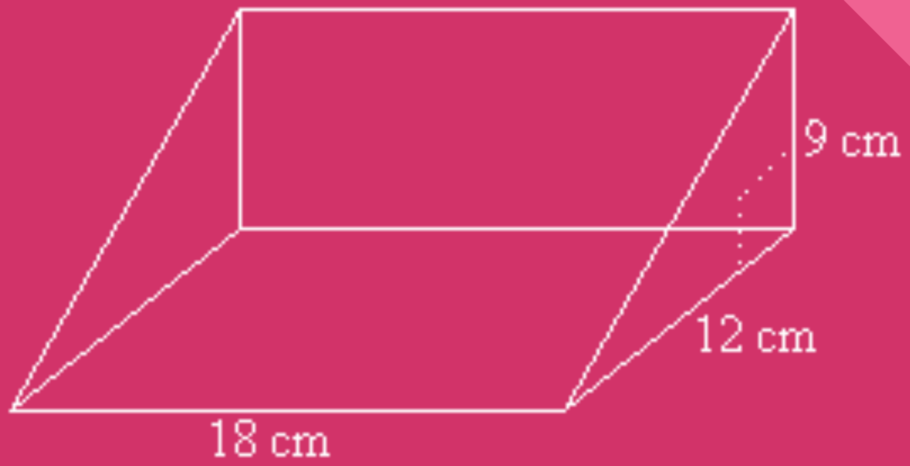
# Finding Surface Area - Triangular Prism

$SA = (2 \times A_b) + (P_b \times H)$

The base shape is a triangle, so use the triangle area/perimeter formula

$SA = (2 \times \frac{bxh}{2}) + (s_1+s_2+s_3 \times H)$

$SA = (2 \times \frac{12x9}{2}) + (9+12+s_3 \times H)$




$s_1{}^2 + s_2{}^2 = s_3{}^2$

$12^2 + 9^2 = s_3{}^2$

$144 + 81 = s_3{}^2$

$225 = s_3{}^2$

$\sqrt{225} = s_3{}^2$

$15 = s_3$

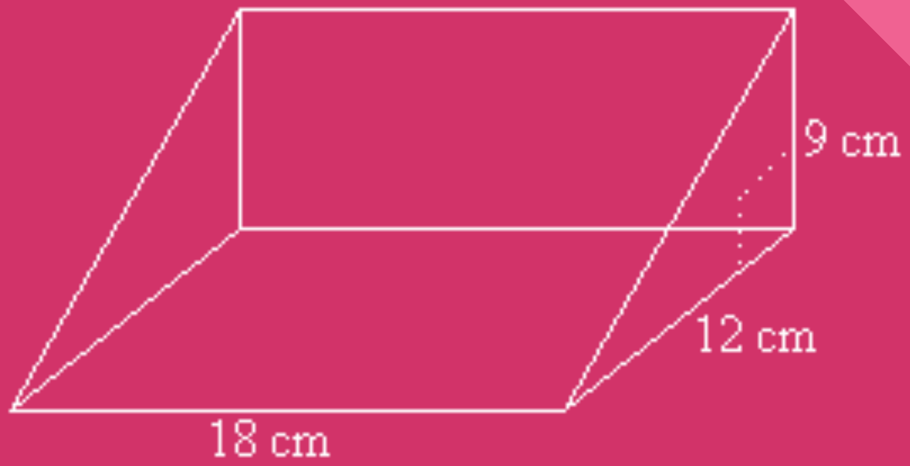
# Finding Surface Area - Triangular Prism

$SA = (2 \times A_b) + (P_b \times H)$

The base shape is a triangle, so use the triangle area/perimeter formula

$$SA = \left(2 \times \frac{bxh}{2}\right) + (s_1+s_2+s_3 \times H)$$

$$SA = \left(2 \times \frac{12x9}{2}\right) + (9+12+15 \times 18)$$




$s_1^2 + s_2^2 = s_3^2$

$12^2 + 9^2 = s_3^2$

$144 + 81 = s_3^2$

$225 = s_3^2$

$\sqrt{225} = s_3^2$

$15 = s_3$

# Finding Surface Area - Triangular Prism

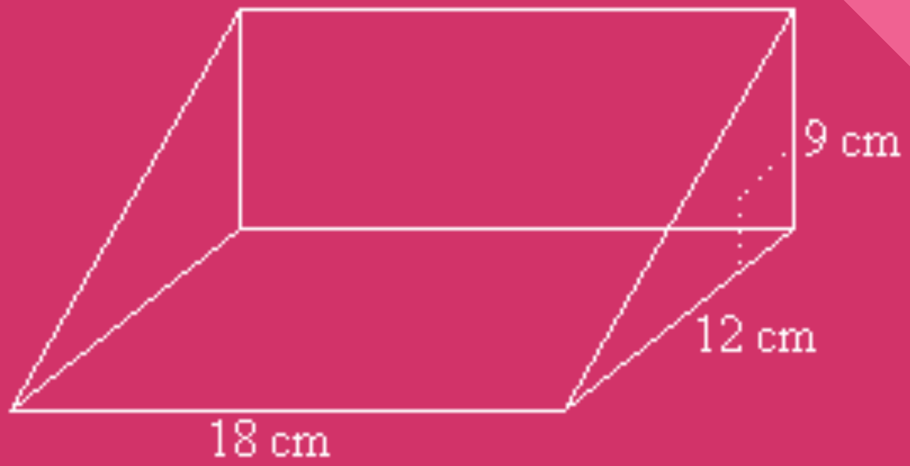
$SA = (2 \times A_b) + (P_b \times H)$

The base shape is a triangle, so use the triangle area/perimeter formula

$SA = \left(2 \times \frac{b \times h}{2}\right) + (s_1 + s_2 + s_3 \times H)$

$SA = \left(2 \times \frac{12 \times 9}{2}\right) + (9 + 12 + 15 \times 18)$

$SA = \left(2 \times \frac{108}{2}\right) + (36 \times 18)$




$s_1^2 + s_2^2 = s_3^2$

$12^2 + 9^2 = s_3^2$

$144 + 81 = s_3^2$

$225 = s_3^2$

$\sqrt{225} = s_3^2$

$15 = s_3$

# Finding Surface Area - Triangular Prism

$SA = (2 \times A_b) + (P_b \times H)$

The base shape is a triangle, so use the triangle area/perimeter formula

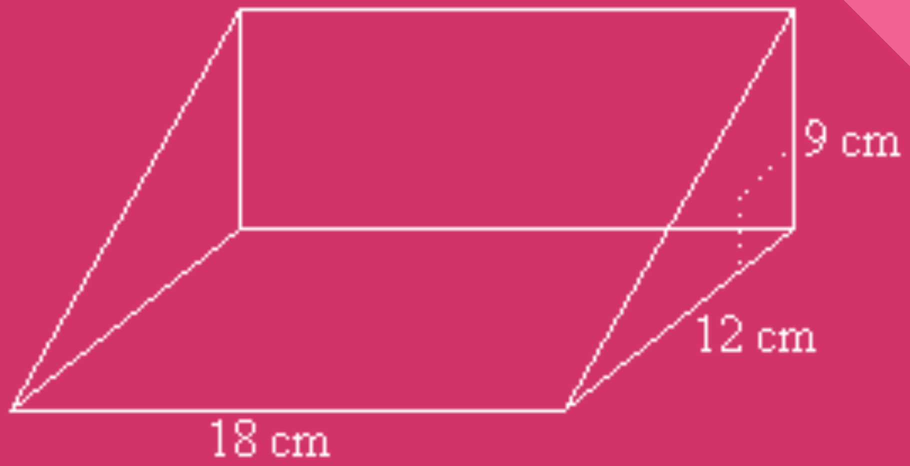
$SA = \left(2 \times \frac{b \times h}{2}\right) + (s_1+s_2+s_3 \times H)$

$SA = \left(2 \times \frac{12 \times 9}{2}\right) + (9+12+15 \times 18)$

$SA = \left(2 \times \frac{108}{2}\right) + (36 \times 18)$

$SA = 108 + 288$

$SA = 396\ cm^2$




$s_1^{\ 2} + s_2^{\ 2} = s_3^{\ 2}$

$12^2 + 9^2 = s_3^{\ 2}$

$144 + 81 = s_3^{\ 2}$

$225 = s_3^{\ 2}$

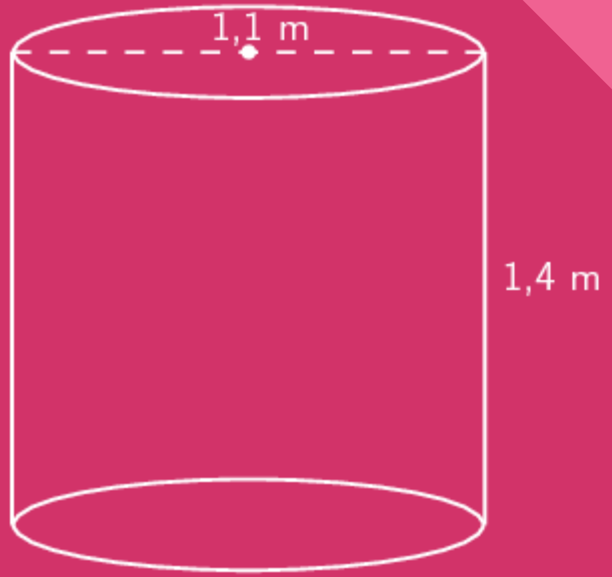
$\sqrt{225} = s_3^{\ 2}$

$15 = s_3$

# Finding Surface Area - Cylinder

# Finding Surface Area - Cylinder

$SA = (2 \times A_b) + (P_b \times H)$

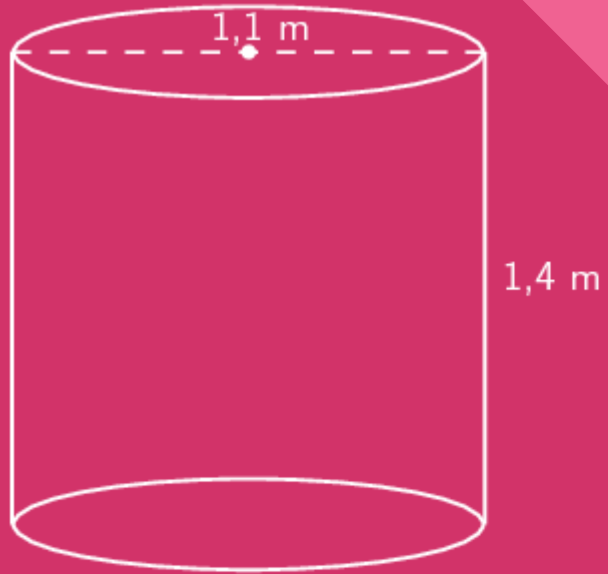


# Finding Surface Area - Cylinder

$SA = (2 \times A_b) + (P_b \times H)$

The base shape is a circle, so use the circle area/perimeter formula

$SA = (2 \times \pi \times r^2) + (\pi \times d \times H)$



# Finding Surface Area - Cylinder

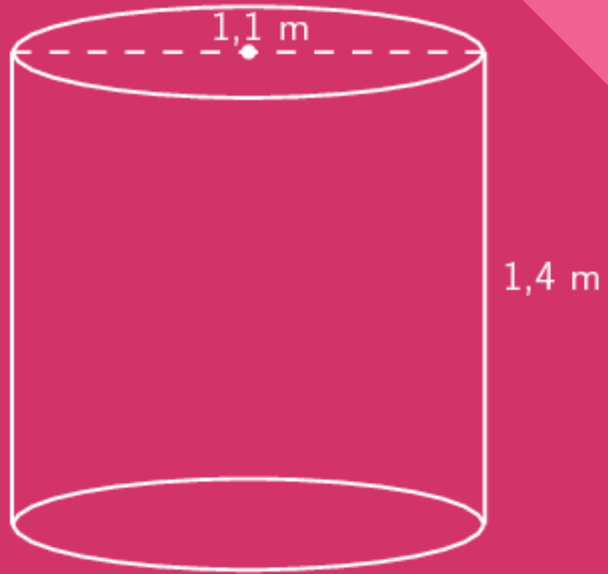
$SA = (2 \times A_b) + (P_b \times H)$

The base shape is a circle, so use

the circle area/perimeter formula

$SA = (2 \times \pi \times r^2) + (\pi \times d \times H)$

$SA = (2 \times 3.14 \times 0.55 \times 0.55) + (3.14 \times 1.1 \times 1.4)$



# Finding Surface Area - Cylinder

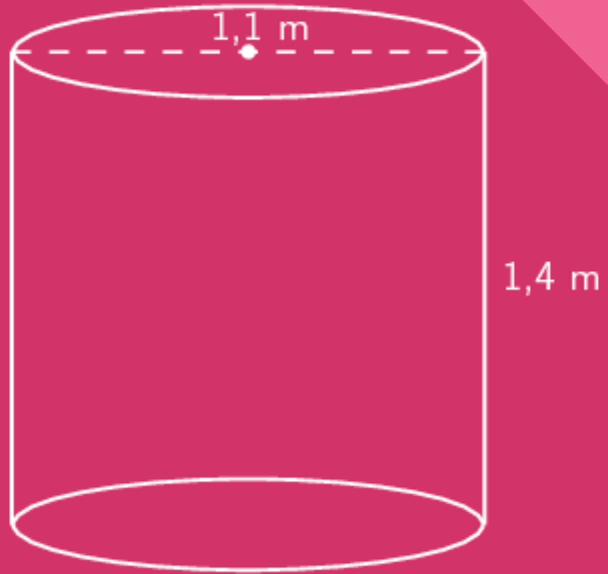
$SA = (2 \times A_b) + (P_b \times H)$

The base shape is a circle, so use the circle area/perimeter formula

$SA = (2 \times \pi \times r^2) + (\pi \times d \times H)$

$SA = (2 \times 3.14 \times 0.55 \times 0.55) + (3.14 \times 1.1 \times 1.4)$

$SA = 1.8997 + 4.8356$



# Finding Surface Area - Cylinder

SA = ( 2 x $A_b$ ) + ( $P_b$ x H )

The base shape is a circle, so use

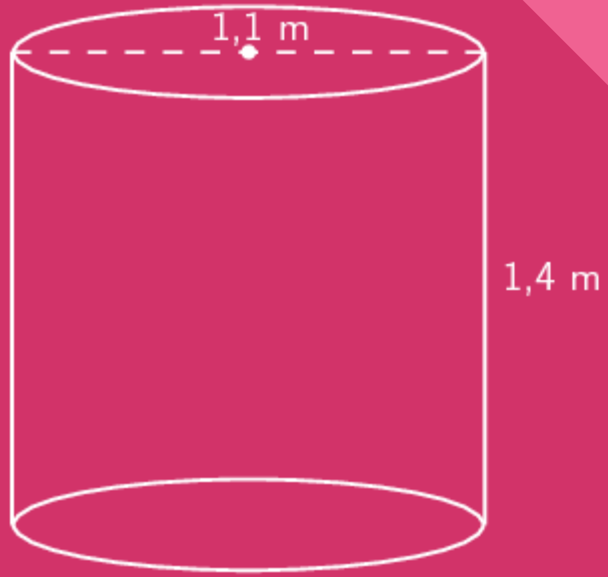
the circle area/perimeter formula

SA = ( 2 x π x $r^2$ ) + ( π x d x H )

SA = ( 2 x 3.14 x 0.55 x 0.55 ) + ( 3.14 x 1.1 x 1.4 )

SA = 1.8997 + 4.8356

SA = 6. 74 $m^2$



# Chapter 7

## Volume

# What is volume?

# What is volume?

Volume is the amount that a shape can hold inside of itself.

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Volume is the amount that a shape can hold inside of itself.

Volume is measured in $units^3$.

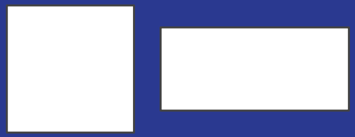
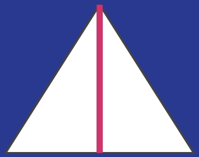
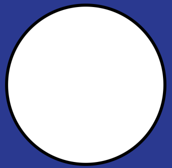
# What is volume?

Volume is the amount that a shape can hold inside of itself.

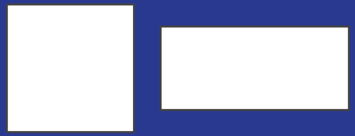
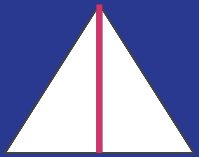
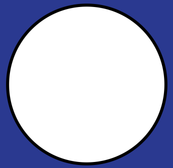
Volume is measured in $units^3$.

The formula for volume is → $V = A_b \times H$

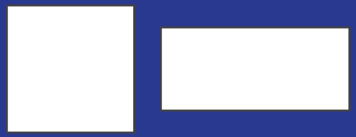
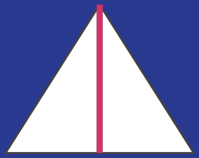
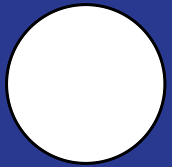
# Area Formulas

| Area Formulas | Shape |
|---|---|
| |  |
| |  |
| |  |

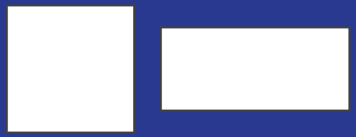
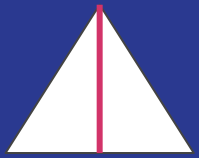
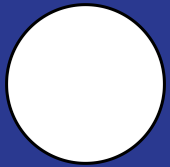
# Area Formulas

| Area Formulas | Shape |
|---|---|
| $l$ x $w$ |  |
| |  |
| |  |

# Area Formulas

| Area Formulas | Shape |
|---|---|
| $l \times w$ |  |
| $\frac{b \times h}{2}$ |  |
| |  |

# Area Formulas

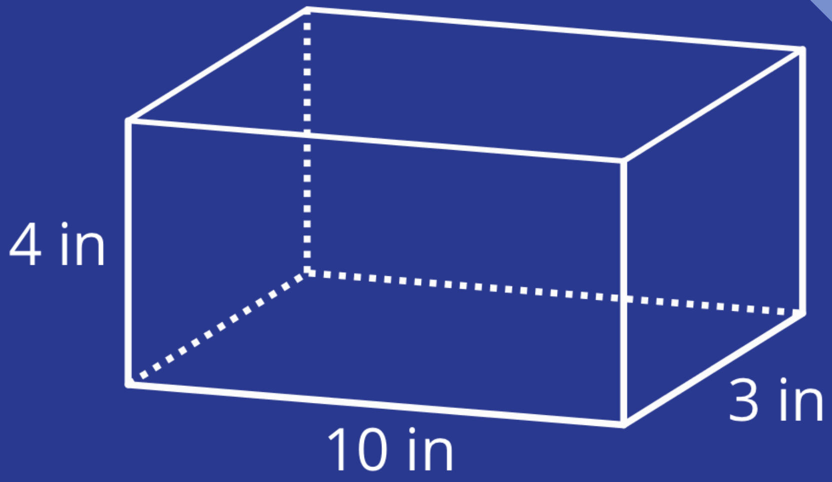
| Area Formulas | Shape |
|---|---|
| $l \times w$ |  |
| $\frac{b \times h}{2}$ |  |
| $\pi \times r^2$ |  |

# Finding Volume - Rectangular Prism

# Finding Volume - Rectangular Prism

# Finding Volume - Rectangular Prism

$V = A_b \times H$



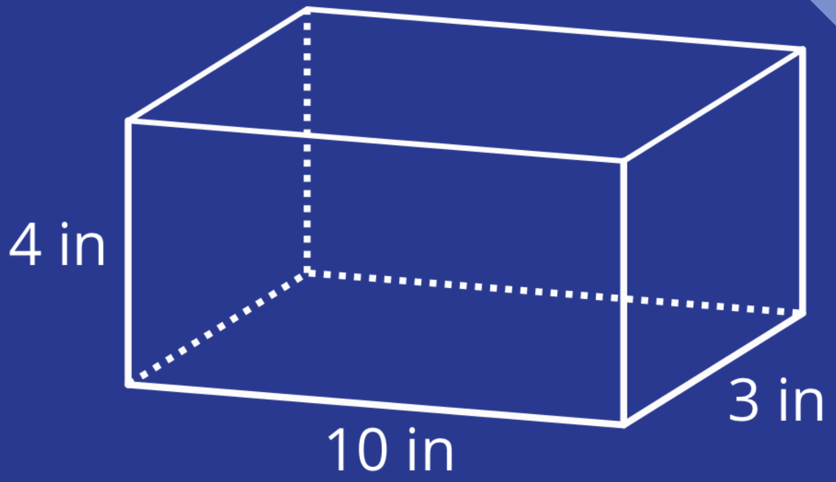
# Finding Volume - Rectangular Prism

$V = A_b \times H$

The base shape is a rectangle,

so use the rectangle formula.

$V = l \times w \times H$



# Finding Volume - Rectangular Prism

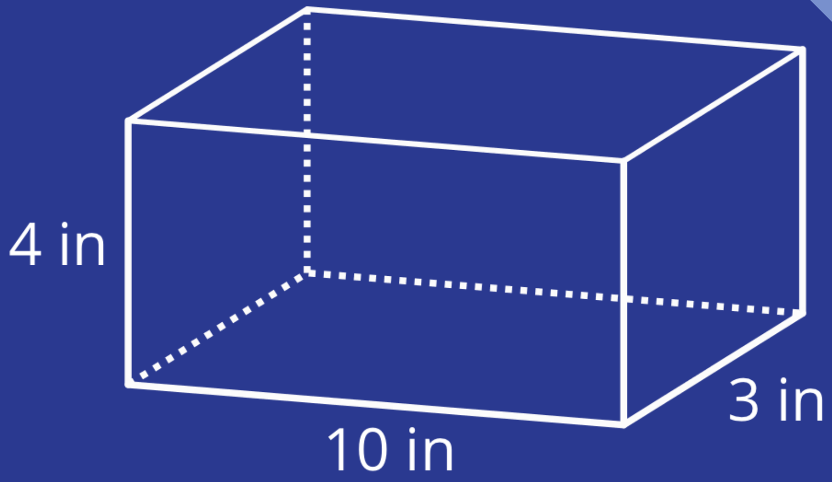
$V = A_b \times H$

The base shape is a rectangle,

so use the rectangle formula.

$V = l \times w \times H$

$V = 10 \times 3 \times 4$



# Finding Volume - Rectangular Prism

$V = A_b \times H$

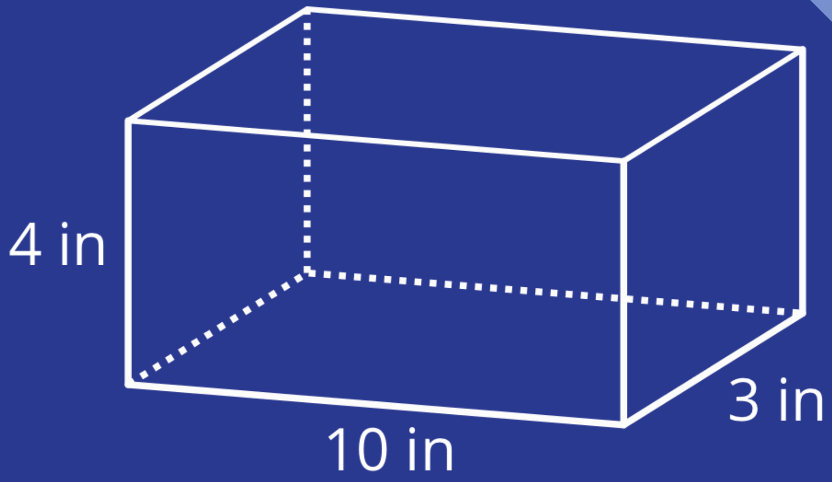
The base shape is a rectangle,

so use the rectangle formula.

$V = l \times w \times H$

$V = 10 \times 3 \times 4$

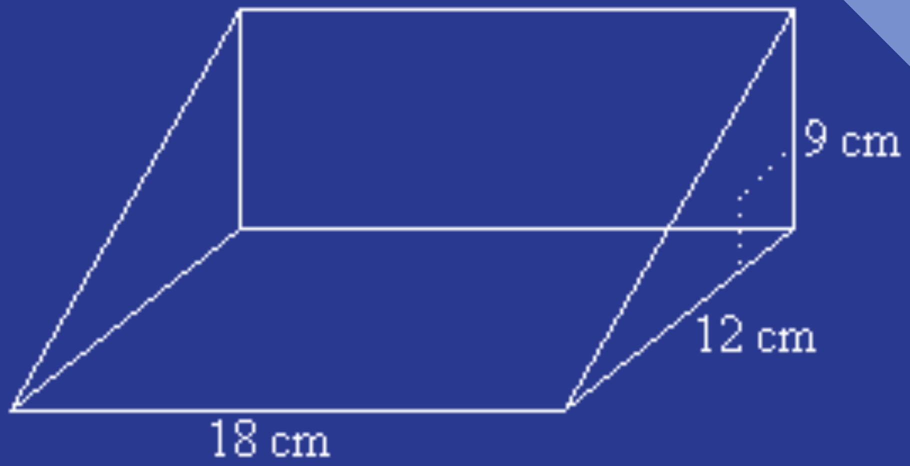
$V = 120 \text{ in}^3$



# Finding Volume - Triangular Prism

# Finding Volume - Triangular Prism

$V = A_b \times H$



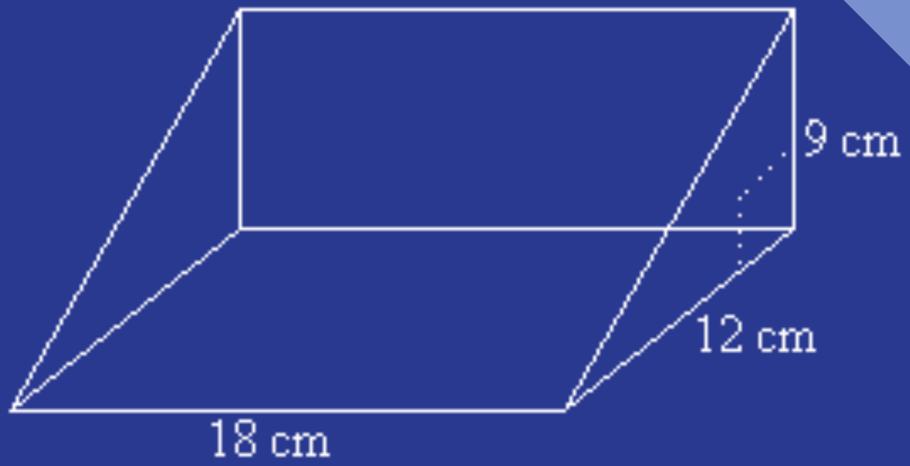
# Finding Volume - Triangular Prism

$V = A_b \times H$

The base shape is a triangle,

so use the triangle formula.

$V = \frac{b \times h}{2} \times H$



# Finding Volume - Triangular Prism

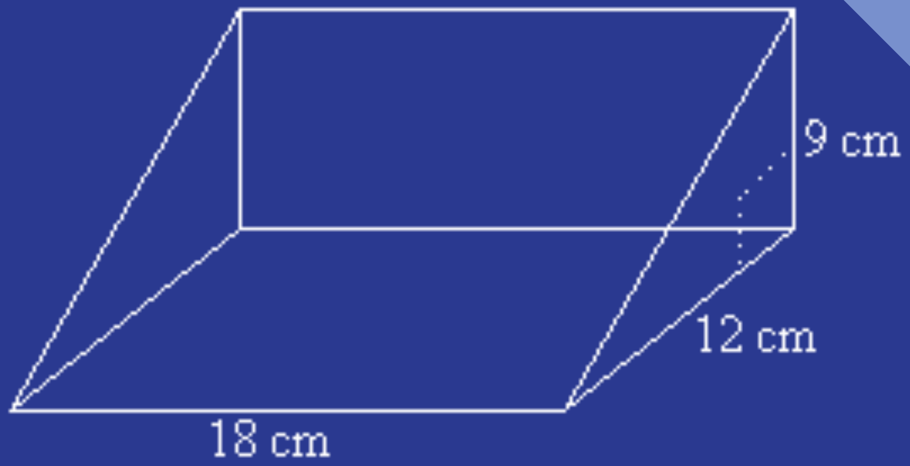
$V = A_b \times H$

The base shape is a triangle,

so use the triangle formula.

$$V = \frac{b \times h}{2} \times H$$

$$V = \frac{12 \times 9}{2} \times 18$$



# Finding Volume - Triangular Prism

$V = A_b \times H$

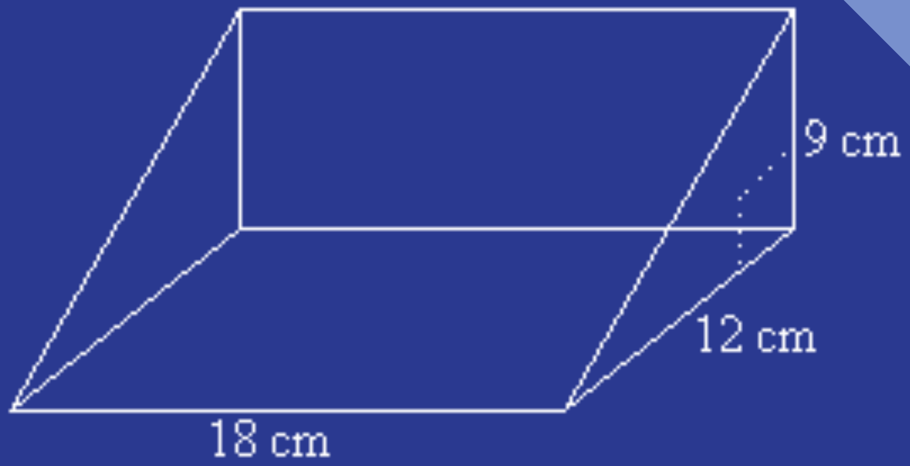
The base shape is a triangle,

so use the triangle formula.

$V = \frac{b \times h}{2} \times H$

$V = \frac{12 \times 9}{2} \times 18$

$V = \frac{108}{2} \times 18$



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$V = A_b \times H$

The base shape is a triangle,

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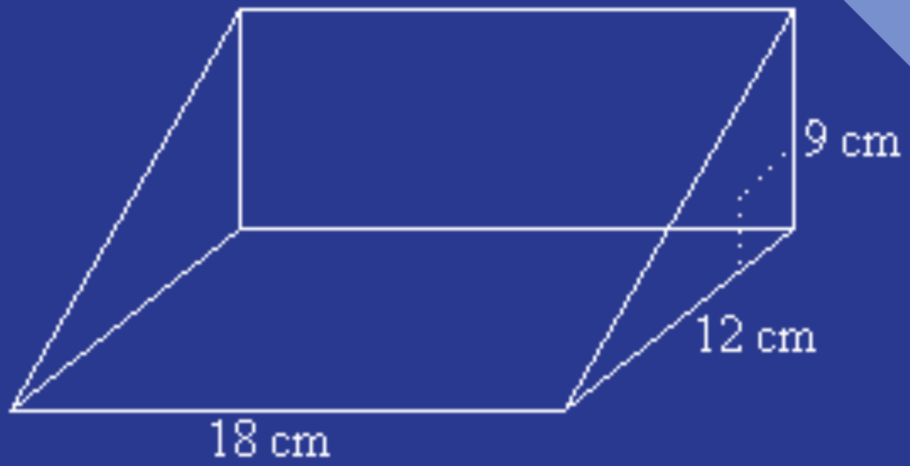
$V = \frac{b \times h}{2} \times H$

$V = \frac{12 \times 9}{2} \times 18$

$V = \frac{108}{2} \times 18$

$V = 54 \times 18$



# Finding Volume - Triangular Prism

$V = A_b \times H$

The base shape is a triangle,

so use the triangle formula.

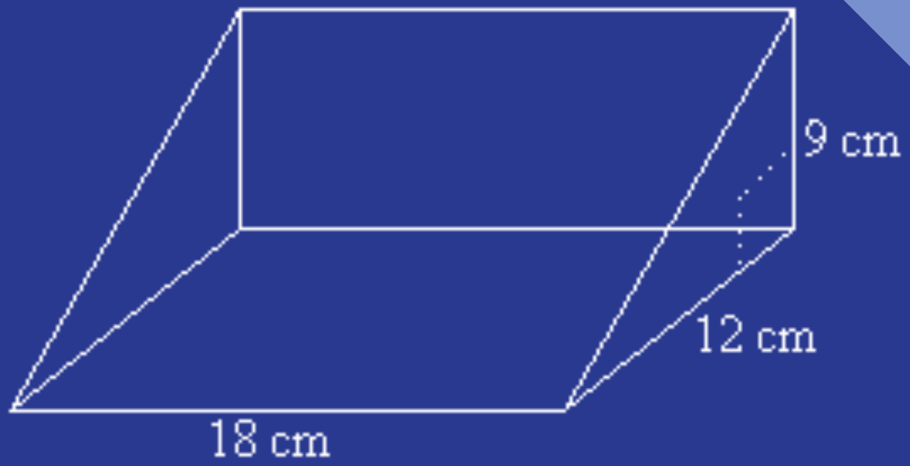
$V = \frac{b \times h}{2} \times H$

$V = \frac{12 \times 9}{2} \times 18$

$V = \frac{108}{2} \times 18$

$V = 54 \times 18$

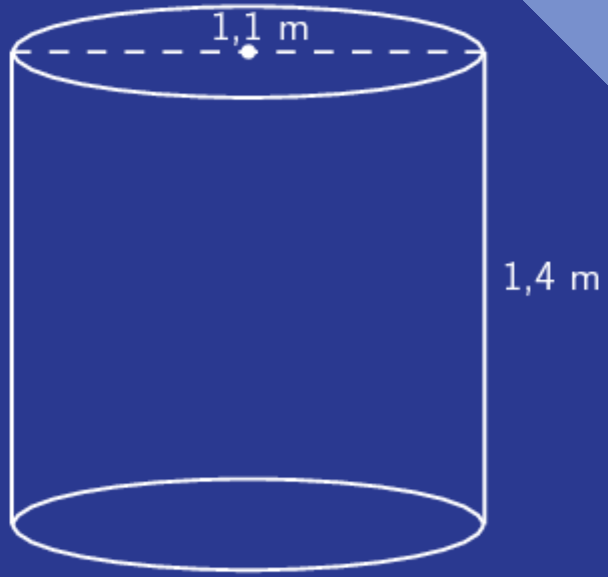
$V = 972\ cm^3$



# Finding Volume - Cylinder

# Finding Volume - Cylinder

$V = A_b \times H$



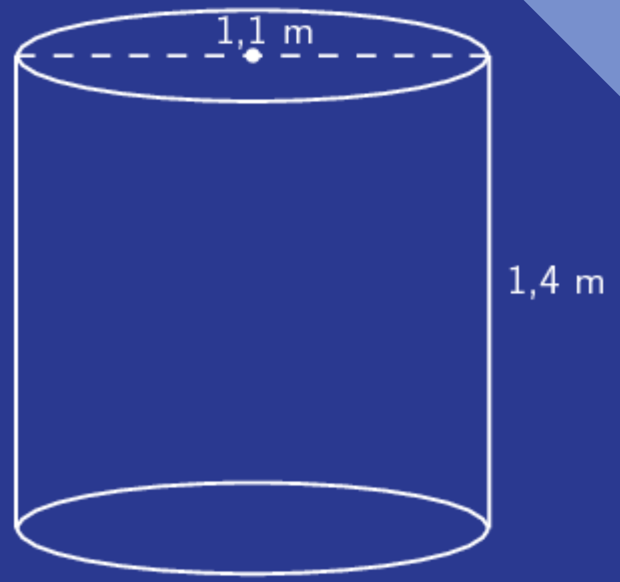
# Finding Volume - Cylinder

$V = A_b \times H$

The base shape is a circle,

so use the circle formula.

$V = \pi \times r^2 \times H$



# Finding Volume - Cylinder

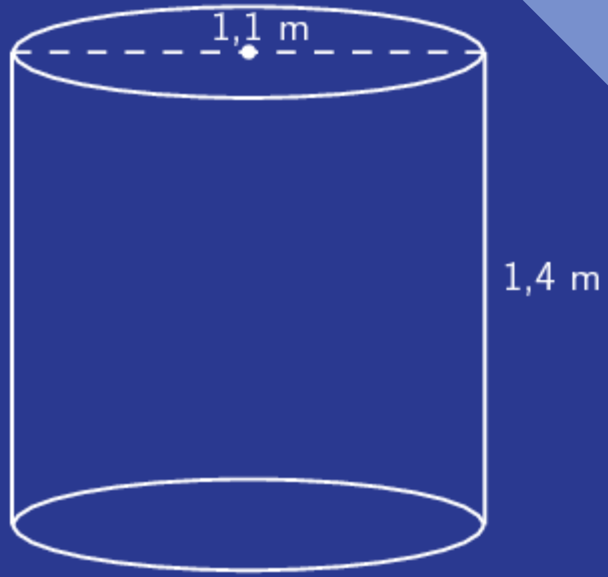
$V = A_b \times H$

The base shape is a circle,

so use the circle formula.

$V = \pi \times r^2 \times H$

$V = 3.14 \times 0.55 \times 0.55 \times 1.4$



# Finding Volume - Cylinder

$V = A_b \times H$

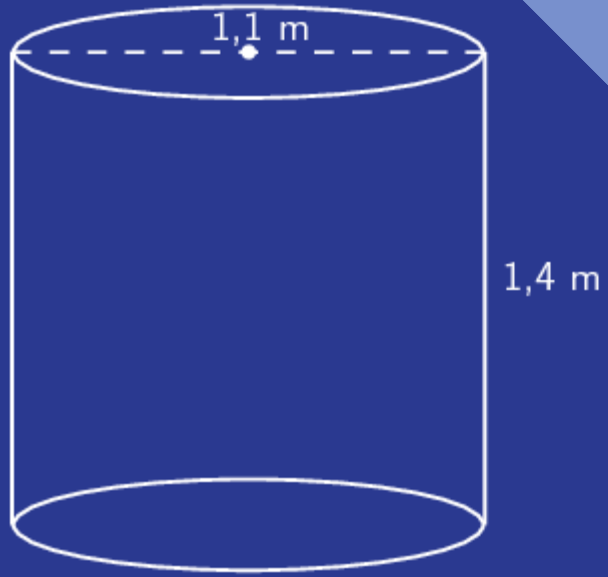
The base shape is a circle,

so use the circle formula.

$V = \pi \times r^2 \times H$

$V = 3.14 \times 0.55 \times 0.55 \times 1.4$

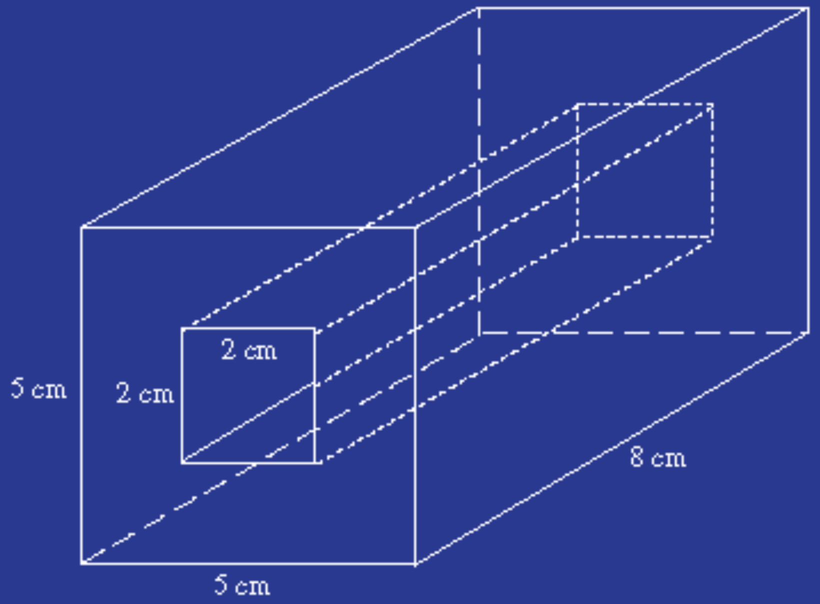
$V = 1.33\ m^3$



# Finding Volume - Combined Shapes

# Finding Volume - Combined Shapes

$V_{big} = A_b \times H$ - $V_{small} = A_b \times H$

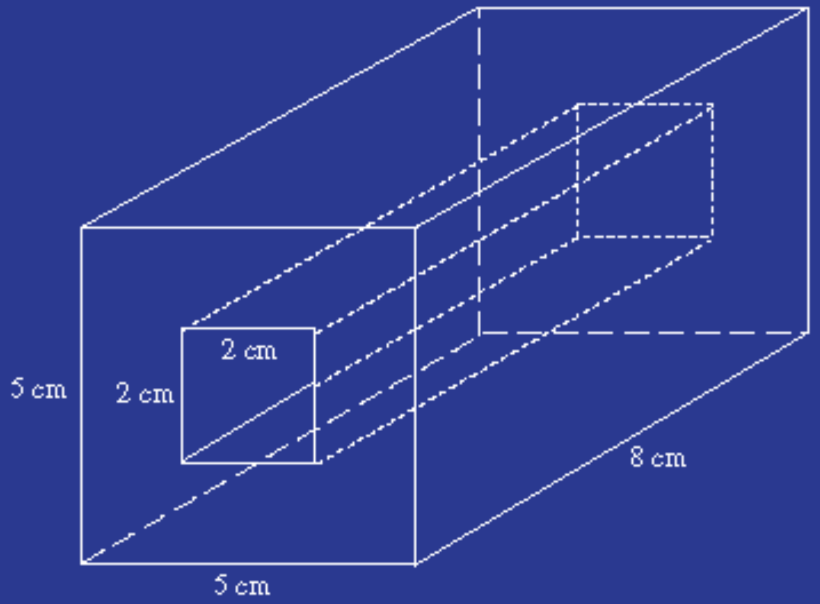


# Finding Volume - Combined Shapes

$V_{big} = A_b \times H$ - $V_{small} = A_b \times H$

Both base shapes are rectangles, so use the rectangle formula.

$l \times w \times H$ - $l \times w \times H$



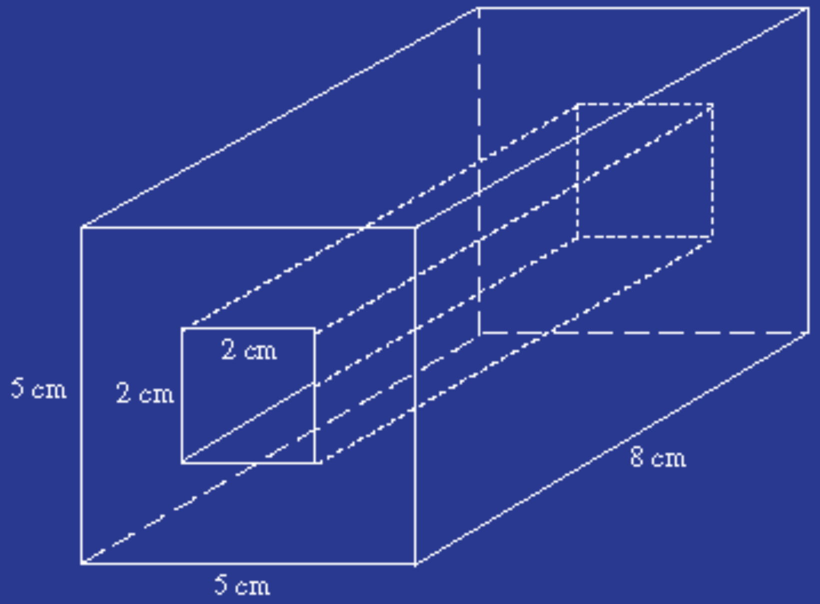
# Finding Volume - Combined Shapes

$V_{big} = A_b \times H$ - $V_{small} = A_b \times H$

Both base shapes are rectangles, so use the rectangle formula.

$l \times w \times H$ - $l \times w \times H$

$5 \times 5 \times 8$ - $2 \times 2 \times 8$



# Finding Volume - Combined Shapes

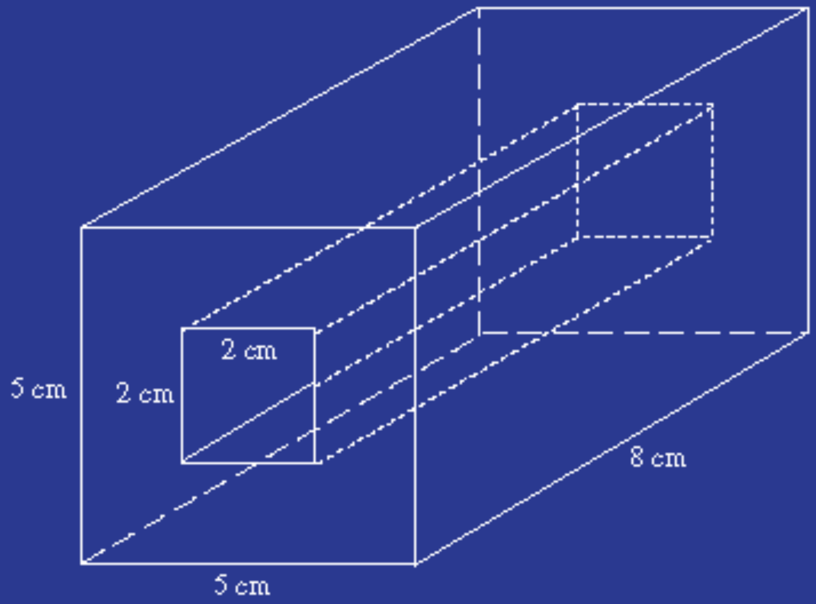
$V_{big} = A_b \times H$ - $V_{small} = A_b \times H$

Both base shapes are rectangles, so use the rectangle formula.

l x w x H - l x w x H

5 x 5 x 8 - 2 x 2 x 8

80 - 32



# Finding Volume - Combined Shapes

$V_{big} = A_b \times H$ - $V_{small} = A_b \times H$

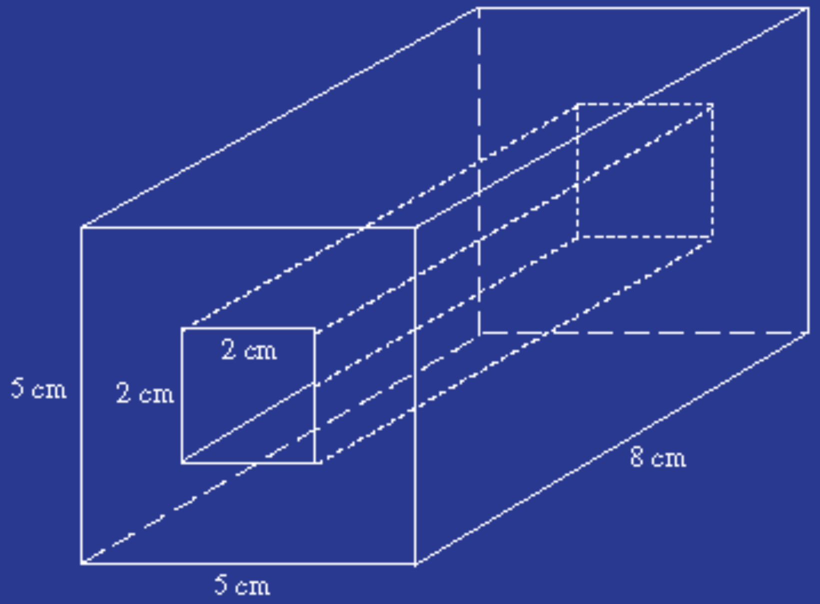
Both base shapes are rectangles, so use the rectangle formula.

l x w x H - l x w x H

5 x 5 x 8 - 2 x 2 x 8

80 - 32

= 48 $cm^3$



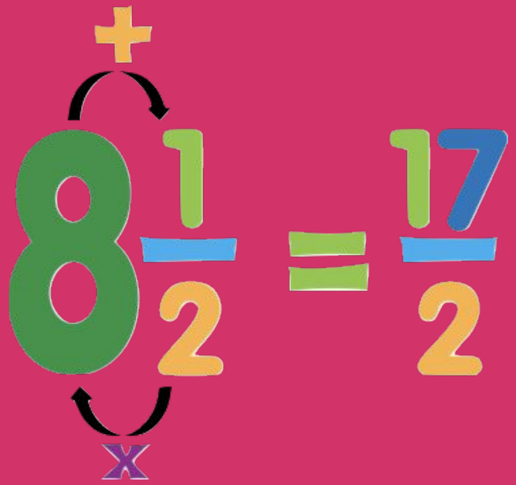
# Chapter 6

## Fraction Operation

# Mixed Numbers to Improper Fractions

# Mixed Numbers to Improper Fractions

1. Multiply the denominator (bottom number) by the whole number.
2. Add the product from step 1 to the numerator.  This becomes the new numerator.
3. Denominator remains the same.

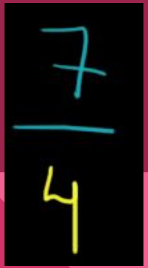


# Converting Fractions

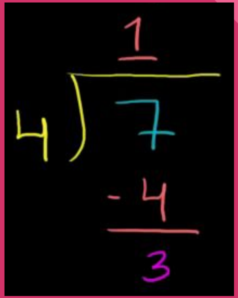
$1\frac{3}{4}$ $6\frac{6}{7}$ $2\frac{1}{3}$ $2\frac{1}{5}$

# Improper Fractions to Mixed Numbers

# Converting Fractions




## Improper Fractions to Mixed Numbers




1. Divide the numerator (top number) by the denominator (bottom number).
    - The whole number quotient is the new whole number in the Mixed Fraction
1. **Multiply** the whole number from step 1 to the denominator and subtract it from the numerator.
    - The remainder becomes the new numerator.
1. Denominator remains the same.

# Converting Fractions

## Improper Fractions to Mixed Numbers

$\frac{9}{5}$ $\frac{29}{7}$ $\frac{14}{5}$ $\frac{77}{10}$

# Whole Numbers into Fractions

# Whole Numbers into Fractions

You can turn a whole number into a fraction by putting it over the number one.

This doesn't change the number, because anything divided by 1 is itself.

# Adding and Subtracting Fractions

# Adding and Subtracting Fractions

1. Convert all fractions to improper/proper fractions
2. Find the Lowest Common Multiple (LCM) to determine the new denominator
3. Convert all the fractions into equivalent fractions with the LCM as the new denominator
   - Multiply both the numerator and denominator by the same value
4. Add or Subtract the numerators using the Integer Operation Rules. Keep the denominator the same.
5. Simplify by dividing the numerator and denominator by the same value.

# Adding and Subtracting Fractions

# Multiplying Fractions

# Multiplying Fractions

1. Convert all fractions to improper/proper fractions
2. Multiply the numerators by each other using Integer Operation Rules.
3. Multiply the denominator by each other using Integer Operation Rules..
4. Simplify by dividing the numerator and denominator by the same value.

# Dividing Fractions

# Dividing Fractions

1. Convert all fractions to improper/proper fractions
2. Apply KiSS Method
   - Keep first fraction
   - Switch sign from division to multiplication
   - Switch your second fraction by flipping it.
1. Multiply the numerators by each other using Integer Operation Rules.
2. Multiply the denominator by each other using Integer Operation Rules.
3. Simplify by dividing the numerator and denominator by the same value.

# Fraction Operation Practice

$$\left(\frac{1}{3}-\frac{1}{6}\right)\div\frac{11}{18}$$

$$\frac{1}{10}+\frac{6}{10}\times\frac{3}{1}$$

$$\frac{2}{3}+\frac{3}{4}(10\times3+10)$$

# Chapter 8

Integers

# Adding Integers

# Adding Integers

Same Signs:  Add the values of the numbers together and use the same sign as the values.

# Adding Integers

Same Signs:  Add the values of the numbers together and use the same sign as the values.

Different Signs: Subtract the smaller value from the larger value. Use the sign of the number with the largest value.

# Adding Integers → Practice

- 2 + - 5 3 + - 8 - 23 + - 4 52 + - 15

# Subtracting Integers

# Subtracting Integers

KiSS → Keep it, Switch it, Switch it.
→ Keep the sign of the first value
→ Switch the subtraction to an addition sign
→ Switch the sign of the second value
→ Continue as an addition problem

Same Signs: Add the values of the numbers together and use the same sign as the values.

Different Signs: Subtract the smaller value from the larger value. Use the sign of the number with the largest value.

# Subtracting Integers

2 - (- 7)

- 9 - 3

- 12 - (- 15)

44 - 36

# Multiplying and Dividing Integers

# Multiplying and Dividing Integers

Same Signs: Multiply or Divide as normal. The result is a positive.

Different Signs: Multiply or Divide as normal. The result is a negative.

# Multiplying and Dividing Integers → Practice

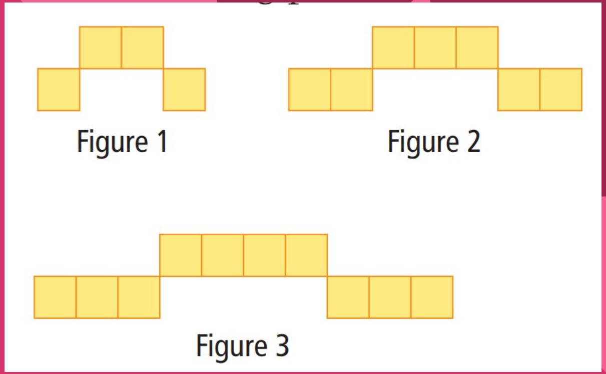
| | | | |
|---|---|---|---|
| -2 x 5 | -12 x -4 | 8 x 7 | 9 x -6 |
| -12 ÷ 4 | -144 ÷ -12 | 48 ÷ 8 | 32 ÷ -4 |

# Chapter 9

## *Linear Relations*

# Table of Values

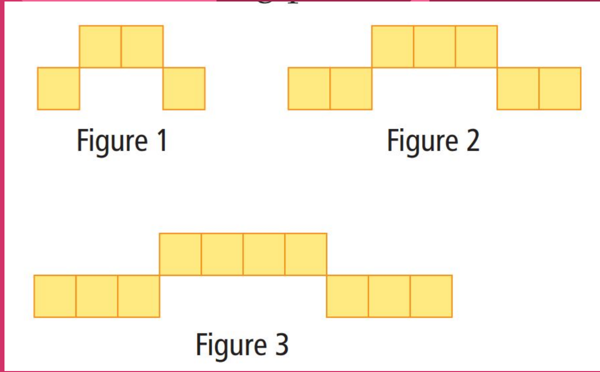
How do you set up a Table of Values?




| | |
|---|---|
| | |
| | |
| | |
| | |
| | |

# Table of Values

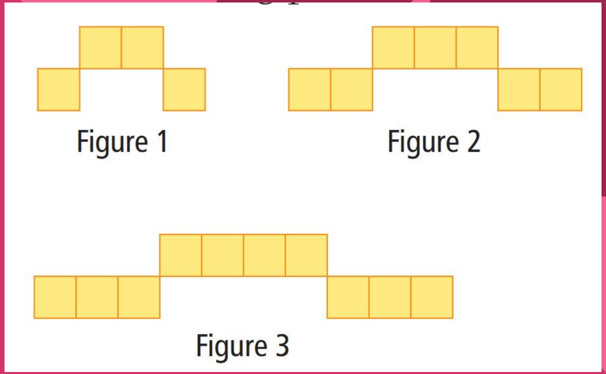
How do you set up a Table of Values?




| Figure Number (f) | Number of Blocks (b) |
|---|---|
| 1 | |
| 2 | |
| 3 | |

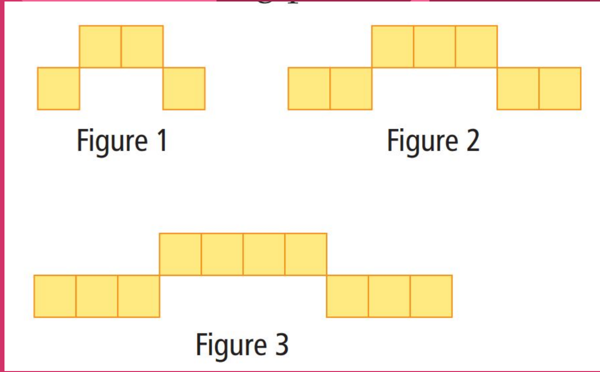
# Table of Values

How do you set up a Table of Values?




| Figure Number (f) | Number of Blocks (b) |
|---|---|
| 1 | 4 |
| 2 | 7 |
| 3 | 10 |

# Table of Values

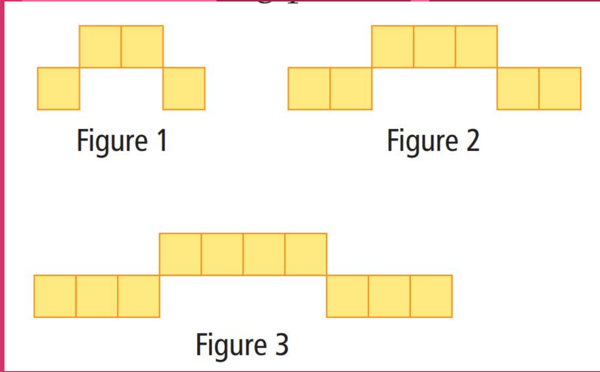



How do you set up a Table of Values?

How do you create an equation from a Table of Values?

| Figure Number (f) | Number of Blocks (b) |
|---|---|
| 1 | 4 |
| 2 | 7 |
| 3 | 10 |

# Table of Values




How do you set up a Table of Values?

How do you create an equation from a Table of Values?

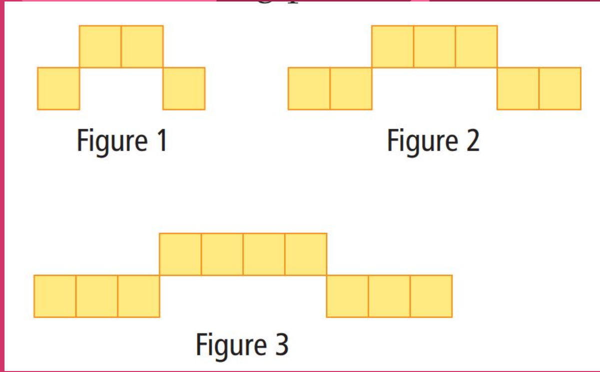
1. Look at the gaps (how much do the blocks increase each time).
2. This is the coefficient of the variable. Also called the slope.

| Figure Number (f) | Number of Blocks (b) |
|---|---|
| 1 | 4 |
| 2 | 7 |
| 3 | 10 |

Gap = 3

# Table of Values

How do you set up a Table of Values?




How do you create an equation from a Table of Values?

| Figure Number (f) | Number of Blocks (b) |
|---|---|
| 1 | 4 |
| 2 | 7 |
| 3 | 10 |

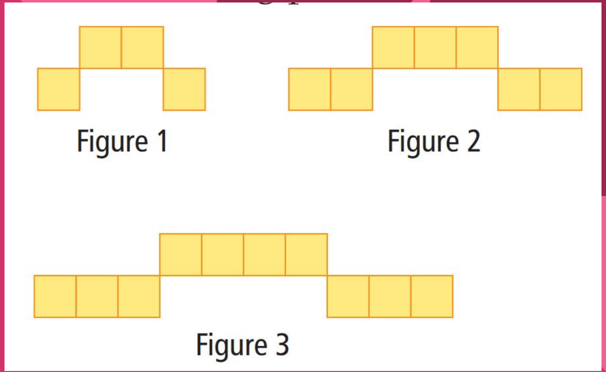
1. Look at the gaps (how much do the blocks increase each time).
2. This is the coefficient of the variable. Also called the slope.
3. See how you need to alter the product to receive the desired value.
   Gap • figure number +/- what gives the number of blocks?

Gap = 3

3 • figure number + 1

# Table of Values

How do you set up a Table of Values?




How do you create an equation from a Table of Values?

| Figure Number (f) | Number of Blocks (b) |
|---|---|
| 1 | 4 |
| 2 | 7 |
| 3 | 10 |

1. Look at the gaps (how much do the blocks increase each time).
2. This is the coefficient of the variable. Also called the slope.
3. See how you need to alter the product to receive the desired value.
   Gap • figure number +/- what gives the number of blocks?

Gap = 3

3 • figure number + 1

$b = 3f + 1$

# Table of Values

How to determine if a Table of Values shows a Linear relation.

# Table of Values

How to determine if a Table of Values shows a Linear relation.

| Figure Number (f) | Number of Blocks (b) |
|---|---|
| 1 | 4 |
| 2 | 7 |
| 3 | 10 |

# Table of Values

How to determine if a Table of Values shows a Linear relation.

| Figure Number (f) | Number of Blocks (b) |
|---|---|
| 1 | 4 |
| 2 | 7 |
| 3 | 10 |

1. Look at the gaps between each column (how much do the blocks increase each time).

# Table of Values

How to determine if a Table of Values shows a Linear relation.

| Figure Number (f) | Number of Blocks (b) |
|---|---|
| 1 | 4 |
| 2 | 7 |
| 3 | 10 |

Gap between each figure numbers = +1

Gap between each number of blocks = +3

1. Look at the gaps between each column (how much do the blocks increase each time).

# Table of Values

How to determine if a Table of Values shows a Linear relation.

| Figure Number (f) | Number of Blocks (b) |
|---|---|
| 1 | 4 |
| 2 | 7 |
| 3 | 10 |

Gap between each figure numbers = +1

Gap between each number of blocks = +3

1. Look at the gaps between each column (how much do the blocks increase each time).
2. If EACH gap between values is consistent, then the pattern is linear.

# Table of Values

Creating a Table of Values from an Equation

# Table of Values

## Creating a Table of Values from an Equation

$5x + 4 =$

| x | y |
| --- | --- |
| | |
| | |
| | |
| | |

# Table of Values

## Creating a Table of Values from an Equation

$5x + 4 =$

| x | y |
|---|---|
| | |
| | |
| | |
| | |

Substitute the values for x into the equation and solve for y.

# Table of Values

## Creating a Table of Values from an Equation

$5x + 4 =$

| x | y |
|---|---|
| 0 | 4 |
| 1 | 9 |
| 2 | 14 |
| 3 | 19 |

Substitute the values for x into the equation and solve for y.

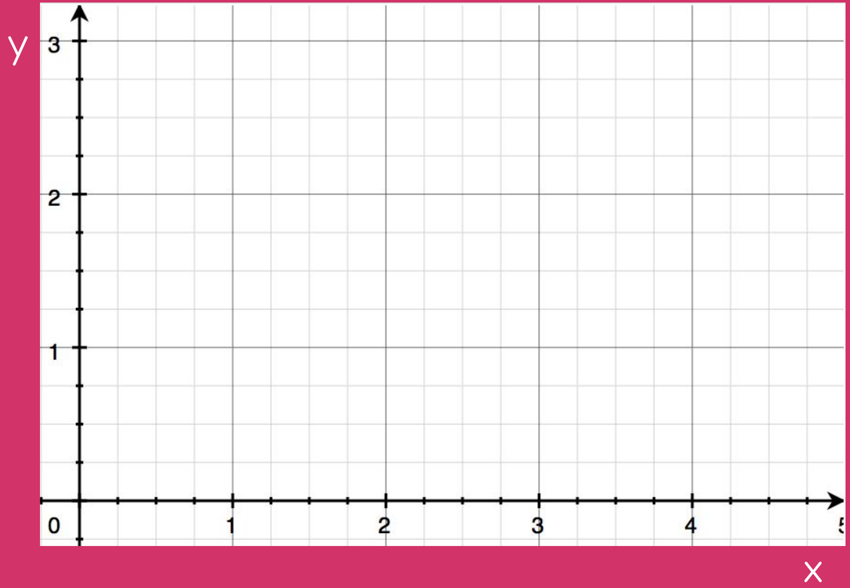
$x = 0 \Rightarrow 5(0) + 4 \Rightarrow 4$
$x = 1 \Rightarrow 5(1) + 4 \Rightarrow 9$
$x = 2 \Rightarrow 5(2) + 4 \Rightarrow 14$
$x = 3 \Rightarrow 5(3) + 4 \Rightarrow 19$

# Graphing Linear Relations

What do you label the axis?

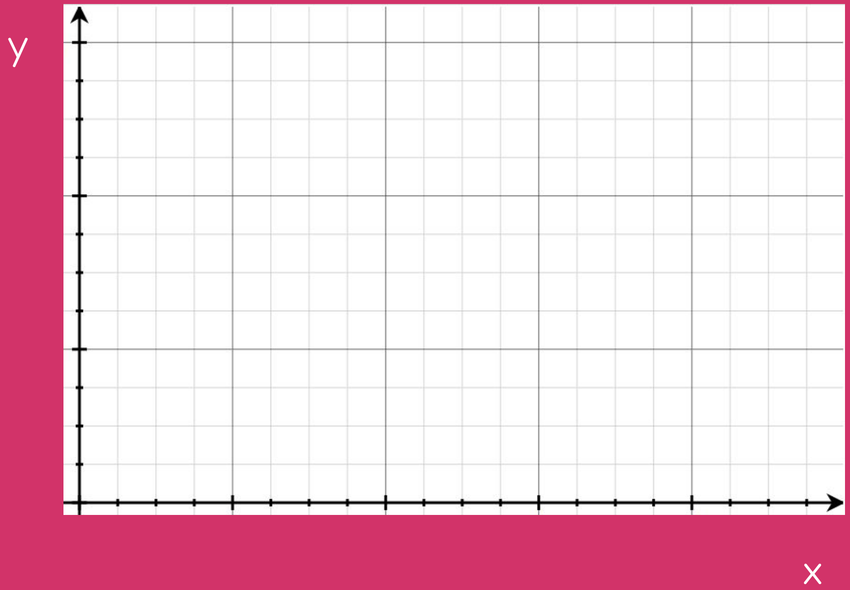
# Graphing Linear Relations

What do you label the axis?



# Graphing Linear Relations

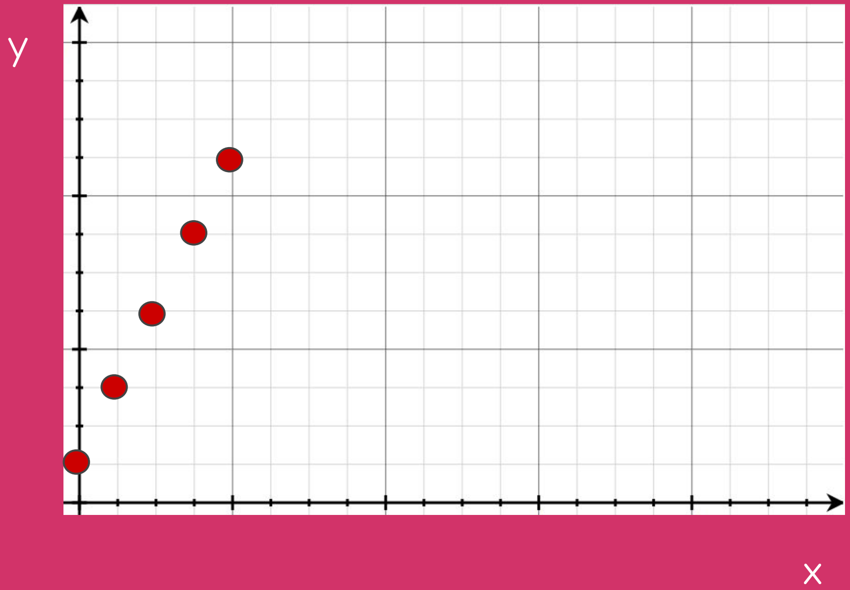
## Graphing from a Table of Values




| x | y |
|---|---|
| 0 | 1 |
| 1 | 3 |
| 2 | 5 |
| 3 | 7 |
| 4 | 9 |

# Graphing Linear Relations

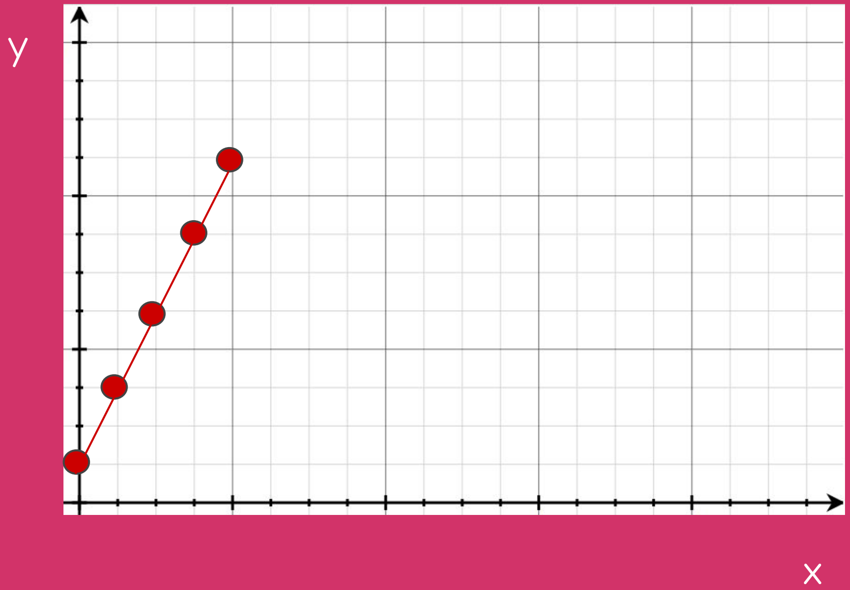
## Graphing from a Table of Values




| x | y |
|---|---|
| 0 | 1 |
| 1 | 3 |
| 2 | 5 |
| 3 | 7 |
| 4 | 9 |

# Graphing Linear Relations

## Graphing from a Table of Values




| x | y |
|---|---|
| 0 | 1 |
| 1 | 3 |
| 2 | 5 |
| 3 | 7 |
| 4 | 9 |

# Graphing Linear Relations

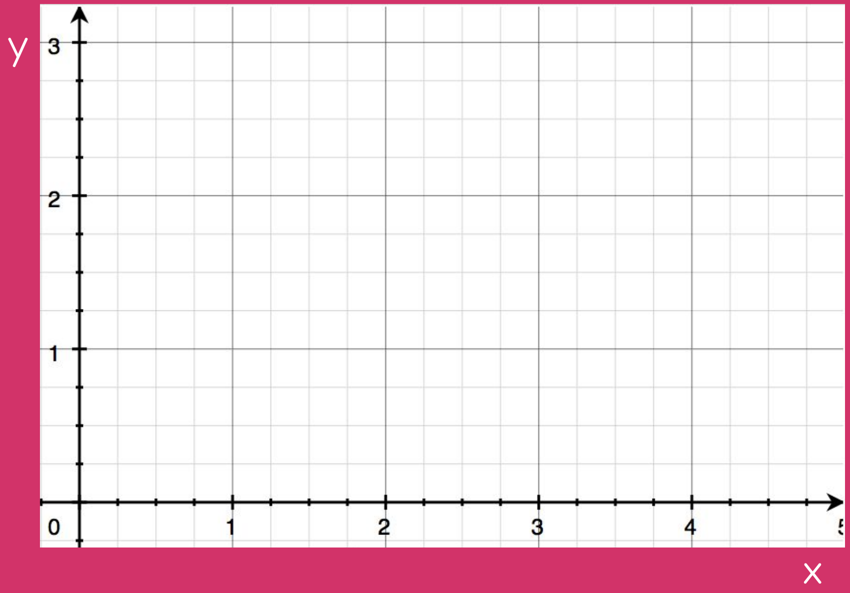
Graphing from an Equation

# Graphing Linear Relations

## Graphing from an Equation

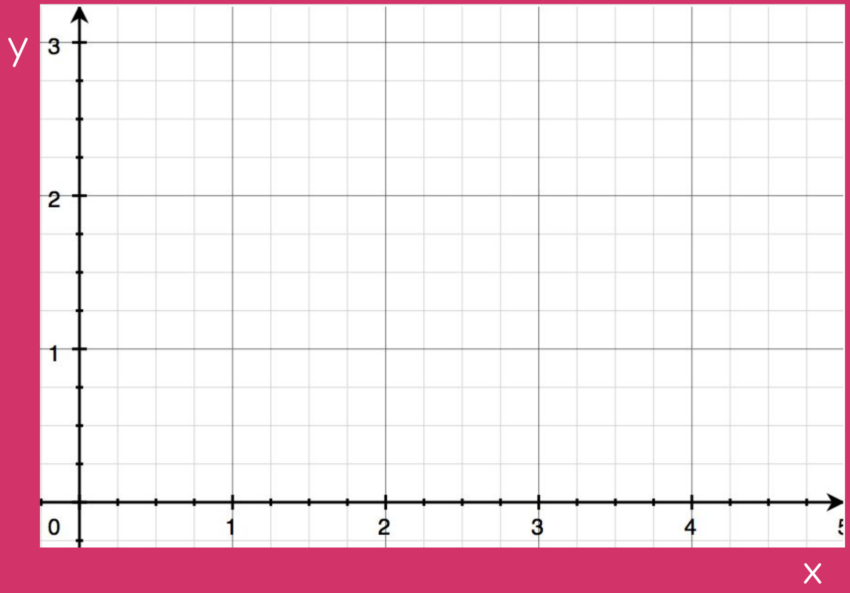
What does this equation mean?

b = 3f - 1



# Graphing Linear Relations

## Graphing from an Equation




What does this equation mean?

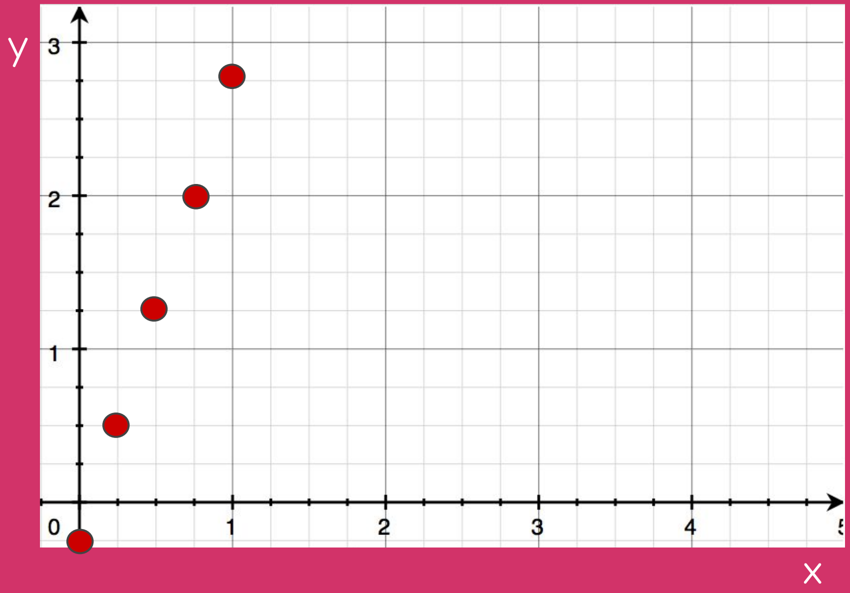
$$b = 3f - 1$$

Slope-Intercept Form

- Coefficient is the slope (how each point move on the graph; Rise-over-Run)
- Constant is y-Intercept (where the graph crosses the y-axis). It is the value of y when x is 0.

# Graphing Linear Relations

## Graphing from an Equation




What does this equation mean?

$$b = 3f - 1$$

Slope-Intercept Form

- Coefficient is the slope (how each point move on the graph; Rise-over-Run)

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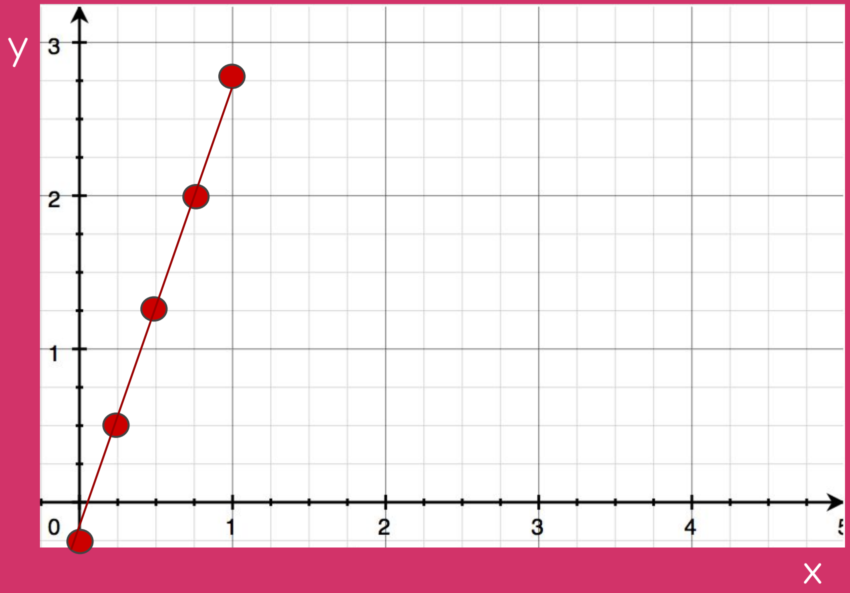
# Graphing Linear Relations

## Graphing from an Equation




What does this equation mean?

$$b = 3f - 1$$

Slope-Intercept Form

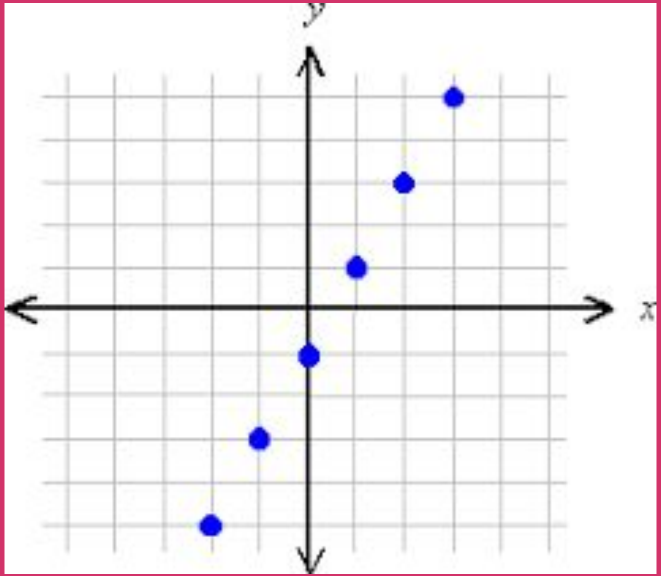
- Coefficient is the slope (how each point move on the graph; Rise-over-Run)
- Constant is y-Intercept (where the graph crosses the y-axis). It is the value of y when x is 0.

# Graphing Linear Relations

Creating a Table of Value from a Graph

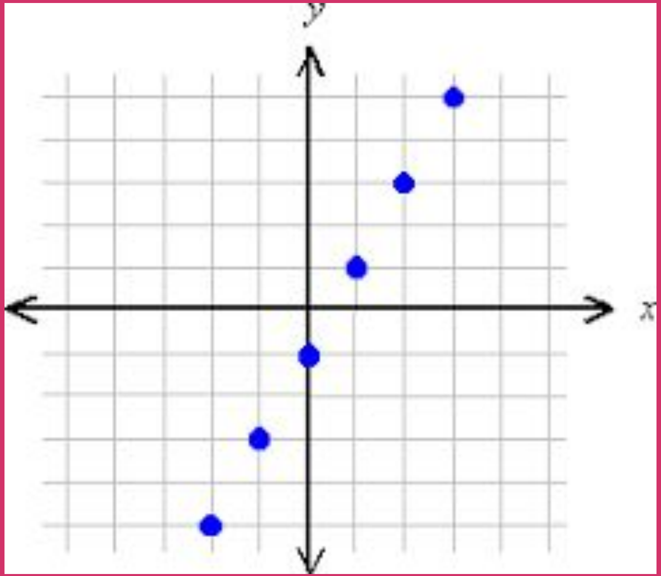
# Graphing Linear Relations

Creating a Table of Value from a Graph



# Graphing Linear Relations

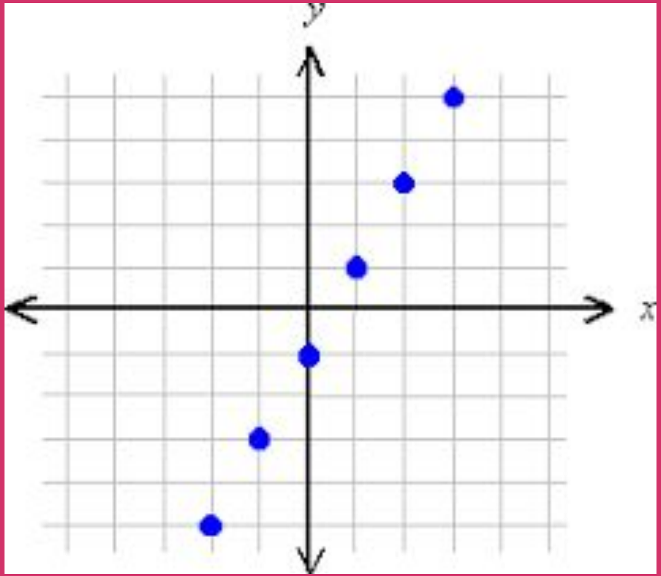
## Creating a Table of Value from a Graph




| x | y |
|---|---|
| -2 | -5 |
| -1 | -3 |
| 0 | -1 |
| 1 | 1 |
| 2 | 3 |
| 3 | 5 |

# Graphing Linear Relations

## Creating a Table of Value from a Graph

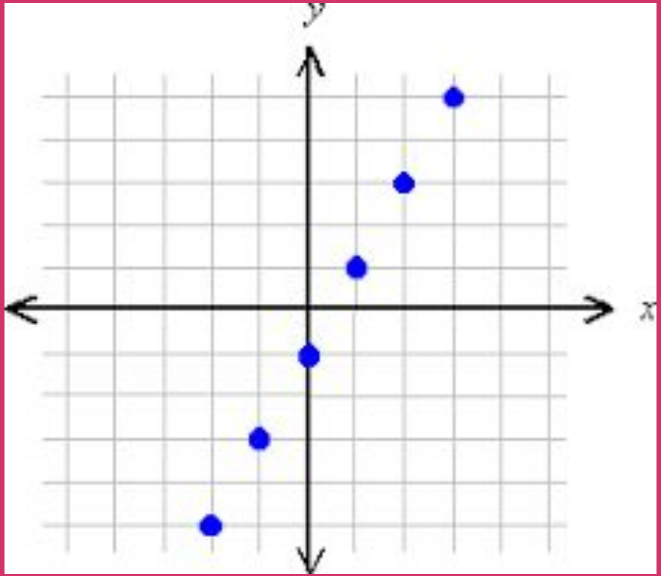



| x | y |
|---|---|
| -2 | -5 |
| -1 | -3 |
| 0 | -1 |
| 1 | 1 |
| 2 | 3 |
| 3 | 5 |

What would the equation be?

# Graphing Linear Relations

## Creating a Table of Value from a Graph




| x | y |
|---|---|
| -2 | -5 |
| -1 | -3 |
| 0 | -1 |
| 1 | 1 |
| 2 | 3 |
| 3 | 5 |

What would the equation be?

= 2x - 1

# Graphing Linear Relations

Horizontal Graphs

# Graphing Linear Relations

Horizontal Graphs

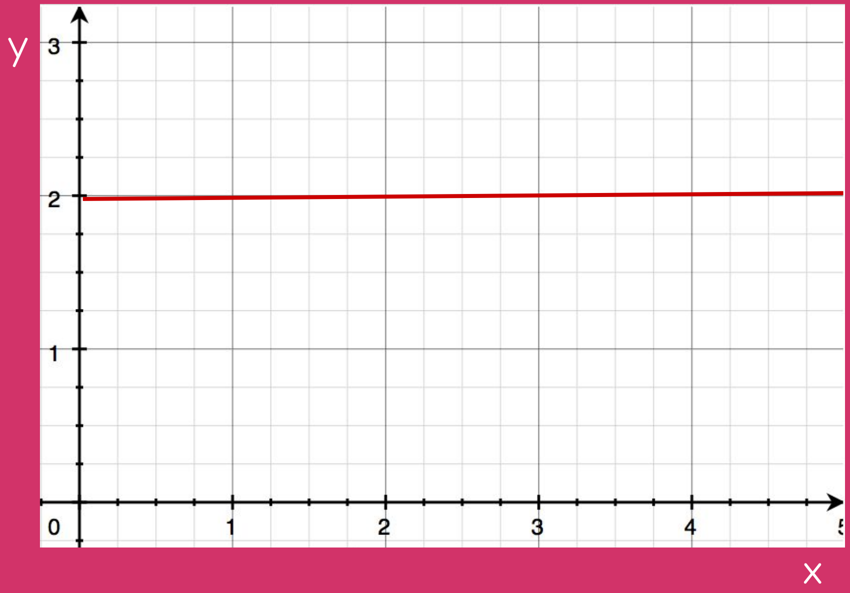
y


x

# Graphing Linear Relations

## Horizontal Graphs

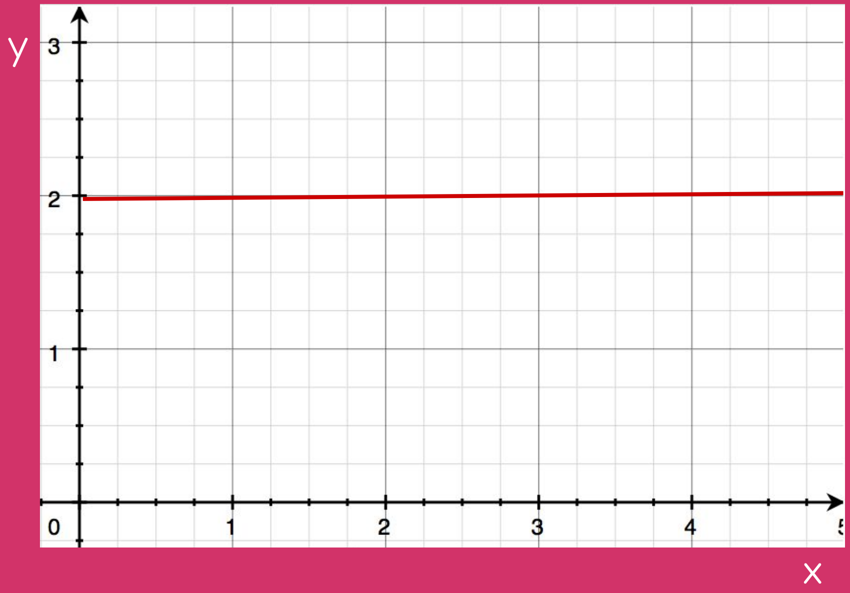
What value would be constant? (not change)



# Graphing Linear Relations

## Horizontal Graphs

What value would be constant? (not change)




In horizontal graphs, the y value does not change.

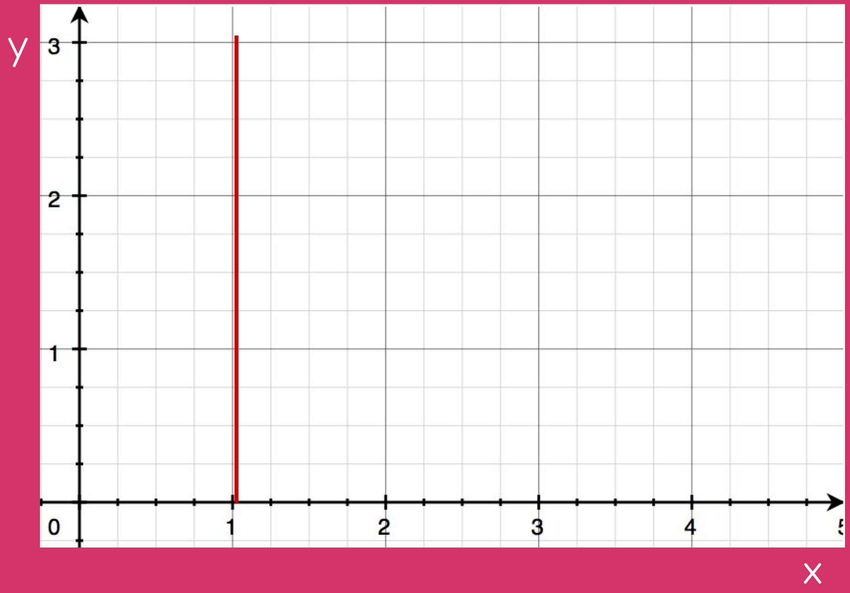
x = 1, y = 2
x = 2, y = 2
x = 3, y = 2

# Graphing Linear Relations

## Vertical Graphs

# Graphing Linear Relations

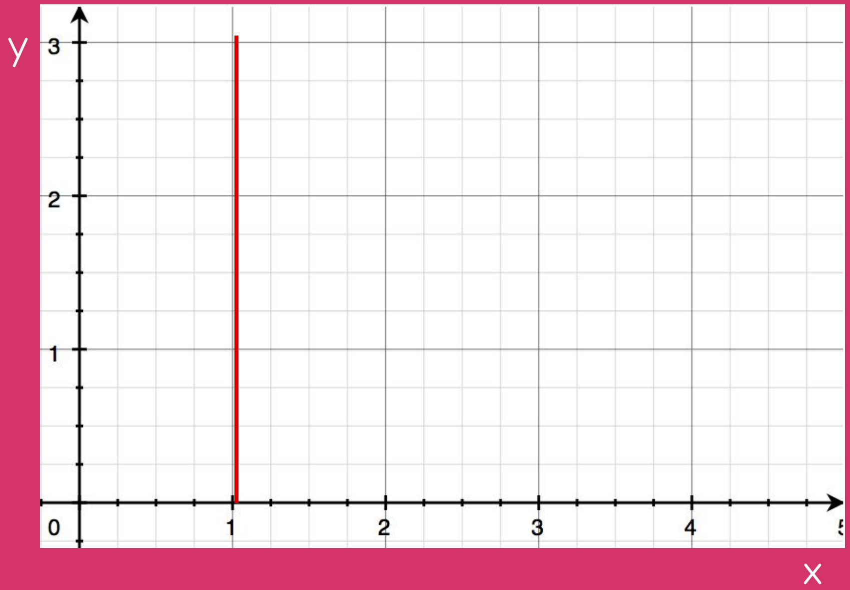
## Horizontal Graphs



# Graphing Linear Relations

## Horizontal Graphs

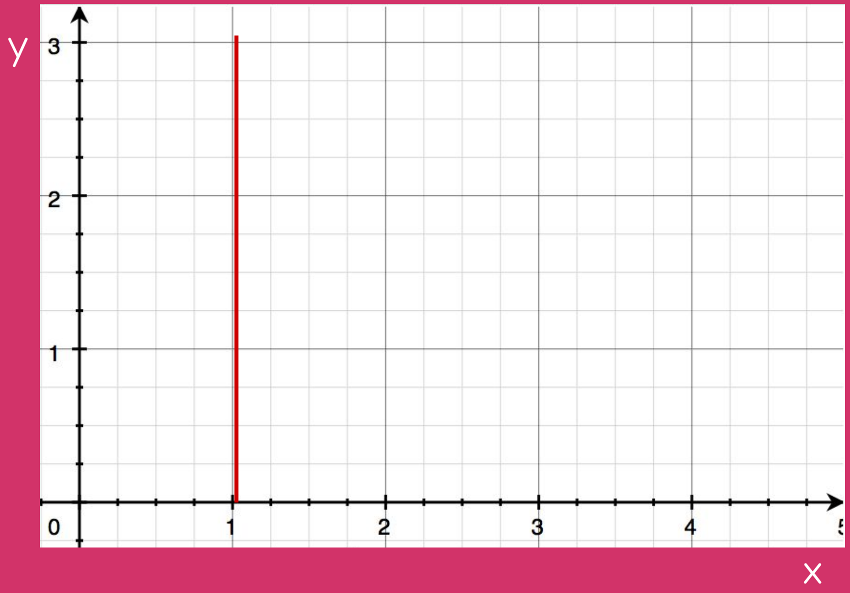
What value would be constant? (not change)



# Graphing Linear Relations

## Horizontal Graphs

What value would be constant? (not change)




In horizontal graphs, the y value does not change.

x = 1, y = 1
x = 1, y = 2
x = 1, y = 3

# Chapter 10

## Solving Linear Equations

# Inverse Functions

Inverse functions reverse one another. They complete the opposite operation.

Subtraction →

Addition →

Multiplication →

Division →

Squaring →

Square Root →

# Chapter 10 - Solving Linear Equations

## Inverse Functions

**Inverse functions reverse one another.  They complete the opposite operation.**

Subtraction → Addition

Addition → Subtraction

Multiplication → Division

Division → Multiplication

Squaring → Square Root

Square Root → Squaring

# How to Solve Equations

To solve equations, you want to isolate for the variable by inverseing all of the operations that were done to it in reverse order.

ie. $5x - 4 = 31$

What does this equation mean?

How do you solve it?

# How to Solve Equations

To solve equations, you want to isolate for the variable by inverseing all of the operations that were done to it in reverse order.

ie. $5x - 4 = 31$

What does this equation mean?

Means: You are multiplying a value by 5, then subtracting 4 to get 31.

How do you solve it?

# How to Solve Equations

To solve equations, you want to isolate for the variable by inverseing all of the operations that were done to it in reverse order.

ie. $5x - 4 = 31$

What does this equation mean?

Means: You are multiplying a value by 5, then subtracting 4 to get 31.

How do you solve it?

To Solve: Do the inverse of each operation in reverse order.

To Solve: Start at 31, Add 4, then divide by 5 to get the original value of x.

# Steps to Solve

What are the steps to solve equations?

# Steps to Solve

What are the steps to solve equations?

1. Simplify

# Steps to Solve

What are the steps to solve equations?

1. Simplify
   - Remove Brackets
   - Bring variables to one side of equation

# Steps to Solve

What are the steps to solve equations?

1. Simplify
   - Remove Brackets
   - Bring variables to one side of equation

2. Add/Subtract Constant

# Steps to Solve

What are the steps to solve equations?

1. Simplify
   - Remove Brackets
   - Bring variables to one side of equation

2. Add/Subtract Constant
   - The value on the same side as the variable, but is not attached to the variable

# Steps to Solve

What are the steps to solve equations?

1. Simplify
   - Remove Brackets
   - Bring variables to one side of equation

2. Add/Subtract Constant
   - The value on the same side as the variable, but is not attached to the variable

3. Multiply/Divide Coefficient

# Steps to Solve

What are the steps to solve equations?

1. Simplify
   - Remove Brackets
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   - The value on the same side as the variable, but is not attached to the variable

3. Multiply/Divide Coefficient
   - The number with the variable

# Steps to Solve

What are the steps to solve equations?

1. Simplify
   - Remove Brackets
   - Bring variables to one side of equation

2. Add/Subtract Constant
   - The value on the same side as the variable, but is not attached to the variable

3. Multiply/Divide Coefficient
   - The number with the variable

4. Check by plugging you answer back in for the variable and solving

# Practice Equations

$7x + 11 = 88$

# Practice Equations

$$2x - 6 = -8$$

# Practice Equations

$$\frac{x}{4} + 5 = -125$$

# Practice Equations

$$2(3x - 7) = 58$$

# Chapter 11

*Probability*

# Types of Graphs and Their Use

What is Probability?

# Types of Graphs and Their Use

What is Probability?

- the likelihood or chance of an event occurring

# Types of Graphs and Their Use

What is a sample space?

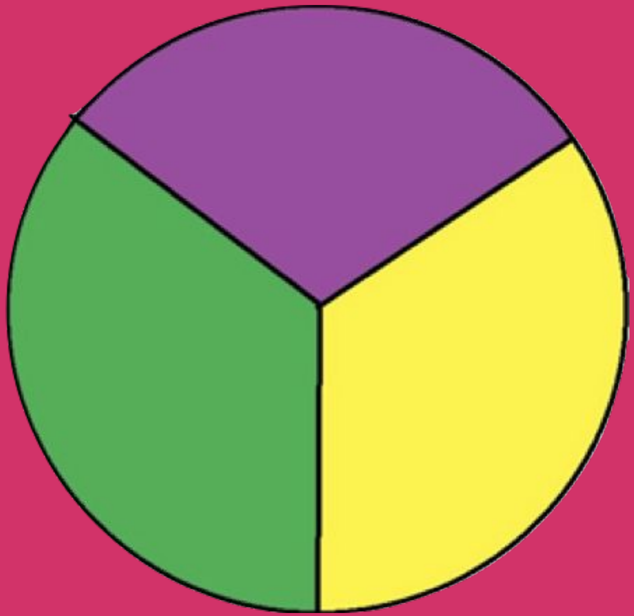
# Types of Graphs and Their Use

What is a sample space?

- all possible outcomes of a probability experiment

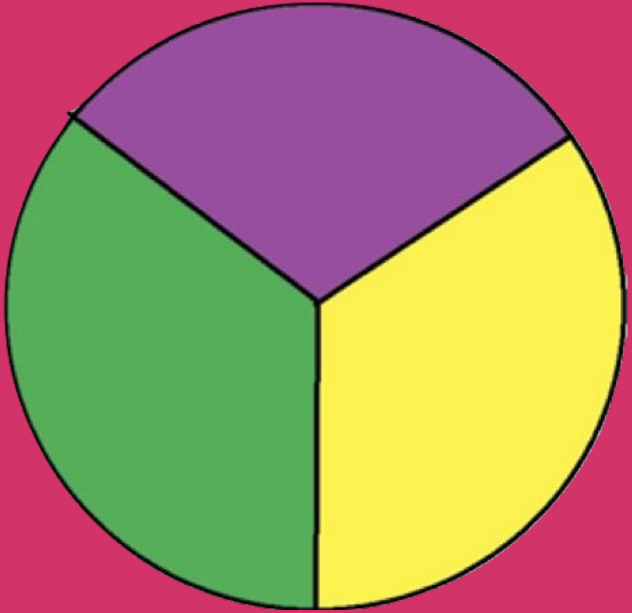
# Tree Diagram

Create a Tree Diagram to determine the sample space of spinning the spinner two times.



# Tree Diagram

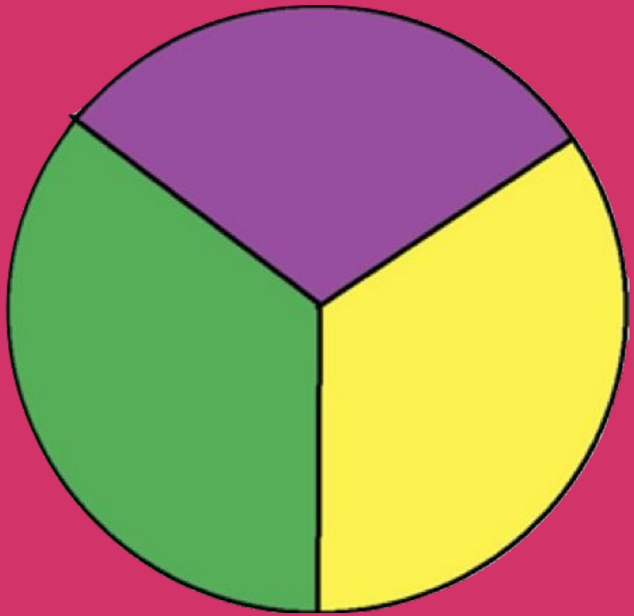
Create a Tree Diagram to determine the sample space of spinning the spinner two times.



| Spin 1 | Spin 2 | Outcome |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

# Tree Diagram

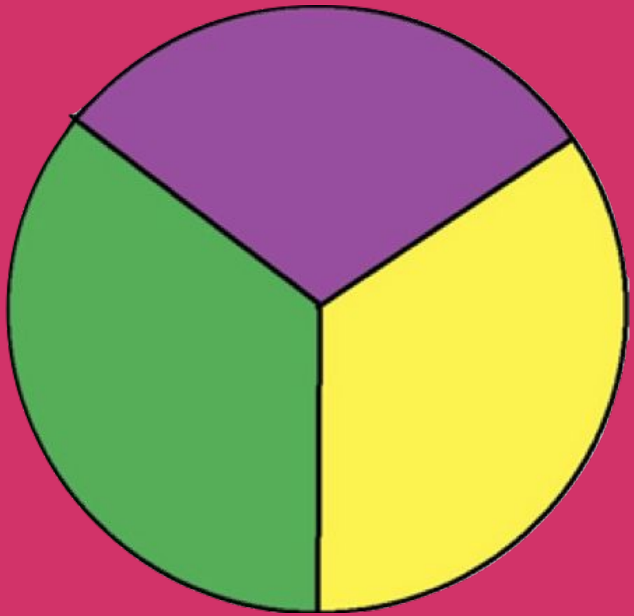
Create a Tree Diagram to determine the sample space of spinning the spinner two times.



| Spin 1 | Spin 2 | Outcome |
|---|---|---|
| Purple | | |
| | | |
| | | |
| Yellow | | |
| | | |
| | | |
| Green | | |
| | | |
| | | |

# Tree Diagram

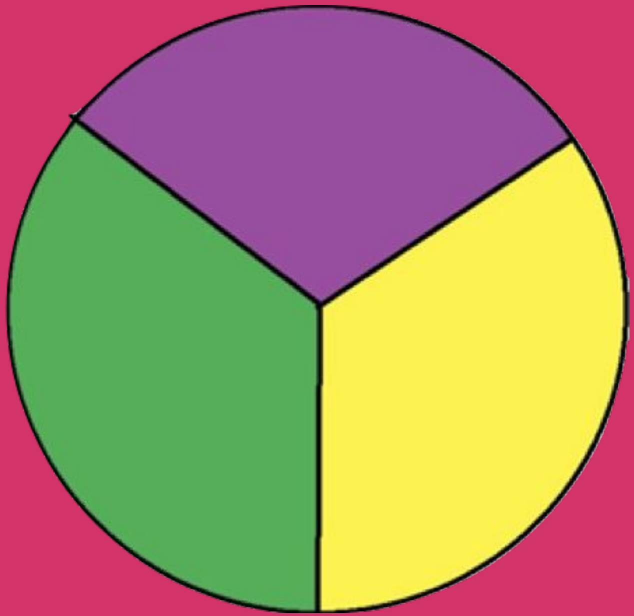
Create a Tree Diagram to determine the sample space of spinning the spinner two times.



| Spin 1 | Spin 2 | Outcome |
|---|---|---|
| Purple | Purple | |
| | Yellow | |
| | Green | |
| Yellow | Purple | |
| | Yellow | |
| | Green | |
| Green | Purple | |
| | Yellow | |
| | Green | |

# Tree Diagram

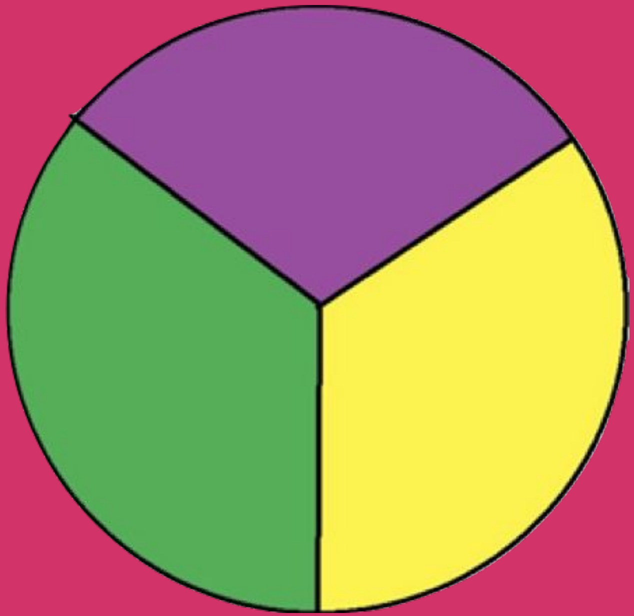
Create a Tree Diagram to determine the sample space of spinning the spinner two times.



| Spin 1 | Spin 2 | Outcome |
| --- | --- | --- |
| Purple | Purple | P, P |
| | Yellow | P, Y |
| | Green | P, G |
| Yellow | Purple | Y, P |
| | Yellow | Y, Y |
| | Green | Y, G |
| Green | Purple | G, P |
| | Yellow | G, Y |
| | Green | G, G |

# Tree Diagram

Create a Tree Diagram to determine the sample space of spinning the spinner two times.



| Spin 1 | Spin 2 | Outcome |
|---|---|---|
| Purple | Purple | P, P |
| | Yellow | P, Y |
| | Green | P, G |
| Yellow | Purple | Y, P |
| | Yellow | Y, Y |
| | Green | Y, G |
| Green | Purple | G, P |
| | Yellow | G, Y |
| | Green | G, G |

How big is the sample space?

# Probability Tables

Create a Probability Table to determine the sample space of throwing the yellow and red dice

# Probability Tables

Create a Probability Table to determine the sample space of throwing the yellow and red dice

| Y, R | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |

# Probability Tables

Create a Probability Table to determine the sample space of throwing the yellow and red dice

| Y, R | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1 | 1, 1 | 1, 2 | 1, 3 | 1, 4 | 1, 5 | 1, 6 |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |

# Probability Tables

Create a Probability Table to determine the sample space of throwing the yellow and red dice

| Y, R | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1 | 1, 1 | 1, 2 | 1, 3 | 1, 4 | 1, 5 | 1, 6 |
| 2 | 2, 1 | 2, 2 | 2, 3 | 2, 4 | 2, 5 | 2, 6 |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |

# Probability Tables

Create a Probability Table to determine the sample space of throwing the yellow and red dice

| Y, R | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1 | 1, 1 | 1, 2 | 1, 3 | 1, 4 | 1, 5 | 1, 6 |
| 2 | 2, 1 | 2, 2 | 2, 3 | 2, 4 | 2, 5 | 2, 6 |
| 3 | 3, 1 | 3, 2 | 3, 3 | 3, 4 | 3, 5 | 3, 6 |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |

# Probability Tables

Create a Probability Table to determine the sample space of throwing the yellow and red dice

| Y, R | 1 | 2 | 3 | 4 | 5 | 6 |
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| 2 | 2, 1 | 2, 2 | 2, 3 | 2, 4 | 2, 5 | 2, 6 |
| 3 | 3, 1 | 3, 2 | 3, 3 | 3, 4 | 3, 5 | 3, 6 |
| 4 | 4, 1 | 4, 2 | 4, 3 | 4, 4 | 4, 5 | 4, 6 |
| 5 | | | | | | |
| 6 | | | | | | |

# Probability Tables

Create a Probability Table to determine the sample space of throwing the yellow and red dice

| Y, R | 1 | 2 | 3 | 4 | 5 | 6 |
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| 3 | 3, 1 | 3, 2 | 3, 3 | 3, 4 | 3, 5 | 3, 6 |
| 4 | 4, 1 | 4, 2 | 4, 3 | 4, 4 | 4, 5 | 4, 6 |
| 5 | 5, 1 | 5, 2 | 5, 3 | 5, 4 | 5, 5 | 5, 6 |
| 6 | | | | | | |

# Probability Tables

Create a Probability Table to determine the sample space of throwing the yellow and red dice

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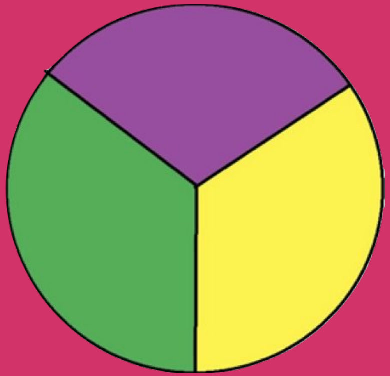
| 3 | 3, 1 | 3, 2 | 3, 3 | 3, 4 | 3, 5 | 3, 6 |
| 4 | 4, 1 | 4, 2 | 4, 3 | 4, 4 | 4, 5 | 4, 6 |
| 5 | 5, 1 | 5, 2 | 5, 3 | 5, 4 | 5, 5 | 5, 6 |
| 6 | 6, 1 | 6, 2 | 6, 3 | 6, 4 | 6, 5 | 6, 5 |

How big is the sample space?

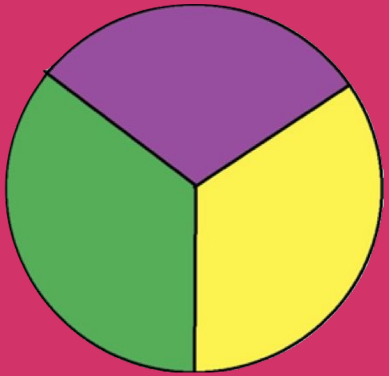
# Determining Probabilities

What is the probability of getting the same colour for both spins?



# Determining Probabilities

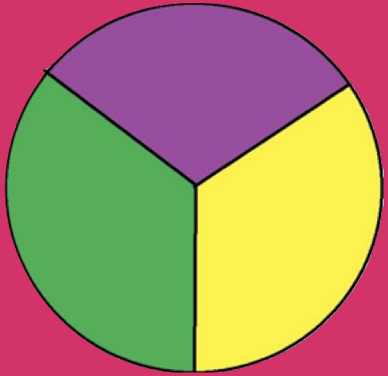
What is the probability of getting the same colour for both spins?



1. First determine the sample space

# Determining Probabilities

What is the probability of getting the same colour for both spins?

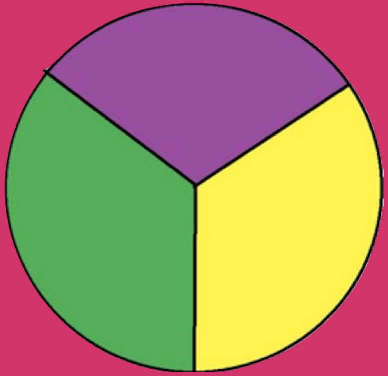


| Spin 1 | Spin 2 | Outcome |
|---|---|---|
| Purple | Purple | P, P |
| | Yellow | P, Y |
| | Green | P, G |
| Yellow | Purple | Y, P |
| | Yellow | Y, Y |
| | Green | Y, G |
| Green | Purple | G, P |
| | Yellow | G, Y |
| | Green | G, G |

1. First determine the sample space. How large is the sample space?

# Determining Probabilities

What is the probability of getting the same colour for both spins?



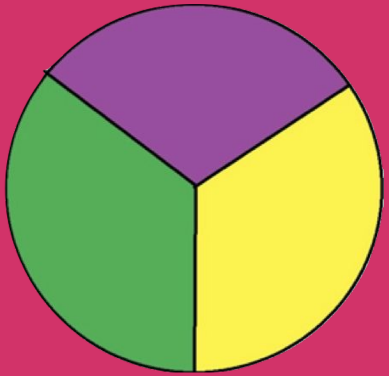
| Spin 1 | Spin 2 | Outcome |
|---|---|---|
| Purple | Purple | P, P |
| | Yellow | P, Y |
| | Green | P, G |
| Yellow | Purple | Y, P |
| | Yellow | Y, Y |
| | Green | Y, G |
| Green | Purple | G, P |
| | Yellow | G, Y |
| | Green | G, G |

1. First determine the sample space. How large is the sample space? 9

2. Located all of the desired outcomes. How many are there?

# Determining Probabilities

What is the probability of getting the same colour for both spins?



| Spin 1 | Spin 2 | Outcome |
|---|---|---|
| Purple | Purple | P, P |
| | Yellow | P, Y |
| | Green | P, G |
| Yellow | Purple | Y, P |
| | Yellow | Y, Y |
| | Green | Y, G |
| Green | Purple | G, P |
| | Yellow | G, Y |
| | Green | G, G |

1. First determine the sample space. How large is the sample space? 9

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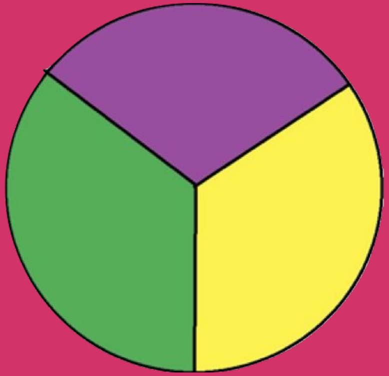
# Determining Probabilities

What is the probability of getting the same colour for both spins?

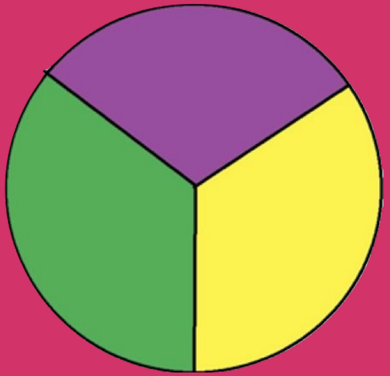


| Spin 1 | Spin 2 | Outcome |
|---|---|---|
| Purple | Purple | P, P |
| | Yellow | P, Y |
| | Green | P, G |
| Yellow | Purple | Y, P |
| | Yellow | Y, Y |
| | Green | Y, G |
| Green | Purple | G, P |
| | Yellow | G, Y |
| | Green | G, G |

1. First determine the sample space. How large is the sample space? 9
2. Located all of the desired outcomes. How many are there? 3
3. Determine the probability by creating a fraction of desired out of total outcomes. Simply.

# Determining Probabilities

What is the probability of getting the same colour for both spins?



| Spin 1 | Spin 2 | Outcome |
|---|---|---|
| Purple | Purple | P, P |
| | Yellow | P, Y |
| | Green | P, G |
| Yellow | Purple | Y, P |
| | Yellow | Y, Y |
| | Green | Y, G |
| Green | Purple | G, P |
| | Yellow | G, Y |
| | Green | G, G |

1. First determine the sample space. How large is the sample space? 9
2. Located all of the desired outcomes. How many are there? 3
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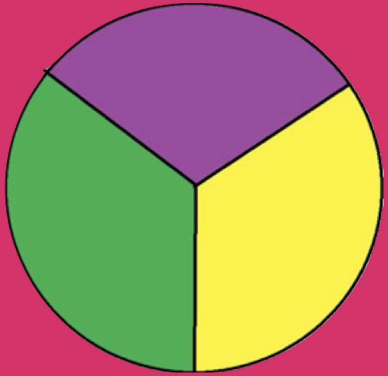
$^{3}/_{9} \rightarrow \frac{1}{3}$

# Determining Probabilities

What is the probability of getting the same colour for both spins?



| Spin 1 | Spin 2 | Outcome |
|---|---|---|
| Purple | Purple | P, P |
| | Yellow | P, Y |
| | Green | P, G |
| Yellow | Purple | Y, P |
| | Yellow | Y, Y |
| | Green | Y, G |
| Green | Purple | G, P |
| | Yellow | G, Y |
| | Green | G, G |

1. First determine the sample space. How large is the sample space? 9
2. Located all of the desired outcomes. How many are there? 3
3. Determine the probability by creating a fraction of desired out of total outcomes. Simply.

$$^3/_9 \rightarrow \frac{1}{3}$$

P(double colours) = $\frac{1}{3}$

# Probability Tables

What is the probability of rolling a sum of 7?

# Probability Tables

What is the probability of rolling a sum of 7?

1. First determine the sample space.

# Probability Tables

What is the probability of rolling a sum of 7?

| Y, R | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1 | 1, 1 | 1, 2 | 1, 3 | 1, 4 | 1, 5 | 1, 6 |
| 2 | 2, 1 | 2, 2 | 2, 3 | 2, 4 | 2, 5 | 2, 6 |
| 3 | 3, 1 | 3, 2 | 3, 3 | 3, 4 | 3, 5 | 3, 6 |
| 4 | 4, 1 | 4, 2 | 4, 3 | 4, 4 | 4, 5 | 4, 6 |
| 5 | 5, 1 | 5, 2 | 5, 3 | 5, 4 | 5, 5 | 5, 6 |
| 6 | 6, 1 | 6, 2 | 6, 3 | 6, 4 | 6, 5 | 6, 5 |

1. First determine the sample space. How large is the sample space?

# Probability Tables

What is the probability of rolling a sum of 7?

| Y, R | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1 | 1, 1 | 1, 2 | 1, 3 | 1, 4 | 1, 5 | 1, 6 |
| 2 | 2, 1 | 2, 2 | 2, 3 | 2, 4 | 2, 5 | 2, 6 |
| 3 | 3, 1 | 3, 2 | 3, 3 | 3, 4 | 3, 5 | 3, 6 |
| 4 | 4, 1 | 4, 2 | 4, 3 | 4, 4 | 4, 5 | 4, 6 |
| 5 | 5, 1 | 5, 2 | 5, 3 | 5, 4 | 5, 5 | 5, 6 |
| 6 | 6, 1 | 6, 2 | 6, 3 | 6, 4 | 6, 5 | 6, 5 |

1. First determine the sample space. How large is the sample space? 36
2. Located all of the desired outcomes.

# Probability Tables

What is the probability of rolling a sum of 7?

| Y, R | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1 | 1, 1 | 1, 2 | 1, 3 | 1, 4 | 1, 5 | 1, 6 |
| 2 | 2, 1 | 2, 2 | 2, 3 | 2, 4 | 2, 5 | 2, 6 |
| 3 | 3, 1 | 3, 2 | 3, 3 | 3, 4 | 3, 5 | 3, 6 |
| 4 | 4, 1 | 4, 2 | 4, 3 | 4, 4 | 4, 5 | 4, 6 |
| 5 | 5, 1 | 5, 2 | 5, 3 | 5, 4 | 5, 5 | 5, 6 |
| 6 | 6, 1 | 6, 2 | 6, 3 | 6, 4 | 6, 5 | 6, 5 |

1. First determine the sample space. How large is the sample space? 36
2. Located all of the desired outcomes. How many are there?

# Probability Tables

What is the probability of rolling a sum of 7?

| Y, R | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1 | 1, 1 | 1, 2 | 1, 3 | 1, 4 | 1, 5 | 1, 6 |
| 2 | 2, 1 | 2, 2 | 2, 3 | 2, 4 | 2, 5 | 2, 6 |
| 3 | 3, 1 | 3, 2 | 3, 3 | 3, 4 | 3, 5 | 3, 6 |
| 4 | 4, 1 | 4, 2 | 4, 3 | 4, 4 | 4, 5 | 4, 6 |
| 5 | 5, 1 | 5, 2 | 5, 3 | 5, 4 | 5, 5 | 5, 6 |
| 6 | 6, 1 | 6, 2 | 6, 3 | 6, 4 | 6, 5 | 6, 5 |

1. First determine the sample space. How large is the sample space? 36
2. Located all of the desired outcomes. How many are there? 6
3. Determine the probability by creating a fraction of desired out of total outcomes. Simply.

# Probability Tables

What is the probability of rolling a sum of 7?

| Y, R | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1 | 1, 1 | 1, 2 | 1, 3 | 1, 4 | 1, 5 | 1, 6 |
| 2 | 2, 1 | 2, 2 | 2, 3 | 2, 4 | 2, 5 | 2, 6 |
| 3 | 3, 1 | 3, 2 | 3, 3 | 3, 4 | 3, 5 | 3, 6 |
| 4 | 4, 1 | 4, 2 | 4, 3 | 4, 4 | 4, 5 | 4, 6 |
| 5 | 5, 1 | 5, 2 | 5, 3 | 5, 4 | 5, 5 | 5, 6 |
| 6 | 6, 1 | 6, 2 | 6, 3 | 6, 4 | 6, 5 | 6, 5 |

1. First determine the sample space. How large is the sample space? 36
2. Located all of the desired outcomes. How many are there? 6
3. Determine the probability by creating a fraction of desired out of total outcomes. Simply.

$^{6}/_{36} \rightarrow \frac{1}{6}$

# Probability Tables

What is the probability of rolling a sum of 7?

| Y, R | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1 | 1, 1 | 1, 2 | 1, 3 | 1, 4 | 1, 5 | 1, 6 |
| 2 | 2, 1 | 2, 2 | 2, 3 | 2, 4 | 2, 5 | 2, 6 |
| 3 | 3, 1 | 3, 2 | 3, 3 | 3, 4 | 3, 5 | 3, 6 |
| 4 | 4, 1 | 4, 2 | 4, 3 | 4, 4 | 4, 5 | 4, 6 |
| 5 | 5, 1 | 5, 2 | 5, 3 | 5, 4 | 5, 5 | 5, 6 |
| 6 | 6, 1 | 6, 2 | 6, 3 | 6, 4 | 6, 5 | 6, 5 |

1. First determine the sample space. How large is the sample space? 36
2. Located all of the desired outcomes. How many are there? 6
3. Determine the probability by creating a fraction of desired out of total outcomes. Simply.

$^{6}/_{36} \rightarrow ^{1}/_{6}$

P(sum 7) = $^{1}/_{6}$

# Experimental vs. Theoretical Probability

What is Theoretical Probability?

# Experimental vs. Theoretical Probability

What is Theoretical Probability?

Theoretical probability is the likelihood of a particular event happening in a perfectly fair situation.

Based on what could happen.

# Experimental vs. Theoretical Probability

What is Experimental Probability?

# Experimental vs. Theoretical Probability

## What is Experimental Probability?

Experimental probability is the actually number of times a particular event occurred in a probability experiment.

Based on what actually happened.

# Chapter 12

Tesselations

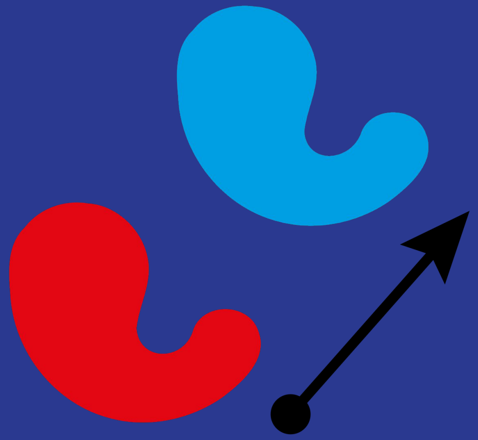
# Types of Transformations

## What are Translations?

# Types of Transformations

## What are Translations?

Translations are slides where the entire image moves the same amount of spaces left/right and up/down.



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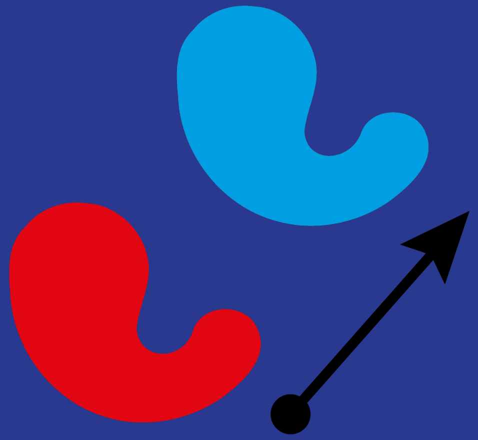

Determining New Coordinates:

A translation of 7 units up and 3 units left.

(x, y)

# Types of Transformations

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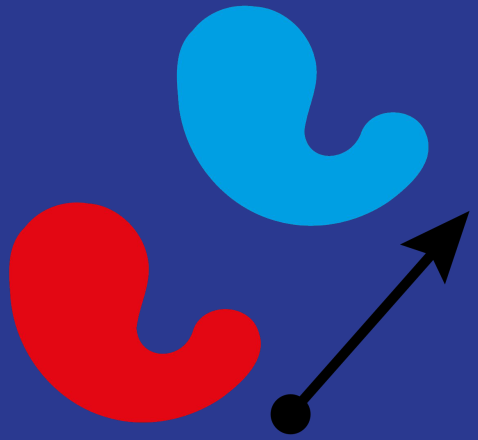

Determining New Coordinates:

A translation of 7 units up and 3 units left.

$(x, y)$

$(x - 3, y + 7)$

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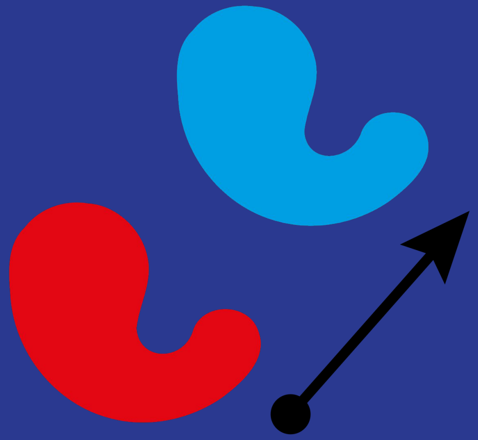

Determining New Coordinates:

A translation of 7 units up and 3 units left.

(5, 9)

(x - 3, y + 7)

# Types of Transformations

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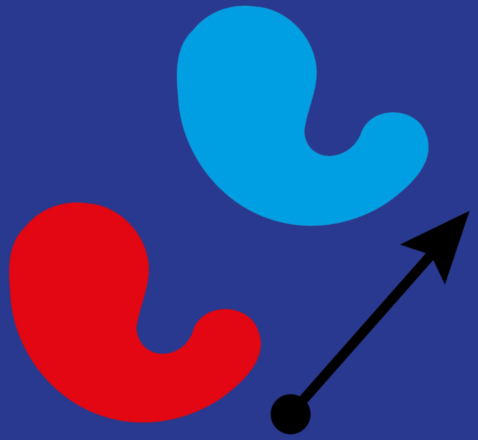

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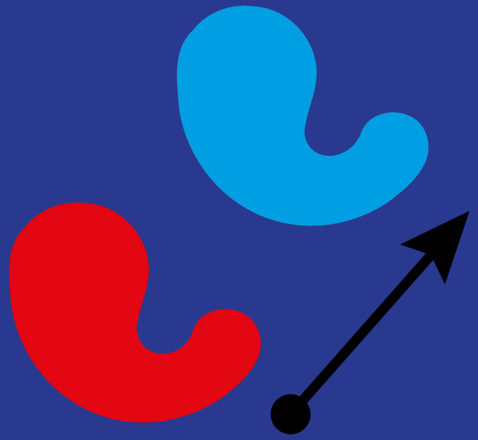


Determining New Coordinates:

A translation of 7 units up and 3 units left.

(5, 9)

(5 - 3, 9 + 7)

(2, 16)

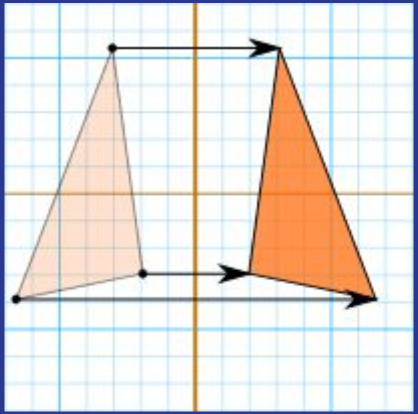
# Types of Transformations

## What is a Reflection?

# Types of Transformations

## What is a Reflection?

Reflections are when the entire image is flipped or reflected across a line.



# Types of Transformations

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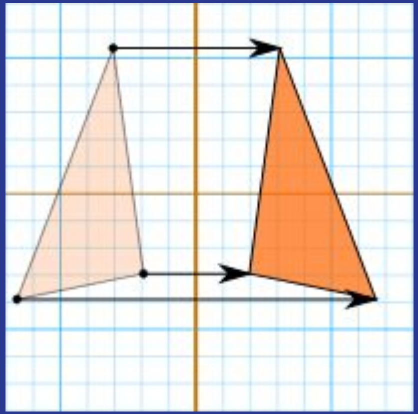

Determining New Coordinates:

A reflection about the y-axis

(x, y)

# Types of Transformations

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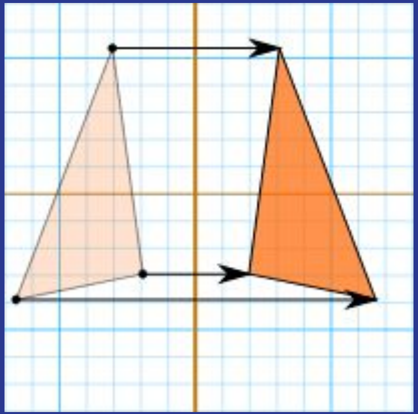

Determining New Coordinates:

A reflection about the y-axis

(x, y)

(-x, y)

# Types of Transformations

## What is a Reflection?

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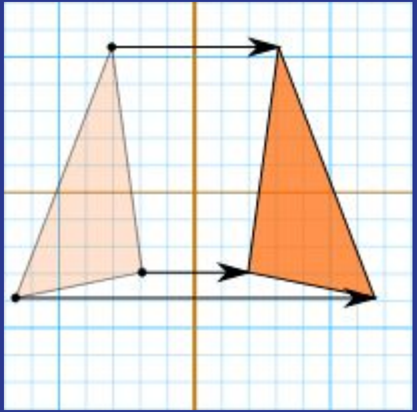


Determining New Coordinates:

A reflection about the y-axis

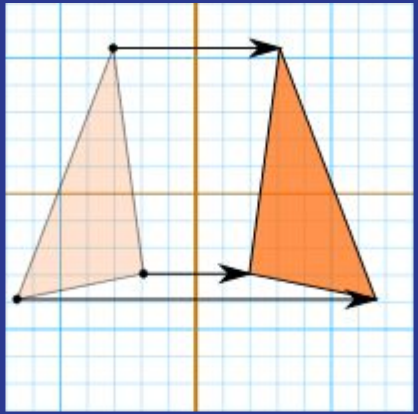
(-2, -3)

(-x, y)

# Types of Transformations

## What is a Reflection?

Reflections are when the entire image is flipped or reflected across a line.



Determining New Coordinates:

A reflection about the y-axis

(-2, -3)

(-(-2), -3)

# Types of Transformations

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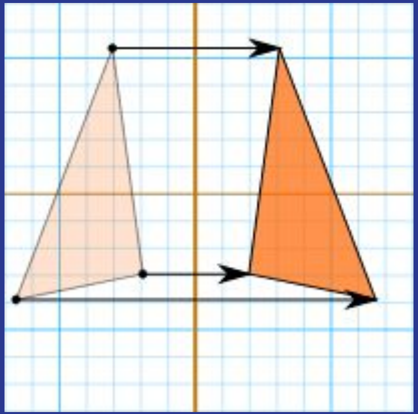
Reflections are when the entire image is flipped or reflected across a line.



Determining New Coordinates:

A reflection about the y-axis

(-2, -3)

(-(-2), -3)

(2, -3)c

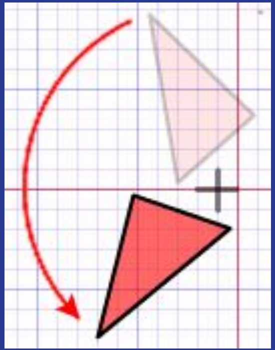
# Types of Transformations

## What is a Rotation?

# Types of Transformations

## What is a Rotation?

Rotations are when the entire image is turned or rotated around a central point.



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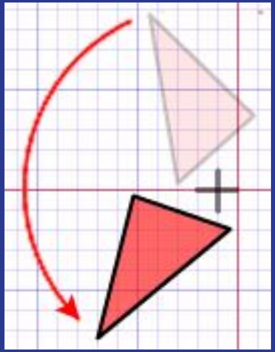


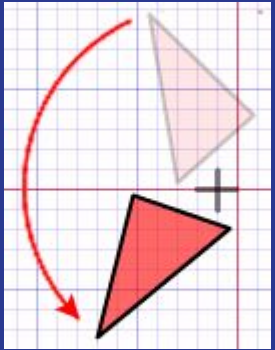
Determining New Coordinates:

| 90° CW/270° CCW | 180° CW/CCW | 270° CW/90° CCW |
|---|---|---|
| (x, y) | (x, y) | (x, y) |

# Types of Transformations

## What is a Rotation?

Rotations are when the entire image is turned or rotated around a central point.



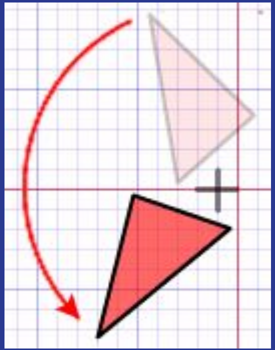
Determining New Coordinates:

| 90° CW/270° CCW | 180° CW/CCW | 270° CW/90° CCW |
|---|---|---|
| (x, y)<br>(y, - x) | (x, y)<br>(- y, - x) | (x, y)<br>(- y, x) |

## Types of Transformations

### What is a Rotation?

Rotations are when the entire image is turned or rotated around a central point.



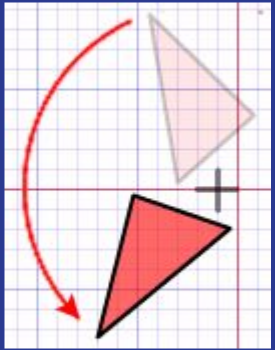
Determining New Coordinates:

| 90° CW/270° CCW | 180° CW/CCW | 270° CW/90° CCW |
|---|---|---|
| (4, 5)<br>(y, - x) | (-7, 2)<br>(- y, - x) | (3, -8)<br>(- y, x) |

# Types of Transformations

## What is a Rotation?

Rotations are when the entire image is turned or rotated around a central point.



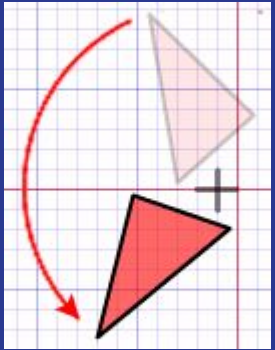
Determining New Coordinates:

| 90° CW/270° CCW | 180° CW/CCW | 270° CW/90° CCW |
|---|---|---|
| (4, 5)<br><br>(5, - 4) | (-7, 2)<br><br>(- 2, - (-7)) | (3, -8)<br><br>(- (-8), 3) |

## Types of Transformations

### What is a Rotation?

Rotations are when the entire image is turned or rotated around a central point.



Determining New Coordinates:

| 90° CW/270° CCW | 180° CW/CCW | 270° CW/90° CCW |
|---|---|---|
| (4, 5)<br>(5, - 4) | (-7, 2)<br>(- 2, - (-7))<br>(-2, 7) | (3, -8)<br>(- (-8), 3)<br>(8, 3) |

# Tessellations

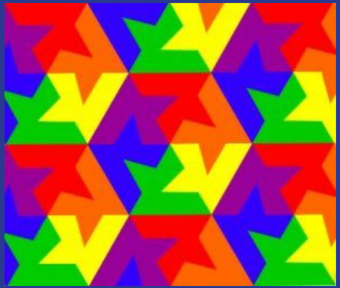
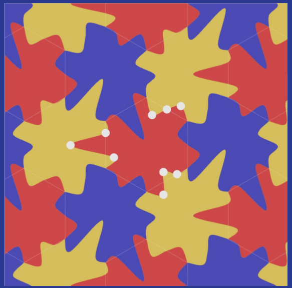
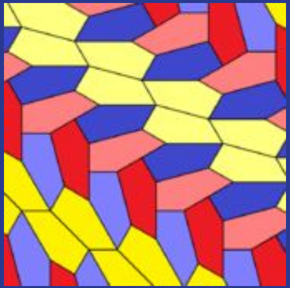
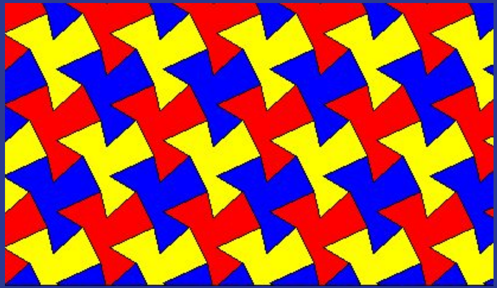
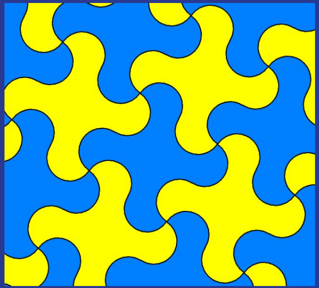
What does it mean is something tessellates?

# Tessellations

## What does it mean is something tessellates?

When congruent copies of a shape cover a plane with no overlaps or gaps, we say the shape tessellates.

The design created is called a tessellation.

# Tessellations

## What does it mean is something tessellates?

When congruent copies of a shape cover a plane with no overlaps or gaps, we say the shape tessellates.

The design created is called a tessellation.

For copies of a polygon to tessellate, the sum of the angles at any point where vertices meet must be 360°. We say the *polygons surround a point.*