Math 9

Year in Review

Symmetry & Surface Area

Chapter 1 Review

Chapter 1 - Symmetry and Surface Area

What does symmetry mean?

What does symmetry mean?

Symmetry is when an object matches up with itself. Symmetry can be described has either having Line Symmetry, Rotational Symmetry or both.

Chapter 1 - Symmetry and Surface Area
1.1 Line Symmetry

What is Line Symmetry?

Chapter 1 - Symmetry and Surface Area
1.1 Line Symmetry

What is Line Symmetry?

Line Symmetry can also be referred to as mirror symmetry. It is when two halves of an object are identical to one another as if it is a mirror image.

Line symmetry can be determined by splitting an image precisely in half (folding or drawing a line) and seeing if both sides match up to one another perfectly.

Chapter 1 - Symmetry and Surface Area
1.1 Line Symmetry

Types of Line Symmetry.

What types (or directions) of line symmetry are used to describe images?

Chapter 1 - Symmetry and Surface Area
1.1 Line Symmetry

Types of Line Symmetry.

What types (or directions) of line symmetry are used to describe images?

Horizontal

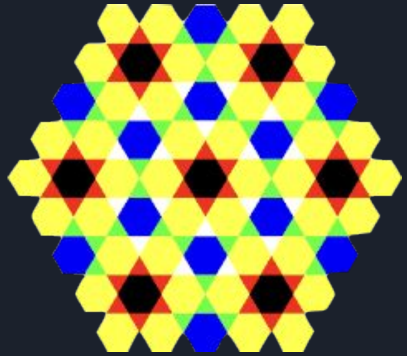
Vertical

Oblique (diagonal)

Chapter 1 - Symmetry and Surface Area
1.1 Line Symmetry

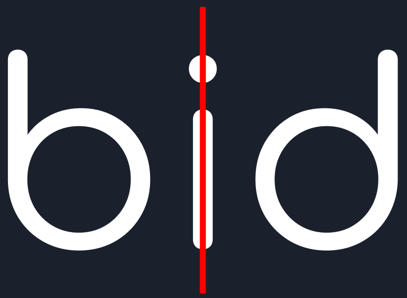
How many lines of symmetry do the following images have?



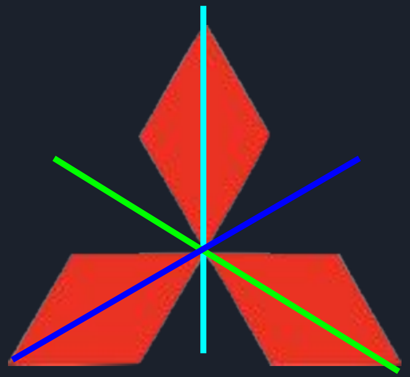


Chapter 1 - Symmetry and Surface Area
1.1 Line Symmetry

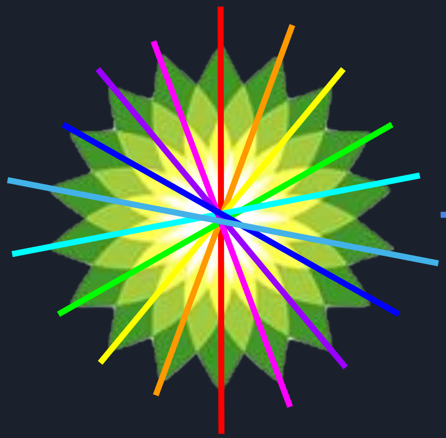
How many lines of symmetry do the following images have?



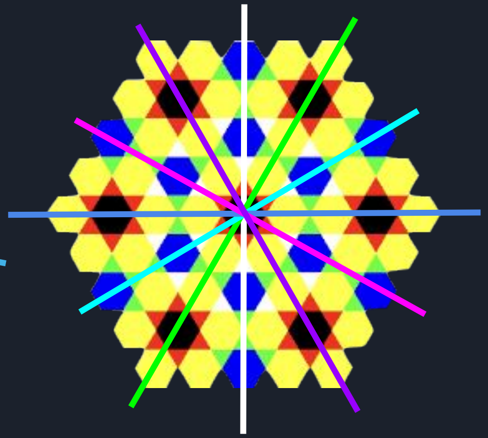
Lines of Symmetry: 1



Lines of Symmetry: 3



Lines of Symmetry: 9



Lines of Symmetry: 6

Chapter 1 - Symmetry and Surface Area
1.2 Rotational Symmetry

What is Rotational Symmetry?

Chapter 1 - Symmetry and Surface Area
1.2 Rotational Symmetry

What is Rotational Symmetry?

Rotational Symmetry is when an image can be rotated or turned around its center and matches its own original image perfectly at least once during one full rotation.

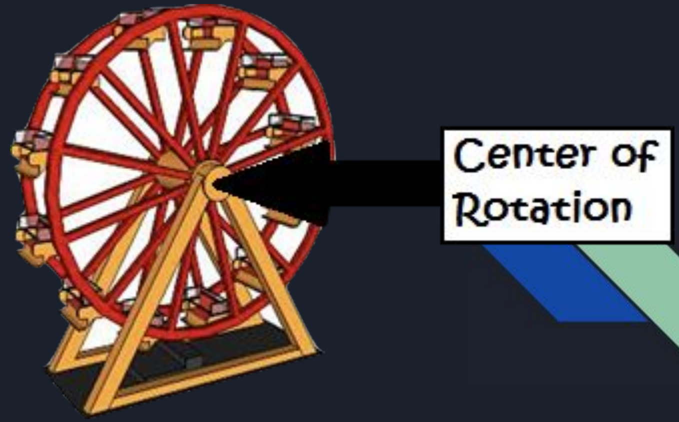
Chapter 1 - Symmetry and Surface Area
1.1 Line Symmetry

Center of Rotation

Chapter 1 - Symmetry and Surface Area
1.1 Line Symmetry

Center of Rotation

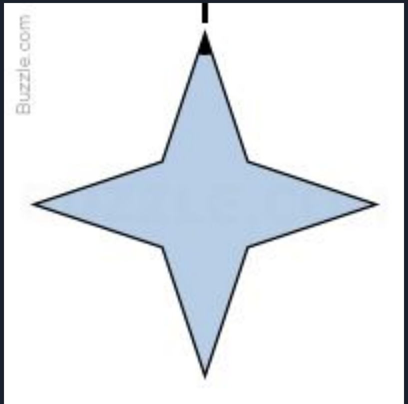
Center of Rotation is the center of the image and the point at which an image rotates around.



Chapter 1 - Symmetry and Surface Area
1.2 Rotational Symmetry

Order of Rotation

Chapter 1 - Symmetry and Surface Area
1.2 Rotational Symmetry



Order of Rotation

Order of Rotation is the number of times an image matches its own original image perfectly during one full rotation around its center of rotation. You include the original position but only once.

Chapter 1 - Symmetry and Surface Area
1.2 Rotational Symmetry

Angle/Degree of Rotation

Chapter 1 - Symmetry and Surface Area
1.2 Rotational Symmetry

Angle/Degree of Rotation

Angle of Rotation is the minimum measure of the angle needed to turn a shape or design onto itself.

You get this measurement by taking one full turn in degrees (360°) and dividing it by the Order of Rotation (the number of times the image matches itself during that turn).

Chapter 1 - Symmetry and Surface Area

1.2 Rotational Symmetry

Fraction of a Turn

Chapter 1 - Symmetry and Surface Area
1.2 Rotational Symmetry

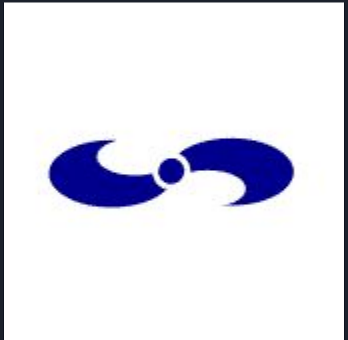
Fraction of a Turn

Fraction of a Turn is the minimum amount of a turn needed to rotate a shape or design onto itself.

You get this measurement by taking one full turn (1) and dividing it by the Order of Rotation (the number of times the image matches itself during that turn).

Chapter 1 - Symmetry and Surface Area
1.2 Rotational Symmetry

What is the Order of Rotational symmetry of each shape?
What is the Angle of Rotation in degrees and as a fraction?
What is the Fraction of a Turn



Chapter 1 - Symmetry and Surface Area

1.2 Rotational Symmetry

What is the Order of Rotational symmetry of each shape?
What is the Angle of Rotation in degrees and as a fraction?
What is the Fraction of a Turn

Order of Rotation: 2
Angle of Rotation:
360°/2
⇒ 180°
Fraction of a Turn: ½

Order of Rotation: 3
Angle of Rotation:
360°/3
⇒ 120°
Fraction of a Turn: ⅓

Order of Rotation: 8
Angle of Rotation:
360°/8
⇒ 45°
Fraction of a Turn: ⅛

Chapter 1 - Symmetry and Surface Area

1.2 Rotational Symmetry

What is the order of rotational symmetry of each shape?
What is the angle of rotation in degrees and as a fraction?
What is the fraction of a turn




Chapter 1 - Symmetry and Surface Area

1.2 Rotational Symmetry

What is the order of rotational symmetry of each shape?
What is the angle of rotation in degrees and as a fraction?
What is the fraction of a turn

Order of Rotation: 4
Angle of Rotation:
360°/4
⇒ 90°
Fraction of a Turn: ¼

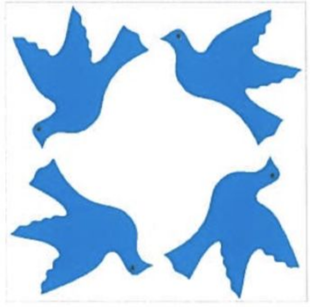
Order of Rotation: 3
Angle of Rotation:
360°/3
⇒ 120°
Fraction of a Turn: ⅓

Order of Rotation: 1
Angle of Rotation:
360°/1
⇒ 360°
Fraction of a Turn: 1

Order of Rotation: 5
Angle of Rotation:
360°/5
⇒ 72°
Fraction of a Turn: ⅕

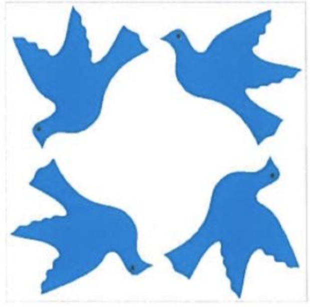
Chapter 1 - Symmetry and Surface Area
1.1 & 1.2 Line & Rotational Symmetry

Determine if the following shapes has line symmetry, rotational symmetry or both. How many lines of symmetry does each shape have? What is the order of rotation? What is the Fraction of Turn?



Chapter 1 - Symmetry and Surface Area
1.1 & 1.2 Line & Rotational Symmetry

Determine if the following shapes has line symmetry, rotational symmetry or both. How many lines of symmetry does each shape have? What is the order of rotation? What is the Fraction of Turn?



Line Symmetry: none
Order of Rotation: 4
Angle of Rotation:
360°/4
⇒ 90°
Fraction of a Turn: ¼

Line Symmetry: 5
Order of Rotation: 5
Angle of Rotation:
360°/5
⇒ 72°
Fraction of a Turn: ⅕

Line Symmetry: 8
Order of Rotation: 8
Angle of Rotation:
360°/8
⇒ 45°
Fraction of a Turn: ⅛

Line Symmetry: 4
Order of Rotation: 4
Angle of Rotation:
360°/4
⇒ 90°
Fraction of a Turn: ¼

Chapter 1 - Symmetry and Surface Area
1.3 Surface Area

What is Surface Area?

Chapter 1 - Symmetry and Surface Area
1.3 Surface AREa

What is Surface Area?

Surface Area is the total area of all surfaces present on an object. The easiest way to determine surface area is to label all surfaces (sides) of the object and determine the area, then calculate the total area.*

* Watch out for areas that missing or covered by other parts of the object.

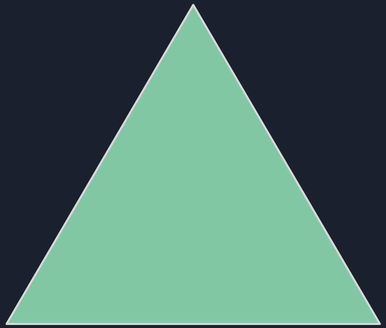
Chapter 1 - Symmetry and Surface Area
1.3 Surface Area

Area Formulas

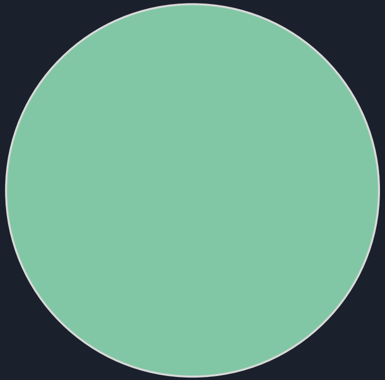
Chapter 1 - Symmetry and Surface Area
1.3 Surface Area

Area Formulas

Area = (Base x Height)



Area = (Base x Height) ÷ 2



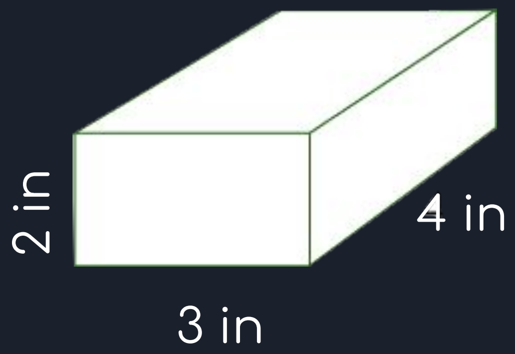
Area = πr^2

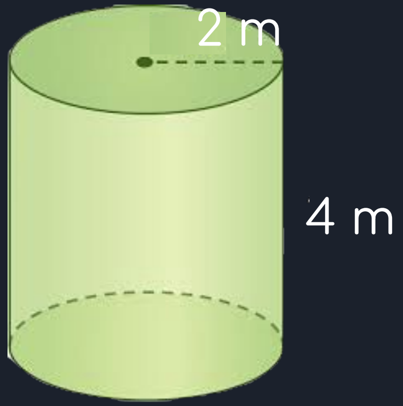
Circumference: πd
($2 \pi r$)

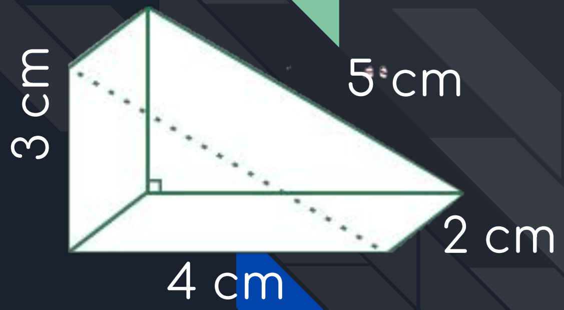
Chapter 1 - Symmetry and Surface Area

1.3 Surface Area

What is the Surface Area of the following images?

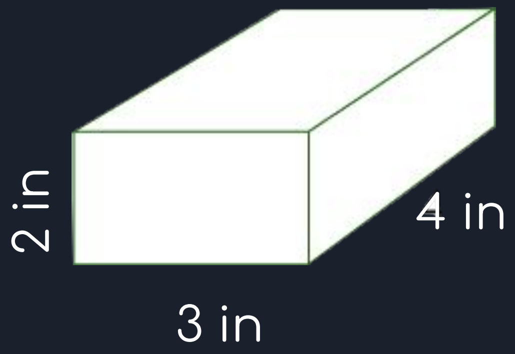






Chapter 1 - Symmetry and Surface Area
1.3 Surface Area

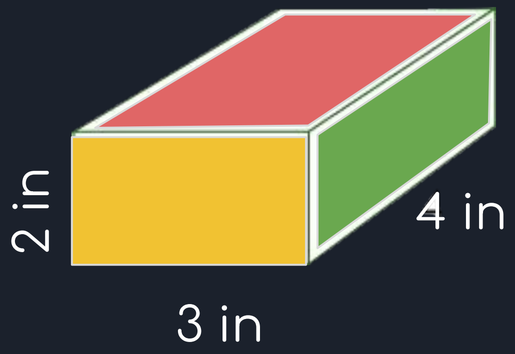
What is the Surface Area of the following images?



Chapter 1 - Symmetry and Surface Area

1.3 Surface Area

What is the Surface Area of the following images?



$= 12\ in^2 + 16\ in^2 + 24\ in^2$

$= 52\ in^2$

Sides: Front, Back, Left, Right, Top, Bottom

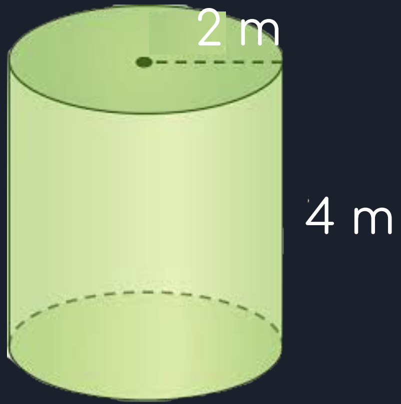
Front/Back (2 sides; Rectangles)
= Number of sides x Area of sides (b x h)
= 2 (2 x 3)
= 2 (6)
$= 12\ in^2$

Left/Right (2 sides, Rectangles)
= Number of sides x Area of sides (b x h)
= 2 (2 x 4)
= 2 (8)
$= 16\ in^2$

Top/Bottom (2 sides, Rectangles)
= Number of sides x Area of sides (b x h)
= 2 (4 x 3)
= 2 (12)
$= 24\ in^2$

Chapter 1 - Symmetry and Surface Area
1.3 Surface Area

What is the Surface Area of the following images?



Chapter 1 - Symmetry and Surface Area

1.3 Surface Area

What is the Surface Area of the following images?

$= 25.1\ m^2 + 50.3\ m^2$

$= 75.4\ m^2$

Sides: Top, Bottom, Side

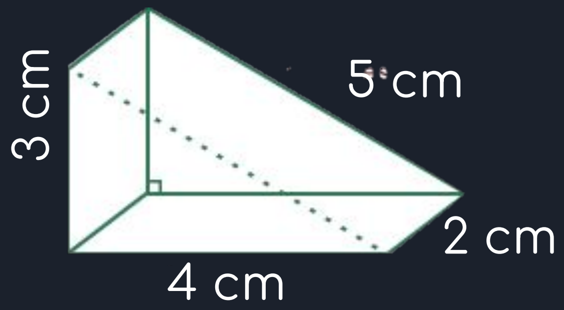
Top/Bottom (2 sides, Circles)
= Number of sides x Area of sides (πr^2)
$= 2 (\pi 2^2)$
$= 2 (\pi 4)$
$= 2 (12.56)$
$= 25.1\ m^2$

Side (1 side, Rectangle)
= Number of sides x Area of sides ((π d) x h)
$= 1 ((\pi \times 4) \times 4)$
$= 1 (12.56 \times 4)$
$= 50.3\ m^2$

Chapter 1 - Symmetry and Surface Area

1.3 Surface Area

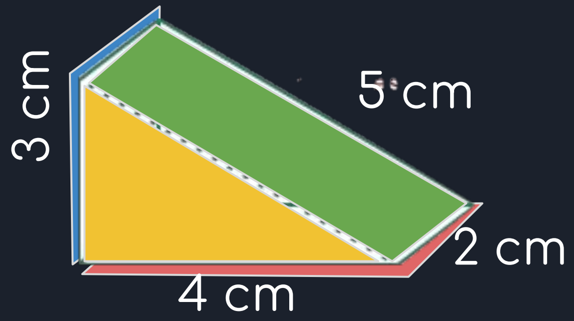
What is the Surface Area of the following images?



Chapter 1 - Symmetry and Surface Area

1.3 Surface Area

What is the Surface Area of the following images?



Sides: Front, Back, Ramp, Bottom, Left

Top/Bottom (2 sides, Triangles)
= Number of sides x Area of sides (b x h ÷ 2)
= 2 (4 x 3 ÷ 2)
= 2 (12 ÷ 2)
= 2 (6)
= 12 cm^2

Ramp (1 side, Rectangle)
= Number of sides x Area of sides (b x h)
= 1 (2 x 5)
= 10 cm^2

Bottom (1 side, Rectangles)
= Number of sides x Area of sides (b x h)
= 1 (4 x 2)
= 8 cm^2

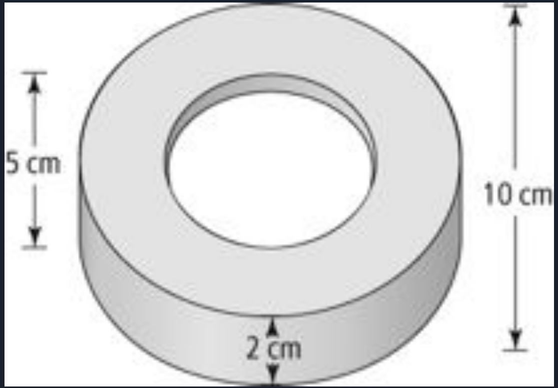
Left (1 side, Rectangles)
= Number of sides x Area of sides (b x h)
= 1 (2 x 3)
= 6 cm^2

= 12 cm^2 + 10 cm^2 + 8 cm^2 + 6 cm^2

= 36 cm^2

Chapter 1 - Symmetry and Surface Area
1.3 Surface AREa

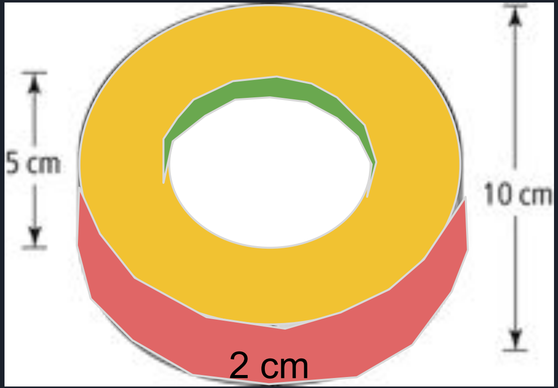
What is the Surface Area of the following images?



Chapter 1 - Symmetry and Surface Area

1.3 Surface Area

Sides: Top, Bottom, Inside ^{SMALL}, Outside ^{BIG}



Top/Bottom (2 sides; Circles)
= Number of sides x Area of sides ($\pi r^{2\ BIG} - \pi r^{2\ SMALL}$)
= 2 ((π 5^2) - (π 2.5^2)
= 2 ((π x 25) - (π x 6.25))
= 2 (78.5 - 19.6)
= 2 (58.9)
= 117.8 cm^2

Inside of Small Circle (1 side, Rectangle)
= Number of sides x Area of sides ((π d) x h)
= 1 ((π x 5) x 2)
= 1 (15.7 x 2)
= 31.4 cm^2

Outside of Large Circle (1 side, Rectangle)
= Number of sides x Area of sides ((π d) x h)
= 1 ((π x 10) x 2)
= 1 (31.4 x 2)
= 62.8 cm^2

= 117.8 cm^2 + 31.4 cm^2 + 62.8 cm^2

= 212 cm^2

Rational Numbers

Chapter 2 Review

Chapter 2 - Rational Numbers

Adding Integers

Chapter 2 - Rational Numbers

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.

Chapter 2 - Rational Numbers

Adding Integers → Practice

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

Chapter 2 - Rational Numbers

Subtracting Integers

Chapter 2 - Rational Numbers

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 → Practice

2 - (- 7)

- 9 - 3

- 12 - (- 15)

44 - 36

Chapter 2 - Rational Numbers

Multiplying and Dividing Integers

Chapter 2 - Rational Numbers

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

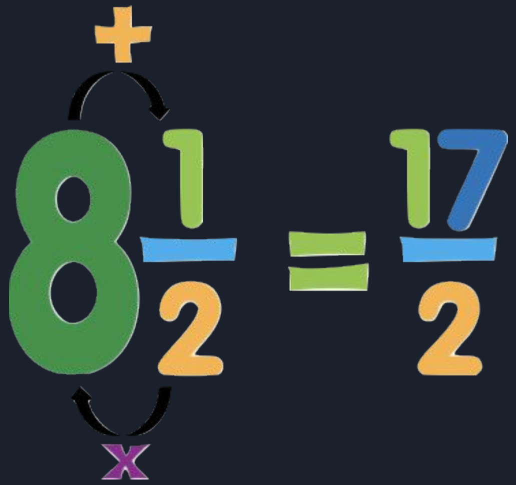
-2 x 5	-12 x -4	8 x 7	9 x -6
-12 ÷ 4	-144 ÷ -12	48 ÷ 8	32 ÷ -4

Chapter 2 - Rational Numbers

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.



Chapter 2 - Rational Numbers

Mixed Numbers to Improper Fractions

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

Chapter 2 - Rational Numbers

Improper Fractions to Mixed Numbers

Improper Fractions to Mixed Numbers

$$\frac{7}{4}$$

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

$$\begin{array}{r} 1 \\ 4\overline{)\,7} \\ -4 \\ \hline 3 \end{array}$$

$$1\frac{3}{4}$$

Chapter 2 - Rational Numbers

Improper Fractions to Mixed Numbers

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

Chapter 2 - Rational Numbers

Adding and Subtracting Fractions

Chapter 2 - Rational Numbers

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.

Chapter 2 - Rational Numbers

Adding and Subtracting Fractions

Chapter 2 - Rational Numbers

Multiplying and Dividing 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.

Chapter 2 - Rational Numbers

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.
3. Multiply the numerators by each other using Integer Operation Rules.
4. Multiply the denominator by each other using Integer Operation Rules.
5. Simplify by dividing the numerator and denominator by the same value.

Chapter 2 - Rational Numbers

Multiplying and Dividing Fractions

Chapter 2 - Rational Numbers

Greater Than & Less Than

What one's which?

$<$ $>$ $\leq$ $\geq$

Greater Than & Less Than

What one's which?

$<$	$>$	$\leq$	$\geq$
Less Than	Greater Than	Less Than or Equal To	Greater Than or Equal To

Chapter 2 - Rational Numbers

Greater Than & Less Than

Order of Operations

What is the Order Of Operations?

Chapter 2 - Rational Numbers

Order of Operations

What is the Order Of Operations?

B E D M A S

Order of Operations

What is the Order Of Operations?

B	E	D	M	A	S
Brackets	Exponents	Division	Multiplication	Addition	Subtraction

Chapter 2 - Rational Numbers

Order of Operations

What is the Order Of Operations?

Exponents & Exponent Laws

Chapter 3 Review

Chapter 3 - Exponents and Exponent Laws

What are exponents?

Chapter 3 - Exponents and Exponent Laws

What are exponents?

Exponents are a way to write repeated multiplication in a shorter, condensed format.

Ie. $5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5 = 5^{11}$

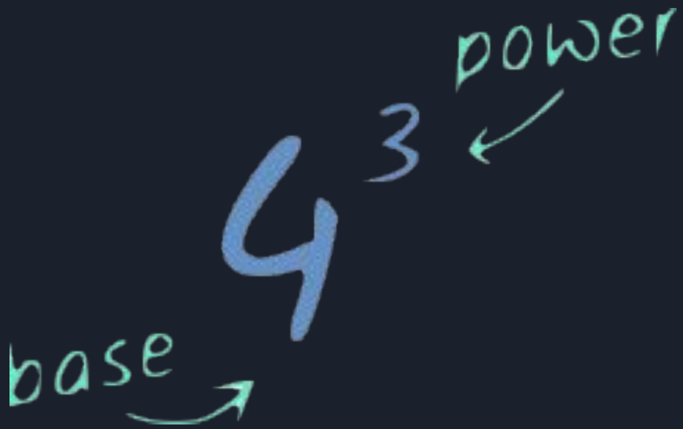
Chapter 3 - Exponents and Exponent Laws

Parts of an Exponent

$$4^3$$

Chapter 3 - Exponents and Exponent Laws

Parts of an Exponent



Base → The number you multiply by itself ⇒ 4

Power/Exponent → The number of times you multiply the base. ⇒ 3

⇒ 4 x 4 x 4

Chapter 3 - Exponents and Exponent Laws

Exponent Laws

Chapter 3 - Exponents and Exponent Laws

Exponent Laws

Exponent Laws are rules to follow in order to simplify exponent problems to make them easier to work with.

Chapter 3 - Exponents and Exponent Laws

Product Law

What it looks like...

$x^m \cdot x^n$

Identical bases being multiplied together.

Chapter 3 - Exponents and Exponent Laws

Product Law

$x^m \cdot x^n$

$= x^{m+n}$

Chapter 3 - Exponents and Exponent Laws

Quotient Law

What it looks like...

$x^m \div x^n$

Identical bases being dividing by one another.

Chapter 3 - Exponents and Exponent Laws

Quotient Law

What it looks like...

$x^m \div x^n$

$= x^{m-n}$

Chapter 3 - Exponents and Exponent Laws

Power Law

What it looks like...

$$(p^m)^n$$

A base being raised to an exponent inside brackets with a second exponent on the outside of the brackets.

Chapter 3 - Exponents and Exponent Laws

Power Law

What it looks like...

$(p^{m})^{n}$

$p^{m \cdot n}$

Chapter 3 - Exponents and Exponent Laws

Zero Exponent Law

What it looks like...

r^0

Any base being raised to the exponent of 0.

Chapter 3 - Exponents and Exponent Laws

Zero Exponent Law

What it looks like…

r^0

$= 1$

Negative Exponent Law

What it looks like...

w^{-6}

Any base being raised to a negative exponent.

Negative Exponent Law

What it looks like...

w^{-m}

$= {}^{1}/_{w^m}$

Chapter 3 - Exponents and Exponent Laws

Power of a Product Law

What it looks like...

$$(x \cdot y)^m$$

2 or more numbers being multiplied by one another, then raised to an exponent.

Chapter 3 - Exponents and Exponent Laws

Power of a Product Law

What it looks like...

$$(x \cdot y)^m$$

$$x^m \cdot y^m$$

Chapter 3 - Exponents and Exponent Laws

Power of a Quotient Law

What it looks like...

$(x \div y)^m$

2 numbers being divided, then raised to an exponent.

Chapter 3 - Exponents and Exponent Laws

Power of a Quotient Law

What it looks like...

$(x \div y)^m$

$x^m \div y^m$

Scale Images

Chapter 4 Review

Chapter 4 - Scale Images and Similarity

Scale Factor

Chapter 4 - Scale Images and Similarity

Scale Factor

In two similar geometric figures, the ratio of their corresponding sides is called the Scale Factor.

The Scale Factor is the value you multiply the original image by to get the new image.

Chapter 4 - Scale Images and Similarity

How do you find the Scale Factor?

Chapter 4 - Scale Images and Similarity

How do you find the Scale Factor?

To find the **scale factor**, locate two corresponding sides, one on each figure, and write the ratio of one length to the other.

Chapter 4 - Scale Images and Similarity

Scale Factors

What happens to an image if you have a Scale Factor…

<1

>1

$=1$

Scale Factors

What happens to an image if you have a Scale Factor…

<1 ⇒ image will get smaller

>1 ⇒ image will get larger

=1 ⇒ image will stay the same

Chapter 4 - Scale Images and Similarity

Setting Up Scale Factors

How do you set up a scale factor in terms of the diagram vs the actual object?

Chapter 4 - Scale Images and Similarity

Setting Up Scale Factors

To find the **scale factor**, locate two corresponding sides, one on each figure, and write the ratio of one length to the other.

Scale Factors are shown as a ratio or as a fraction in one of the following ways.

- original : new OR $^{original}/_{new}$

- diagram : actual. OR $^{diagram}/_{actual}$

Chapter 4 - Scale Images and Similarity

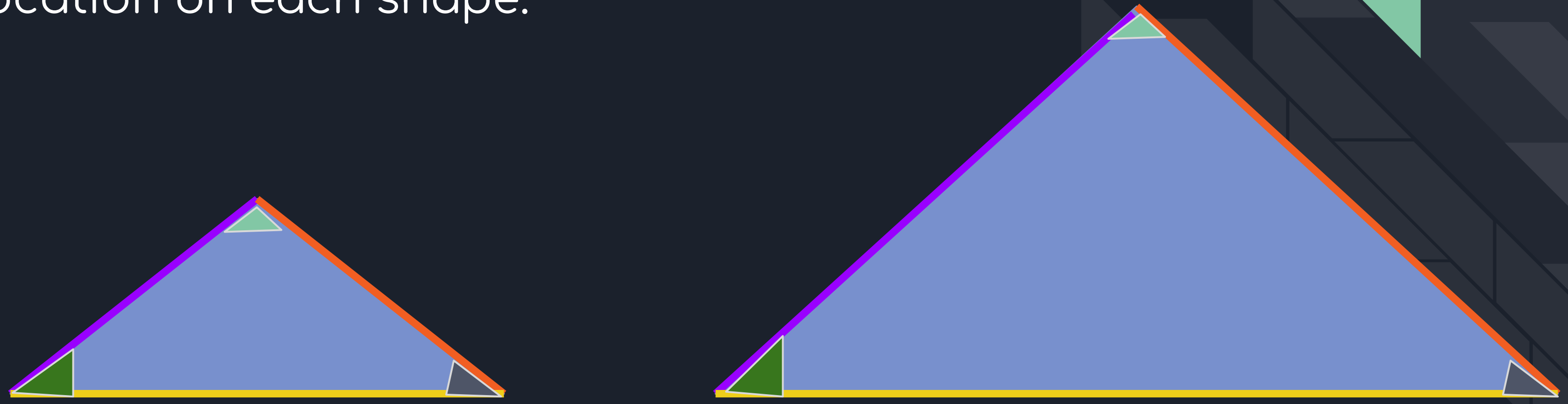
Corresponding Angles/Sides

Corresponding Angles/Sides

Corresponding angles and corresponding sides are the angle or side in the same location on each shape.

Corresponding Angles/Sides

Corresponding angles and corresponding sides are the angle or side in the same location on each shape.



Chapter 4 - Scale Images and Similarity

Proportional

Chapter 4 - Scale Images and Similarity

Proportional

Proportional means to have the same ratio. If the sides of two triangles are proportional, then each set of corresponding sides have the same scale ratio ($^{\text{original}}/_{\text{new}}$)

Types of Triangles

Chapter 4 - Scale Images and Similarity

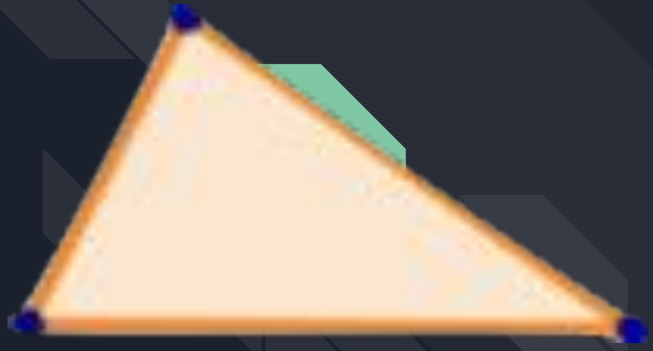
Types of Triangles

Chapter 4 - Scale Images and Similarity

Types of Triangles


Equilateral


Isosceles


Scalene

Types of Triangles

Equilateral	Isosceles	Scalene
3 equal sides 3 equal angles	2 equal sides 2 equal angles	0 equal sides 0 equal angles

Adding & Subtracting Polynomials

Chapter 5 Review

Chapter 5 - Adding and Subtracting Polynomials

Parts of a Polynomial

Chapter 5 - Adding and Subtracting Polynomials

Parts of a Polynomial

$$-8x^4 - 5x^3 - 3x^2 + 7x + 13$$

Chapter 5 - Adding and Subtracting Polynomials

Parts of a Polynomial

$$-8x^4 - 5x^3 - 3x^2 + 7x + 13$$

Coefficient Exponent Variable TermConstant

Chapter 5 - Adding and Subtracting Polynomials

Parts of a Polynomial

Coefficient: the number before the variable. If no number is present, it is a 1.

Variable: the unknown, usually represented by a letter

Term: is a single number, variable, or numbers and variables multiplied together, which are separated by + or – signs.

Exponent: the small number after a variable. If no number is present, but there is a variable, the exponent value is 1.

Constant: the number on its own without a variable.

Chapter 5 - Adding and Subtracting Polynomials

Parts of a Polynomial

$$-4x^4 - 2x^3 - x^2 + 9x + 25$$

Chapter 5 - Adding and Subtracting Polynomials

Naming Polynomials

Chapter 5 - Adding and Subtracting Polynomials

Naming Polynomials

Number of Terms	Name	Example
1		
2		
3		
4 or more		

Naming Polynomials

Number of Terms	Name	Example
1	monomial	$5x$ | -7 | $12xyz$
2	binomial	$2x + 3$ | $5y - x$ | $x + y$
3	trinomial	$3x^2 + 2x - 5$ | $xyz + 3x + 7$
4 or more	polynomial	$x^3 - 2x^3 + 11x^2 - 3$

Chapter 5 - Adding and Subtracting Polynomials

Naming Polynomials

$x^3 - 4x^3 + x^2 - 3$

$2x + 3y$

$12wxyz$

$xyz + 3x + 7$

Chapter 5 - Adding and Subtracting Polynomials

Degree of a Term

Chapter 5 - Adding and Subtracting Polynomials

Degree of a Term

1. Look for the variables (the letters within the term)

2. Look for the exponents attached to **each** variable. If not exponent is present, the exponent is 1.

3. Add the exponents of each variable together. This is your degree for the term.

Chapter 5 - Adding and Subtracting Polynomials

Degree of a Term

$$-4x^4y - 2x^3 - x^2z + 9y + 25$$

Chapter 5 - Adding and Subtracting Polynomials

Degree of a Polynomial

Chapter 5 - Adding and Subtracting Polynomials

Degree of a Polynomial

1. Follow the steps to determine the Degree of a Term to determine the degree of **<u>each</u>** term of the polynomial.
2. The highest value Degree of a Term is the Degree of the entire Polynomial

Chapter 5 - Adding and Subtracting Polynomials

Degree of a Polynomial

$$-2x^4y - 5x^3 - 3x^2z^2 + 9z^3 + 2$$

Chapter 5 - Adding and Subtracting Polynomials

Modelling Polynomials

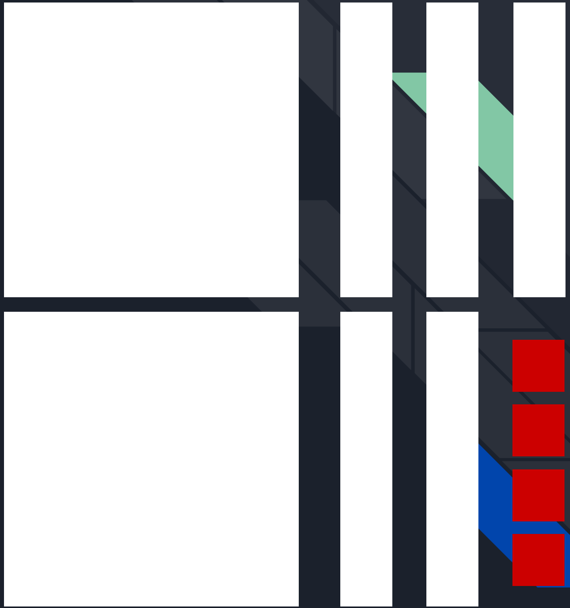
Chapter 5 - Adding and Subtracting Polynomials

Modelling Polynomials

Modelling Polynomials

$+x^2$ $-x^2$ $+x$ $-x$ $+1$ -1

Modelling Polynomials



Chapter 5 - Adding and Subtracting Polynomials

Like Terms

Chapter 5 - Adding and Subtracting Polynomials

Like Terms

Like Terms have the same combination of variables with the same corresponding exponents.

Chapter 5 - Adding and Subtracting Polynomials

Determine the Like Terms Below

$3x$ $9xy$ x^2 x^2y^3 $5xy$ xyz $4x^2y^3$

$-4x$ $9x^2$ $12xyz$ $5x$ $-2xzy$ $4x^2$

Chapter 5 - Adding and Subtracting Polynomials

Adding Polynomials

Chapter 5 - Adding and Subtracting Polynomials

Adding Polynomials

To add polynomials, just combine like terms using the integer rules.

- 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.

Chapter 5 - Adding and Subtracting Polynomials

Adding the following Polynomials

$5x^2 + 3x - 5$ and $-3x^2 + 4x - 7$

Chapter 5 - Adding and Subtracting Polynomials

Adding the following Polynomials

$5x^2 + 3x - 5$ and $-3x^2 + 4x - 7$

$= (5x^2 + 3x - 5) + (-3x^2 + 4x - 7)$

$= 5x^2 - 3x^2 + 3x + 4x - 5 - 7$

$= 2x^2 + 7x - 12$

Chapter 5 - Adding and Subtracting Polynomials

Opposite Polynomials

Chapter 5 - Adding and Subtracting Polynomials

Opposite Polynomials

To create opposite polynomials, simply switch the sign of each term of the polynomial to the opposite.

- If it was a positive, switch it to a negative. $+ \longrightarrow -$
- If it was a negative, switch it to a positive. $- \longrightarrow +$

Opposite Polynomials

Change each of the following to the opposite polynomial

$-5x$ $3x^2 + 5x$ $-x^2 - 4x + 3$

Chapter 5 - Adding and Subtracting Polynomials

Subtracting Polynomials

Chapter 5 - Adding and Subtracting Polynomials

Subtracting Polynomials

1. Apply KiSS Method
   Keep first polynomials
   Switch sign from subtraction to addition
   Switch each of the signs from the second polynomial to its opposite
2. Treat it like an addition problem and combine like terms using the integer rules.
   - 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.

Chapter 5 - Adding and Subtracting Polynomials

Subtract ($-3x^2 + 4x - 7$) from ($5x^2 + 3x - 5$)

Chapter 5 - Adding and Subtracting Polynomials

Subtract $(-3x^2 + 4x - 7)$ from $(5x^2 + 3x - 5)$

$= (5x^2 + 3x - 5) - (-3x^2 + 4x - 7)$

$= (5x^2 + 3x - 5) + (+3x^2 - 4x + 7)$ $\Rightarrow$ KiSS

$= (5x^2 + 3x - 5) + (+3x^2 - 4x + 7)$

$= 5x^2 + 3x^2 + 3x - 4x - 5 + 7$

$= 8x^2 - 1x + 2$

Multiplying & Dividing Polynomials

Chapter 7 Review

Chapter 7 - Multiplying and Dividing Polynomials

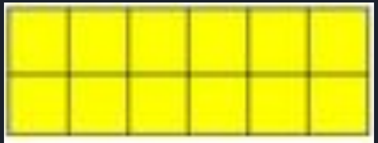
Multiplying Monomials - Tile Area Models

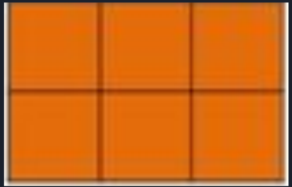
Chapter 7 - Multiplying and Dividing Polynomials

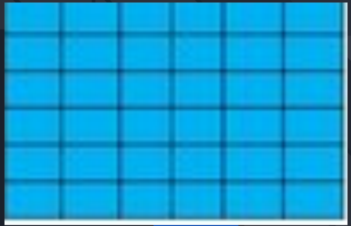
Multiplying Monomials - Tile Area Models

Remember... area is length x width.

What expressions are shown below?



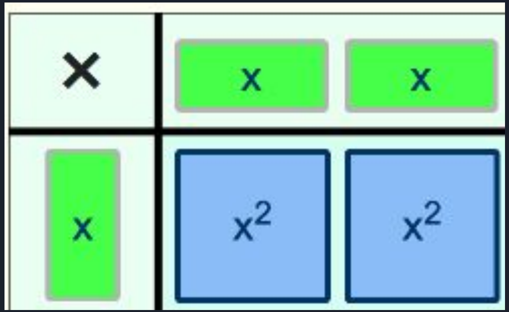




Chapter 7 - Multiplying and Dividing Polynomials

Multiplying Monomials - Tile Area Models

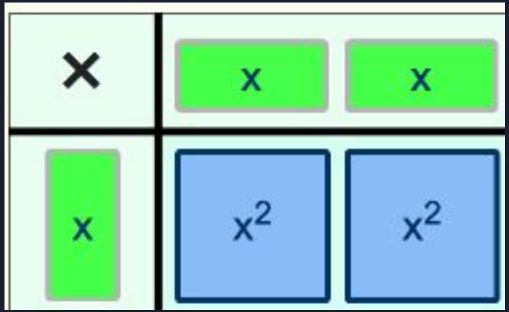
So what does the following image represent?



Chapter 7 - Multiplying and Dividing Polynomials

Multiplying Monomials - Tile Area Models

So what does the following image represent?

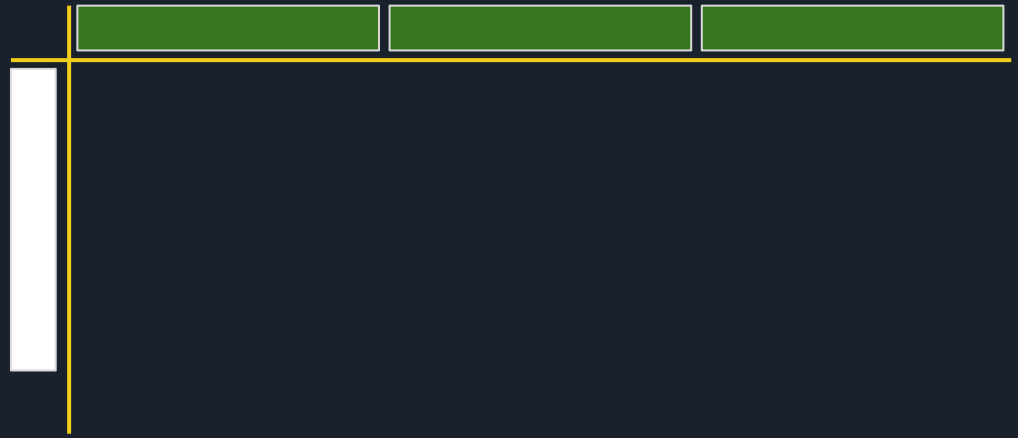


$$\Rightarrow 2x \cdot x$$
$$= 2x^2$$

Chapter 7 - Multiplying and Dividing Polynomials

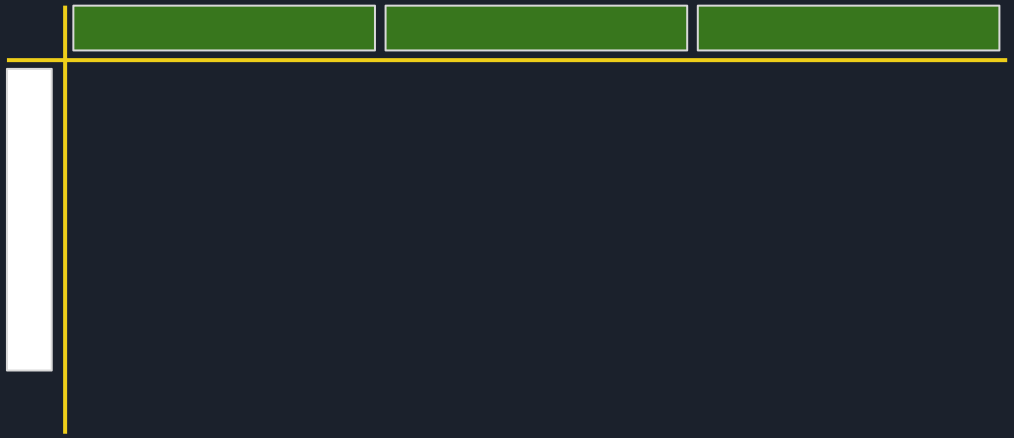
Multiplying Monomials - Tile Area Models

What expression would the following represent?



Multiplying Monomials - Tile Area Models

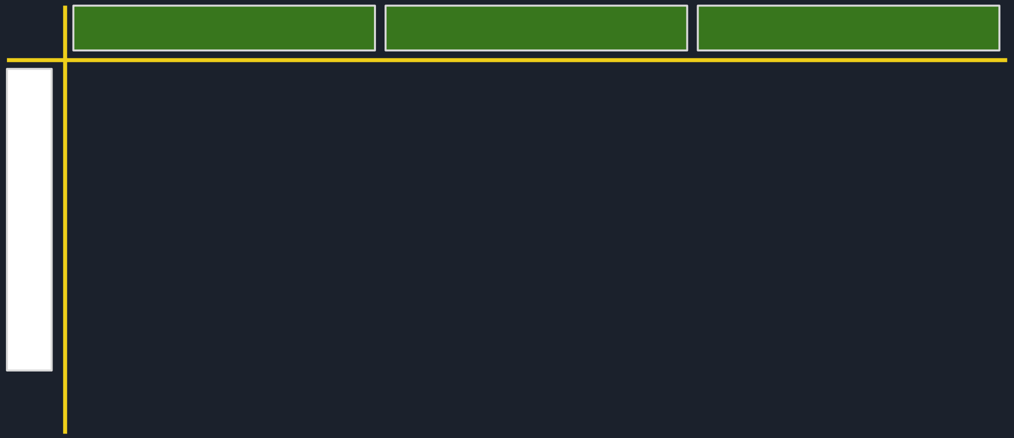
What expression would the following represent?



$\Rightarrow 3x \cdot -x$

Multiplying Monomials - Tile Area Models

What expression would the following represent? What would it equal?



$\Rightarrow 3x \cdot -x$

Multiplying Monomials - Tile Area Models

What expression would the following represent? What would it equal?

$\Rightarrow 3x \cdot -x$

$= -3x^2$

Chapter 7 - Multiplying and Dividing Polynomials

Multiplying Monomials - Algebraically

Reminder...

Product Law

What it looks like...identical bases being multiplied together.

$$x^m \cdot x^n$$

Simplification Law:

$$= x^{m+n}$$

Multiplying Monomials - Algebraically

When you multiply monomials together...

1. Multiply the coefficients together
2. Multiply each variable together following the Product Law. (add your exponents)

Ex.

$$5x \cdot 6xy \Rightarrow (5\cdot6)(x\cdot xy) \Rightarrow 30(x\cdot x\cdot y) \Rightarrow 30x^2y$$

Chapter 7 - Multiplying and Dividing Polynomials

Multiplying Monomials - Algebraically

Practice

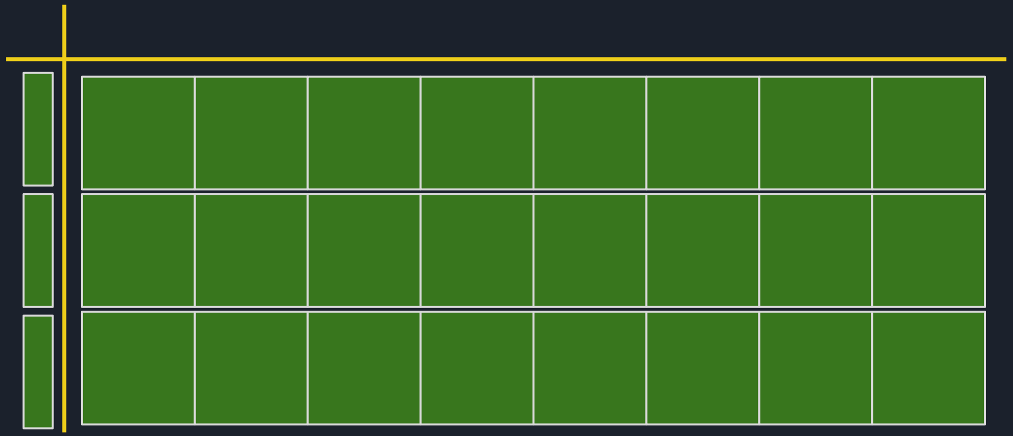
Dividing Monomials - Tile Models

How would you set up $24x^2 \div 3x$?

Chapter 7 - Multiplying and Dividing Polynomials

Dividing Monomials - Tile Models

How would you set up $24x^2 \div 3x$?

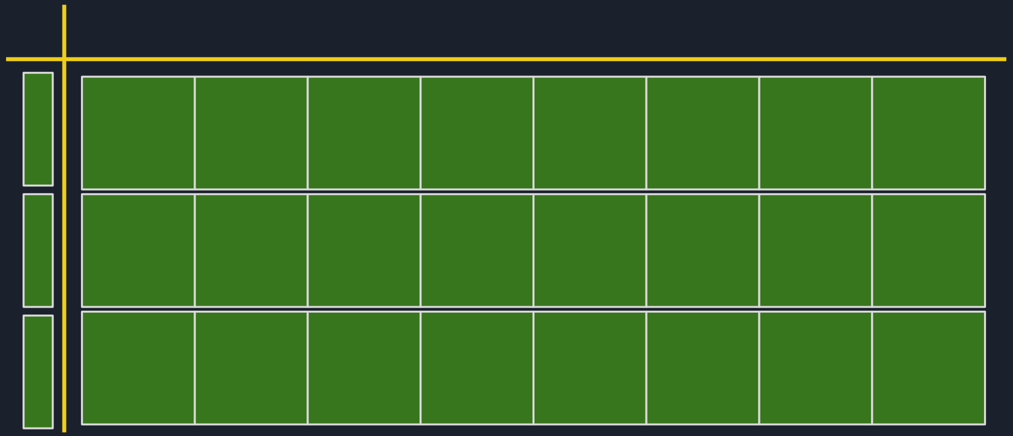


Chapter 7 - Multiplying and Dividing Polynomials

Dividing Monomials - Tile Models

How would you set up $24x^2 \div 3x$?

What is $24x^2 \div 3x$? How do you determine this?



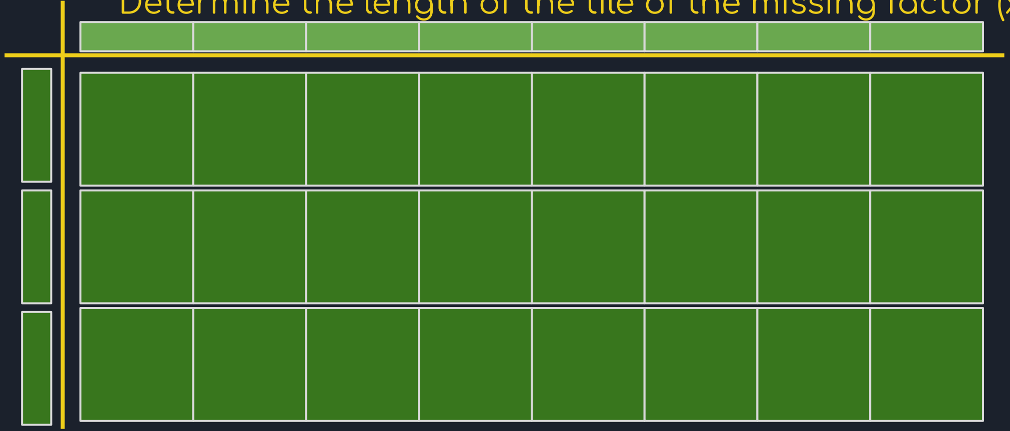
Chapter 7 - Multiplying and Dividing Polynomials

Dividing Monomials - Tile Models

How would you set up $24x^2 \div 3x$?

What is $24x^2 \div 3x$? How do you determine this?

Determine the length of the tile of the missing factor (x) and count how many you need (8).



$\Rightarrow 24x^2 \div 3x$

$= 8x$

Chapter 7 - Multiplying and Dividing Polynomials

Dividing Monomials - Algebraically

Chapter 7 - Multiplying and Dividing Polynomials

Reminder...

Quotient Law

What it looks like...identical bases being dividing by one another.

$$x^{m} \div x^{n}$$

Simplification Law:

$$= x^{m-n}$$

Dividing Monomials - Algebraically

When you divide monomials...

1. Divide the coefficients
2. Divide each variable following the Quotient Law. (subtract your exponents)

Ex.

$$36xy \div 6x \Rightarrow (36 \div 6)(xy \div x) \Rightarrow 6(y \cdot x \div x) \Rightarrow 6y$$

Chapter 7 - Multiplying and Dividing Polynomials

Dividing Monomials - Algebraically

Practice

Chapter 7 - Multiplying and Dividing Polynomials

Multiplying Monomials by Polynomials

Area Model

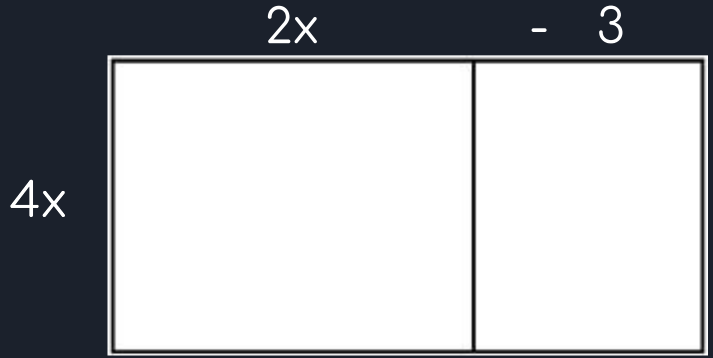
What does a polynomial area model look like?

Chapter 7 - Multiplying and Dividing Polynomials

Multiplying Monomials by Polynomials

Area Model

What does a polynomial area model look like?

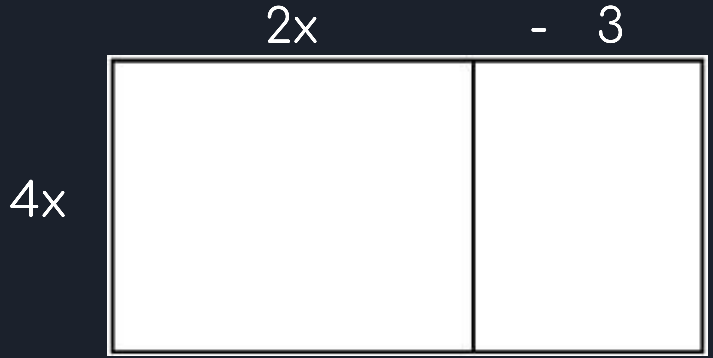


Multiplying Monomials by Polynomials

Area Model

What does a polynomial area model look like?

What would this model give you?



Multiplying Monomials by Polynomials

Area Model

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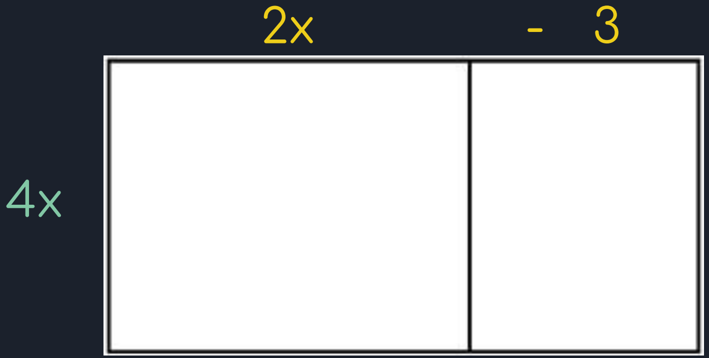


$$
\begin{aligned}
\Rightarrow\ & 4x\,(2x - 3) \\
&= (4x \cdot 2x) + (4x \cdot -3) \\
&= [(4\cdot 2)(x\cdot x)] + [(4\cdot -3)(x)] \\
&= 8x^2 + -12x \\
&= 8x^2 - 12x
\end{aligned}
$$

Multiplying Monomials by Polynomials

Tile Model

How would you set up $(2x)(3x + 3)$ with tiles?

Multiplying Monomials by Polynomials

Tile Model

How would you set up $(2x)(3x + 3)$ with tiles?

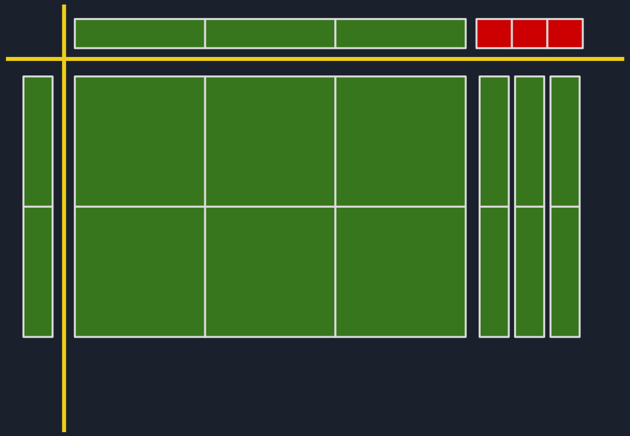
What would you get as a product?

Multiplying Monomials by Polynomials

Tile Model

How would you set up $(2x)(3x + 3)$ with tiles?

What would you get as a product?



$$\Rightarrow (2x)(3x + 3)$$
$$= (2x \cdot 3x) + (2x \cdot 3)$$
$$= [(2 \cdot 3)(x \cdot x)] + [(2 \cdot 3)(x)]$$
$$= 6x^2 + 6x$$

Multiplying Monomials by Polynomials

Distributive Law

What is the Distributive Law?

Multiplying Monomials by Polynomials

Distributive Law

What is the Distributive Law?

The Distributive Law says that multiplying a number by a group of numbers added together is the same as doing each multiplication separately.

Ex.

$$3(4 + 5) \Rightarrow (3 \cdot 4) + (3 \cdot 5)$$

Chapter 7 - Multiplying and Dividing Polynomials

Multiplying Monomials by Polynomials Algebraically

What is $5x(4x - 6)$?

Multiplying Monomials by Polynomials Algebraically

What is $5x(4x - 6)$?

$= (5x \cdot 4x) + (5x \cdot -6)$

$= [(5 \cdot 4)(x \cdot x)] + [(5 \cdot -6)(x)]$

$= 20x^2 + -30x$

$= 20x^2 - 30x$

Chapter 7 - Multiplying and Dividing Polynomials

Multiplying Monomials by Polynomials Algebraically

Practice

Chapter 7 - Multiplying and Dividing Polynomials

Dividing Monomials - Tile Model

How would you set up $(12x^2 - 4x) \div (2x)$ with tiles?

Chapter 7 - Multiplying and Dividing Polynomials

Dividing Monomials - Tile Model

How would you set up $(12x^2 - 4x) \div (2x)$ with tiles?

Chapter 7 - Multiplying and Dividing Polynomials

Dividing Monomials - Tile Model

How would you set up $(12x^2 - 4x) \div (2x)$ with tiles?

What is the missing factor in the model below?

Chapter 7 - Multiplying and Dividing Polynomials

Dividing Monomials - Tile Model

How would you set up $(12x^2 - 4x) \div (2x)$ with tiles?

What is the missing factor in the model below?

$\Rightarrow (12x^2 - 4x) \div (2x)$

$= (12x^2 \div 2x) + (-4x \div 2x)$

$= [(12 \div 2)(x^2 \div x)] + [(-4 \div 2)(x \div x)$

$= 6x + -2$

$= 6x - 2$

Dividing Monomials - Algebraically

What is $(49x^2 - 14x) \div (7x)$?

Dividing Monomials - Algebraically

What is $(49x^2 - 14x) \div (7x)$?

$= (49x^2 - 14x) \div (7x)$
$= [(49 \div 7)(x^2 \div x)] + [(-14 \div 7)(x \div x)]$
$= 7x + -2$
$= 7x - 2$

Chapter 7 - Multiplying and Dividing Polynomials

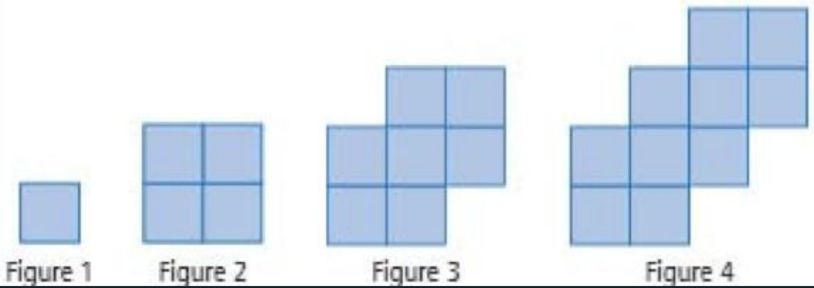
Dividing Monomials - Algebraically

Practice

Linear Relations

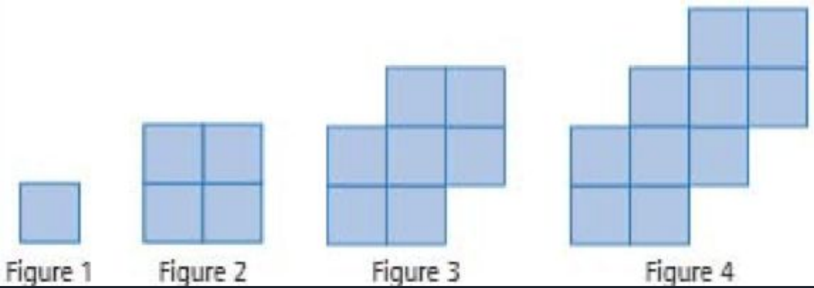
Chapter 6 Review

Chapter 6 - Linear Relations
Table of Values



How do you set up a Table of Values?

Chapter 6 - Linear Relations
Table of Values

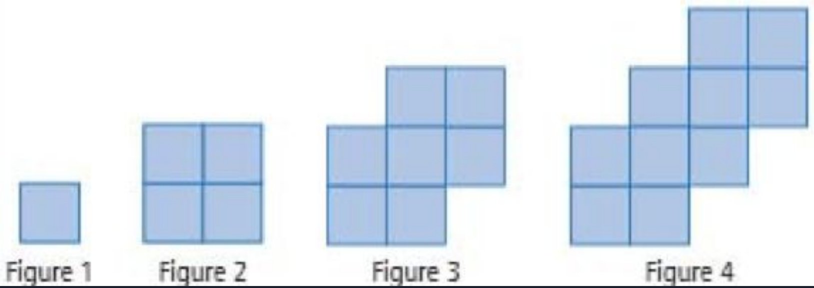


How do you set up a Table of Values?

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

Chapter 6 - Linear Relations

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	1
2	4
3	7
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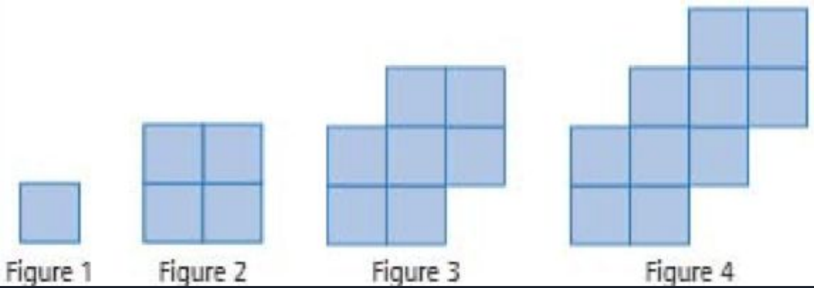
Chapter 6 - Linear Relations
Table of Values



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	1
2	4
3	7
4	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 = 3

3 • figure number - 2
= 3x - 2

Chapter 6 - Linear Relations

Table of Values

Creating a Table of Values from an Equation

Chapter 6 - Linear Relations

Table of Values

Creating a Table of Values from an Equation

= 5x + 4

x	y

Chapter 6 - Linear Relations

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.

Chapter 6 - Linear Relations

Table of Values

Creating a Table of Values from an Equation

= 5x + 4

x	y
0	4
1	9
2	14
3	19

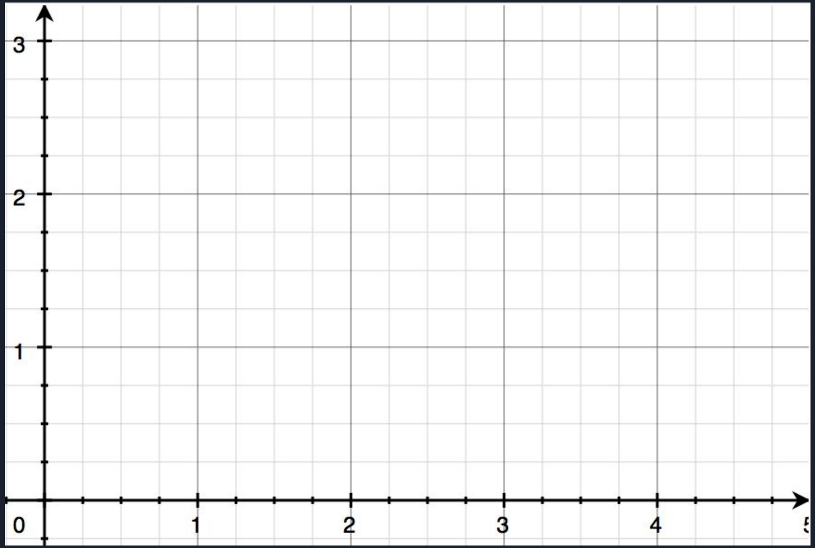
Substitute the values for x into the equation and solve for y.

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

Chapter 6 - Linear Relations

Graphing Linear Relations

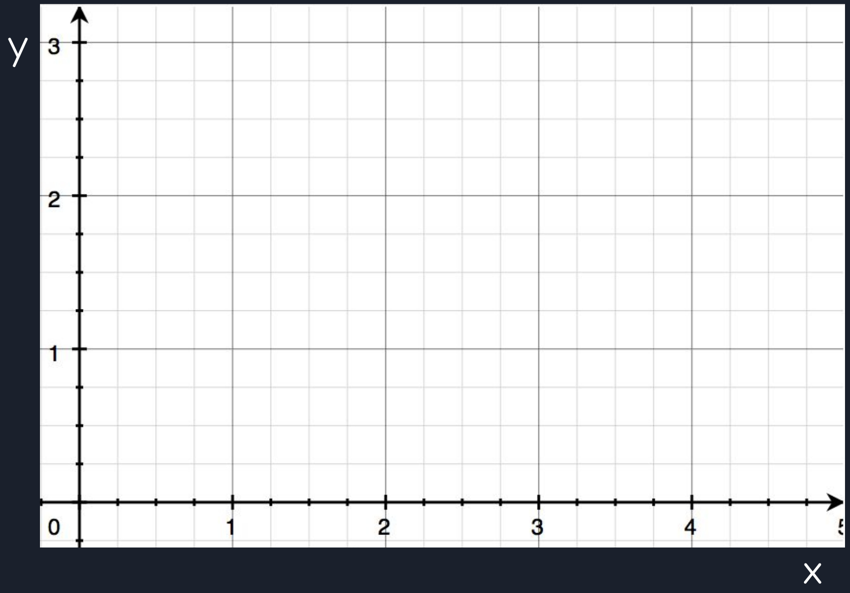
What do you label the axis?



Chapter 6 - Linear Relations

Graphing Linear Relations

What do you label the axis?



Chapter 6 - Linear Relations

Graphing Linear Relations

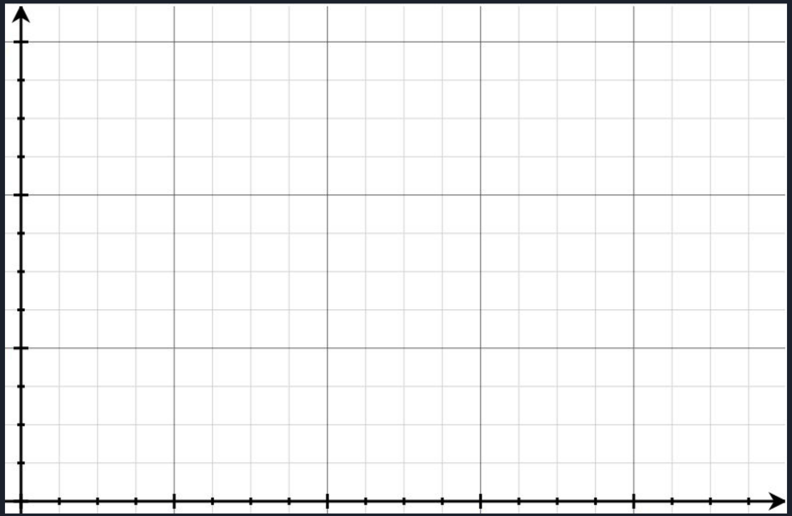
Graphing from a Table of Values

Chapter 6 - Linear Relations

Graphing Linear Relations

Graphing from a Table of Values

y



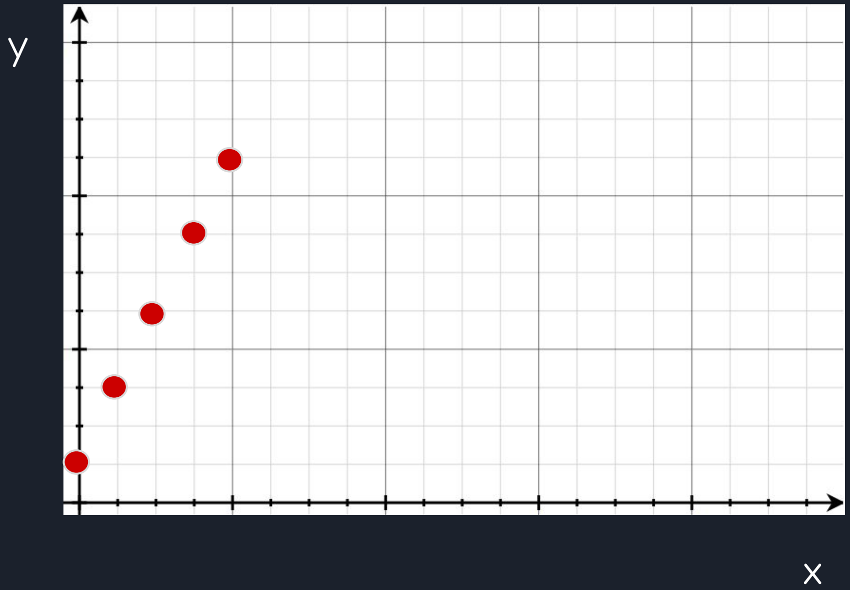
x

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

Chapter 6 - Linear Relations

Graphing Linear Relations

Graphing from a Table of Values

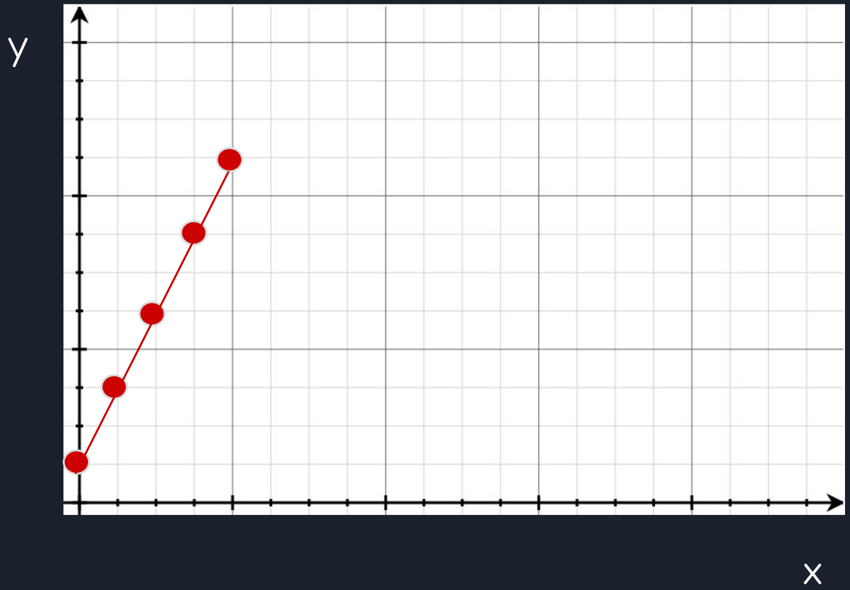


x	y
0	1
1	3
2	5
3	7
4	9

Chapter 6 - Linear Relations

Graphing Linear Relations

Graphing from a Table of Values



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

Chapter 6 - Linear Relations

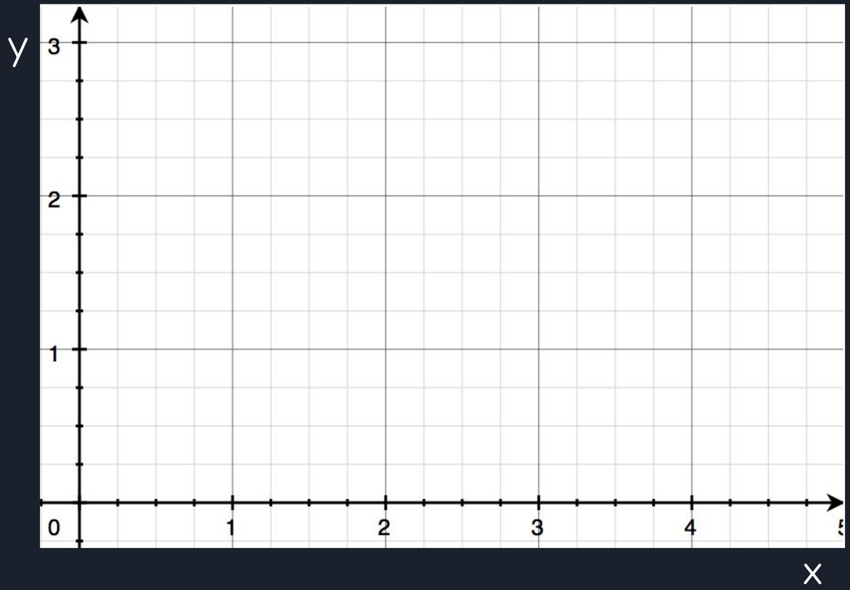
Graphing Linear Relations

Graphing from an Equation

Chapter 6 - Linear Relations

Graphing Linear Relations

Graphing from an Equation



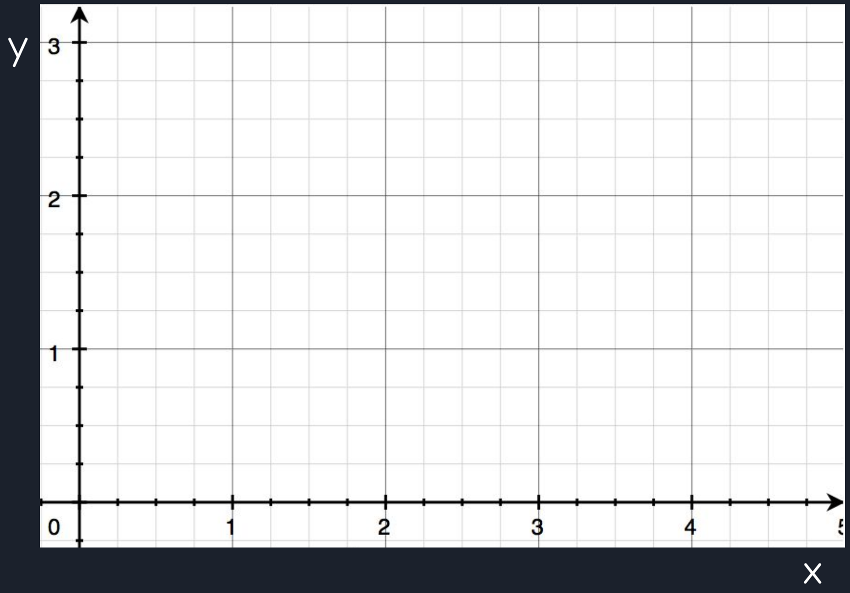
What does this equation mean?

$$b = 3f - 1$$

Chapter 6 - Linear Relations

Graphing Linear Relations

Graphing from an Equation



What does this equation mean?

$b = 3f - 1$

Slope-Intercept Form

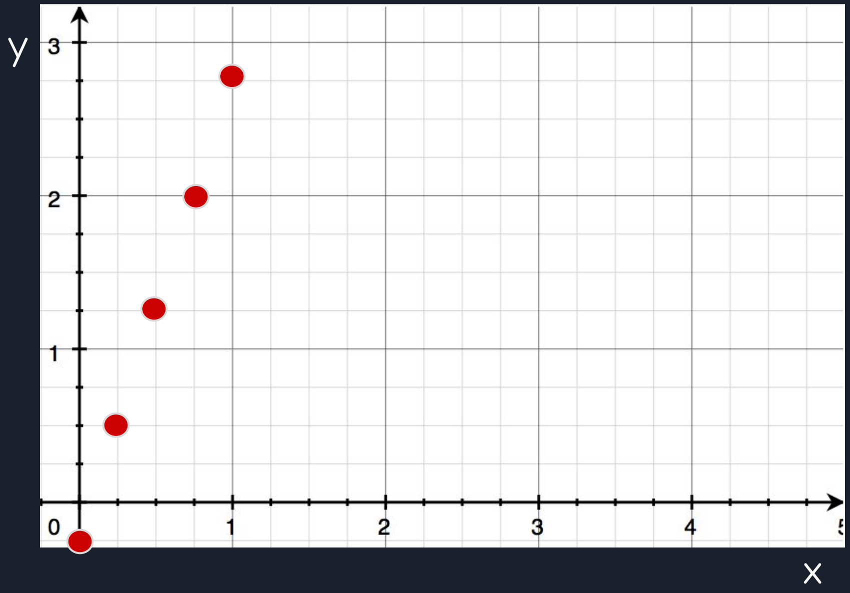
- Coefficient is the slope (how each point move on the graph; Rise-over-Run)

- Constant is y-Intercept (where the graph crosses the y-axis). It is the value of y when x is 0.

Chapter 6 - Linear Relations

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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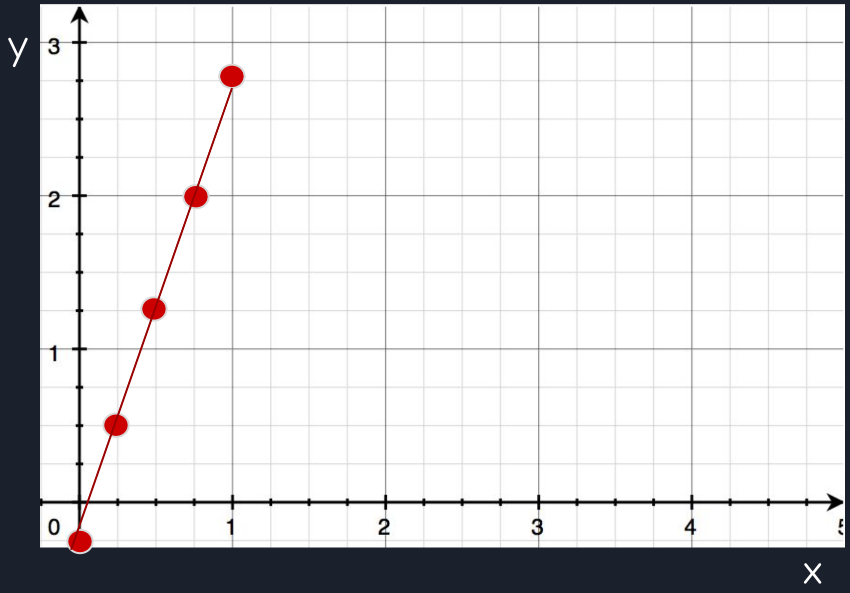
Chapter 6 - Linear Relations

Graphing Linear Relations

Graphing from an Equation



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Chapter 6 - Linear Relations

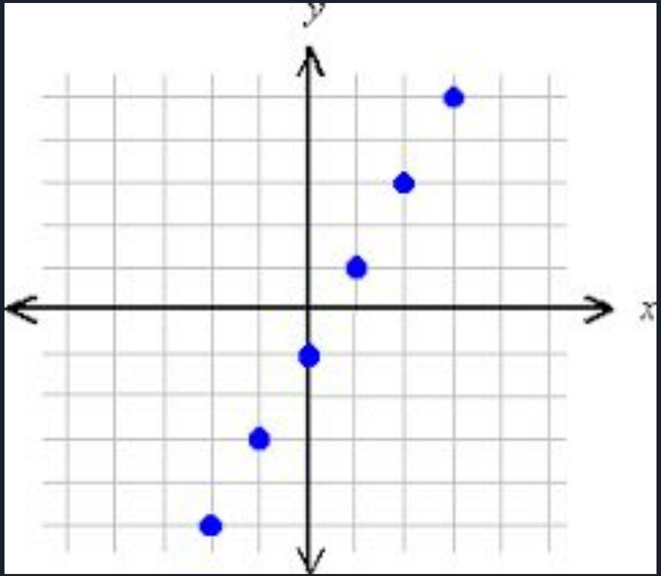
Graphing Linear Relations

Creating a Table of Values from a Graph

Chapter 6 - Linear Relations

Graphing Linear Relations

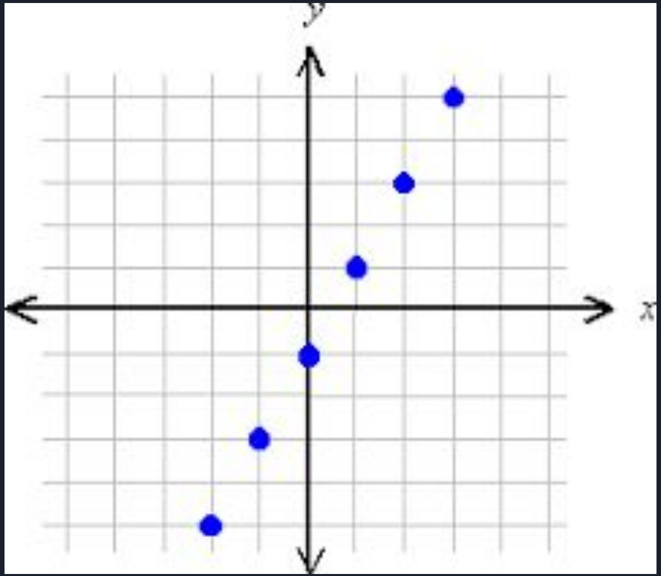
Creating a Table of Values from a Graph



Chapter 6 - Linear Relations

Graphing Linear Relations

Creating a Table of Values from a Graph

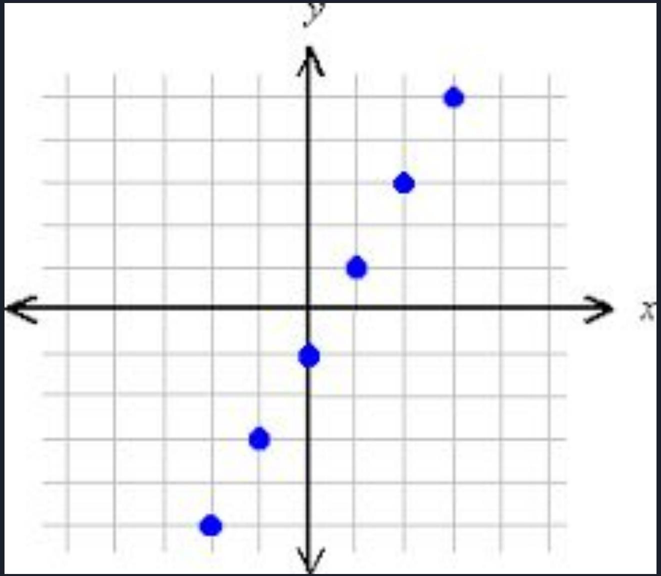


x	y
-2	-5
-1	-3
0	-1
1	1
2	3
3	5

Chapter 6 - Linear Relations

Graphing Linear Relations

Creating a Table of Values from a Graph



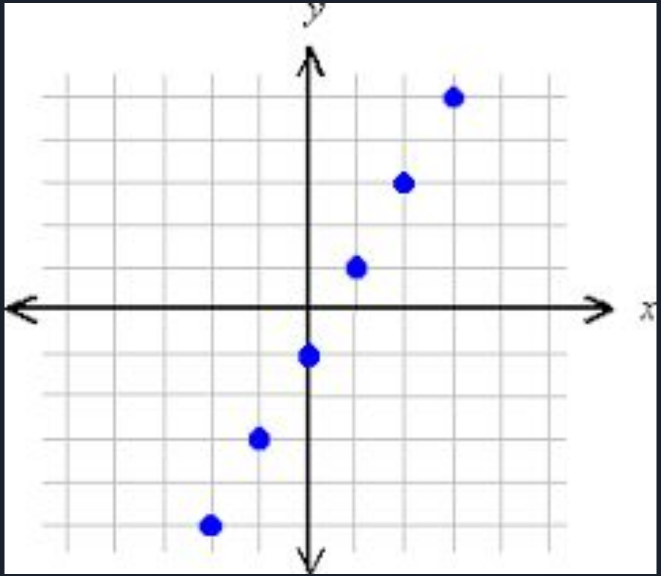
x	y
-2	-5
-1	-3
0	-1
1	1
2	3
3	5

What would the equation be?

Chapter 6 - Linear Relations

Graphing Linear Relations

Creating a Table of Values from a Graph



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

What would the equation be?

= 2x - 1

Chapter 6 - Linear Relations

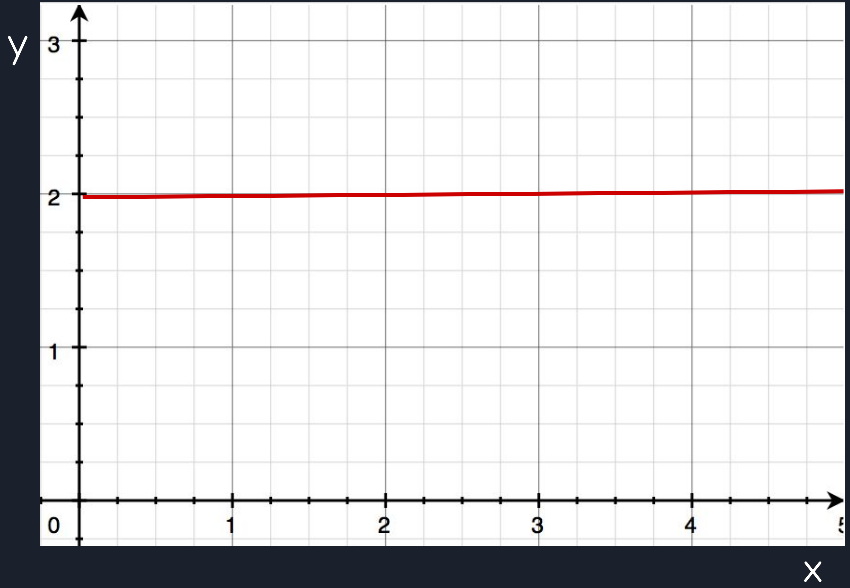
Graphing Linear Relations

Horizontal Graphs

Chapter 6 - Linear Relations

Graphing Linear Relations

Horizontal Graphs

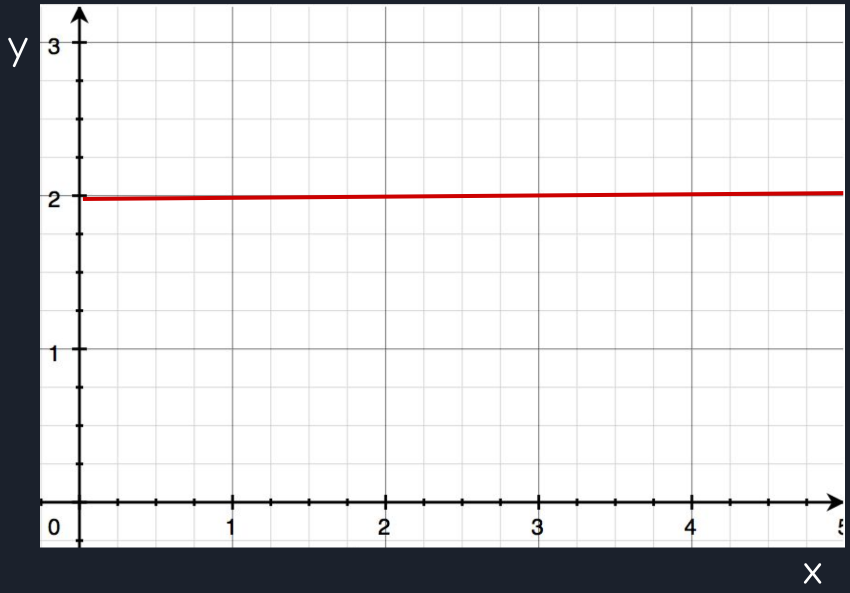


Chapter 6 - Linear Relations

Graphing Linear Relations

Horizontal Graphs

What value would be constant? (not change)



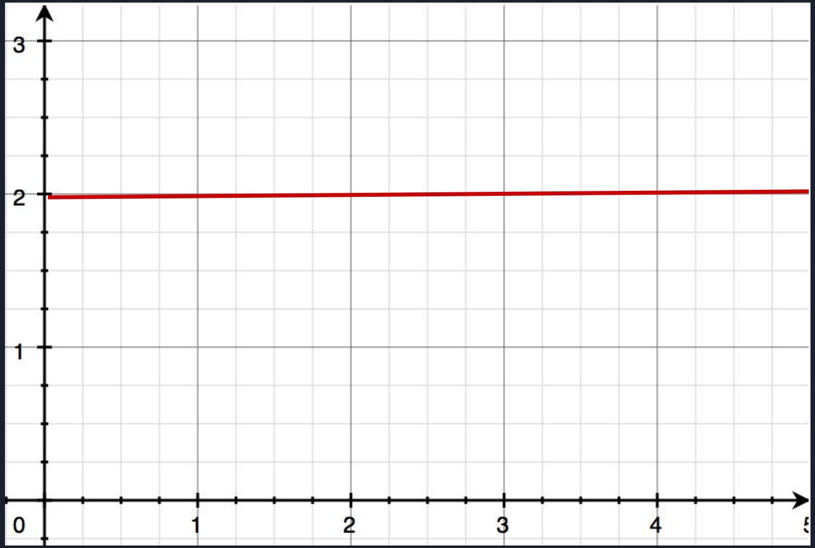
Chapter 6 - Linear Relations

Graphing Linear Relations

Horizontal Graphs

What value would be constant? (not change)

y



x

In horizontal graphs, the y value does not change.

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

Chapter 6 - Linear Relations

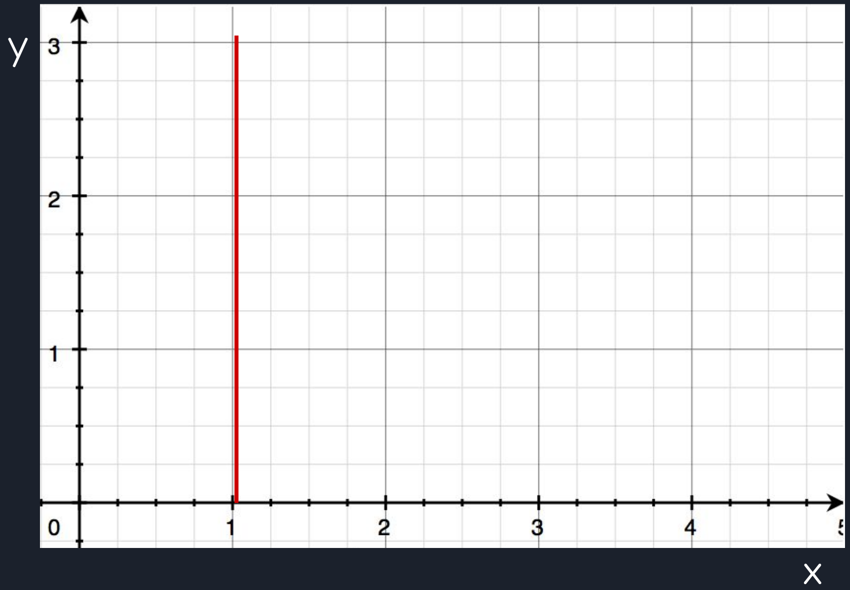
Graphing Linear Relations

Vertical Graphs

Chapter 6 - Linear Relations

Graphing Linear Relations

Vertical Graphs

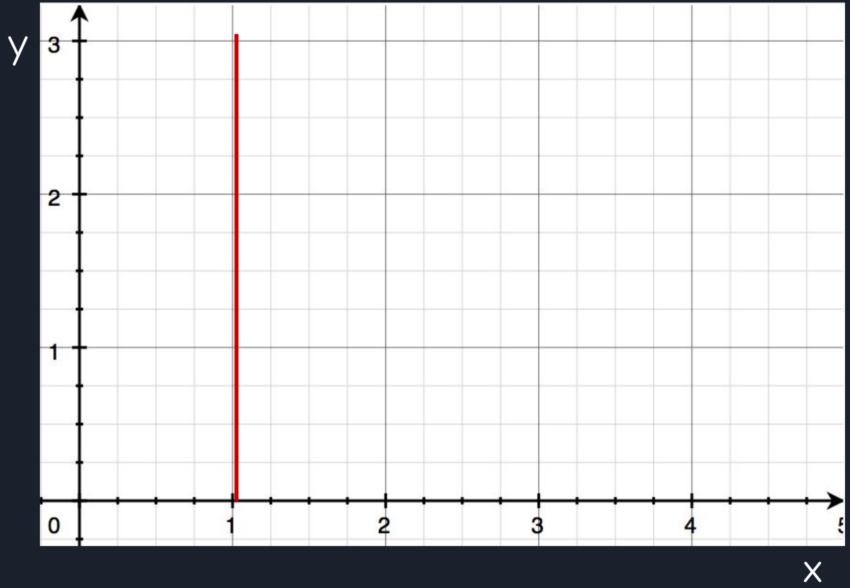


Chapter 6 - Linear Relations

Graphing Linear Relations

Vertical Graphs

What value would be constant? (not change)

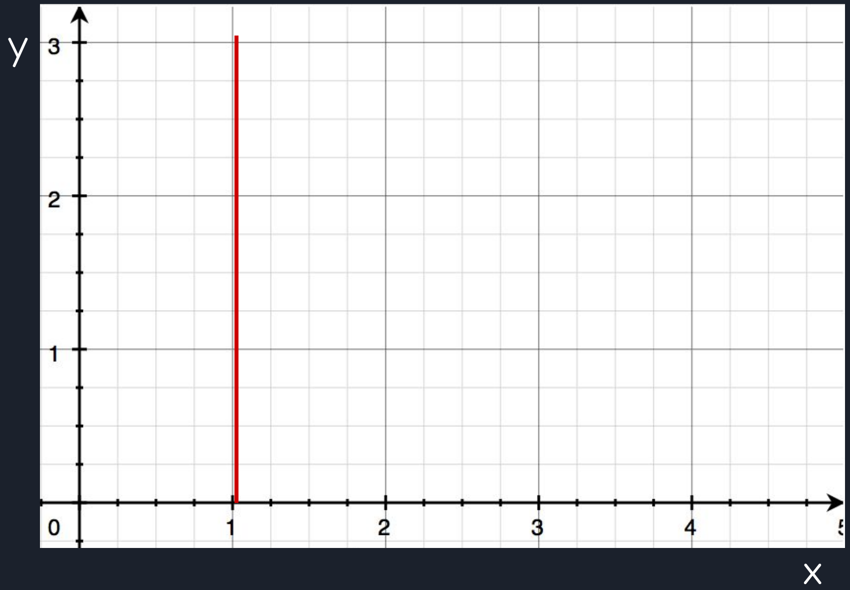


Chapter 6 - Linear Relations

Graphing Linear Relations

Vertical 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 6 - Linear Relations

Interpreting Graphs - Interpolation

What does it mean to Interpolate?

Chapter 6 - Linear Relations

Interpreting Graphs - Interpolation

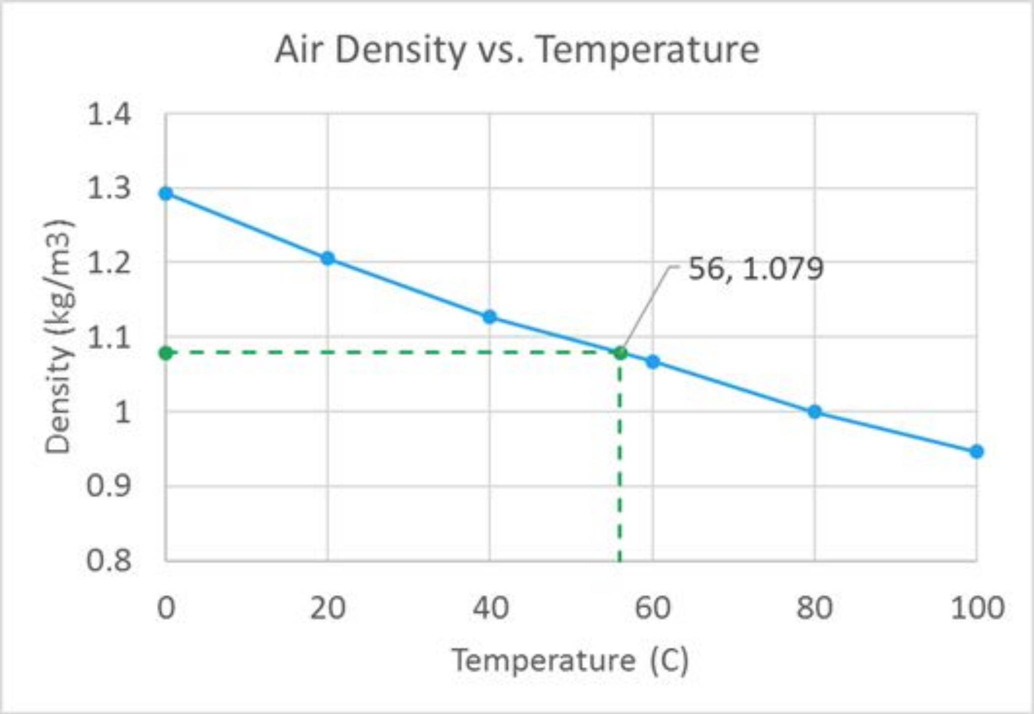
What does it mean to Interpolate?

Interpolate means to estimate a value in between given points on a graph.

** Inter ⇒ in=between

Chapter 6 - Linear Relations

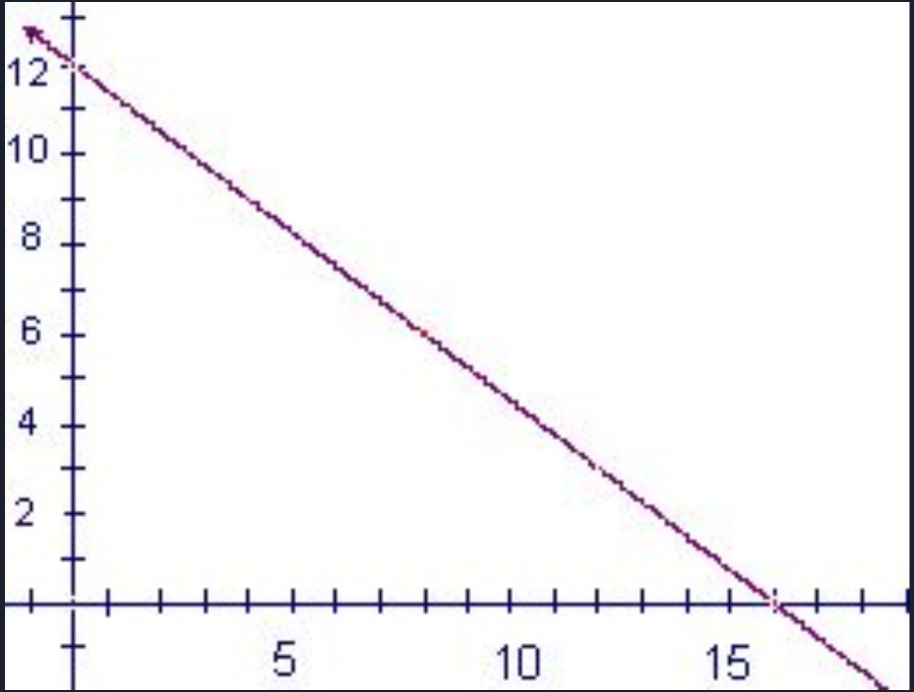
Interpreting Graphs - Interpolation



Chapter 6 - Linear Relations

Interpreting Graphs - Interpolation

Practice



Chapter 6 - Linear Relations

Interpreting Graphs - Extrapolation

What does it mean to Extrapolate?

Chapter 6 - Linear Relations

Interpreting Graphs - Extrapolation

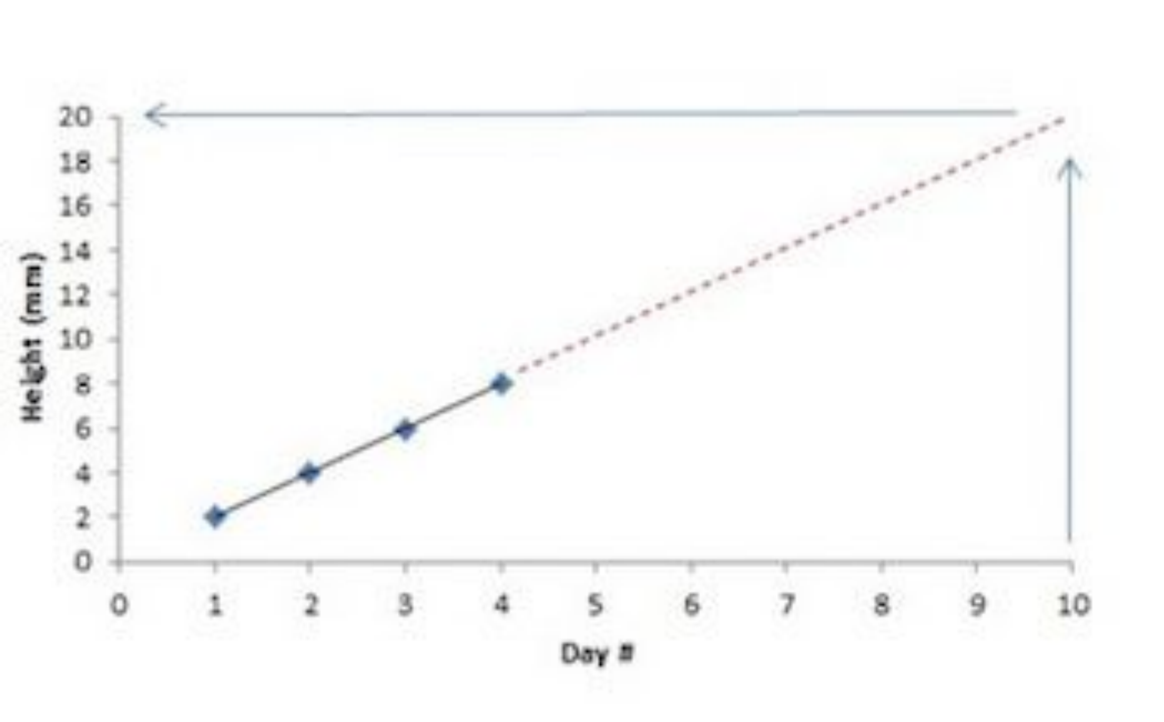
What does it mean to Extrapolate?

Extrapolate means to estimate a value in outside of the given points on a graph.

** Extra ⇒ extra information

Chapter 6 - Linear Relations

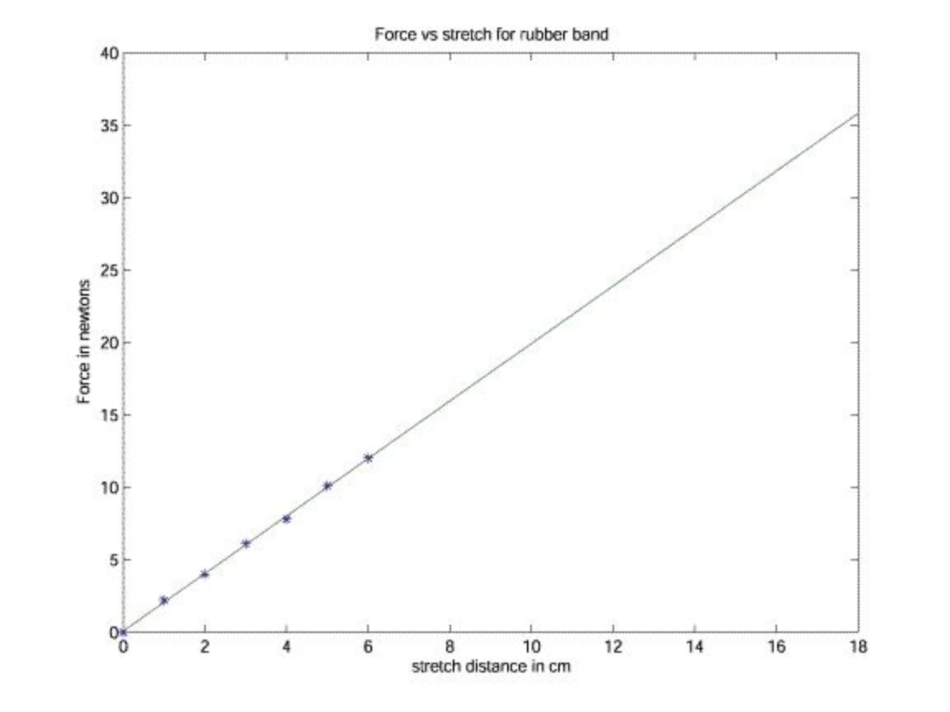
Interpreting Graphs - Extrapolate



Chapter 6 - Linear Relations

Interpreting Graphs - Extrapolation

Practice



Linear Equations

Chapter 8 Review

Inverse Functions

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

Subtraction →

Addition →

Multiplication →

Division →

Squaring →

Square Root →

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 → Square

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. $5x - 4 = 31$

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

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 with a variable
3. Multiply/Divide Coefficient

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 with a 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 with a 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

$$3x + 5x + 4 - x + 7 = 88$$

Practice Equations

$$5x - 6 = 3x - 8$$

Practice Equations

$$\frac{3x}{4} + \frac{5}{6} = 5x - \frac{125}{3}$$

Practice Equations

$$2(3x - 7) + 4(3x + 2) = 6(5x + 9) + 3$$

Linear Inequalities

Chapter 9 Review

Greater Than & Less Than

What one's which?

$<$ $>$ $\leq$ $\geq$

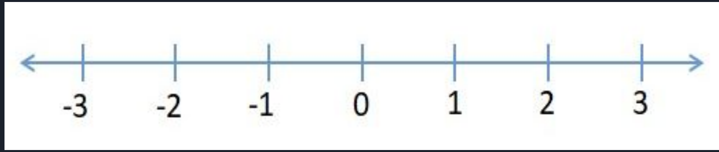
Greater Than & Less Than

What one's which?

$<$	$>$	$\leq$	$\geq$
Less Than	Greater Than	Less Than or Equal To	Greater Than or Equal To

Graphing Linear Inequalities

How do you graph for x > -3 ?



Graphing Linear Inequalities

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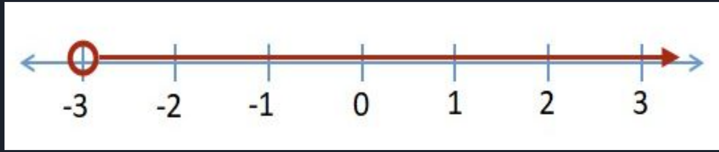
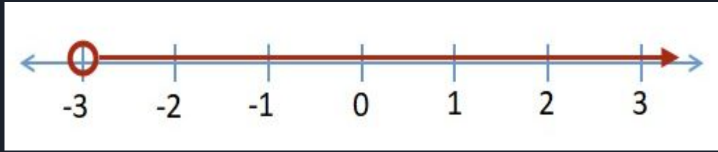


Why is the circle on the -3 left open?

Graphing Linear Inequalities

How do you graph for x > -3 ?

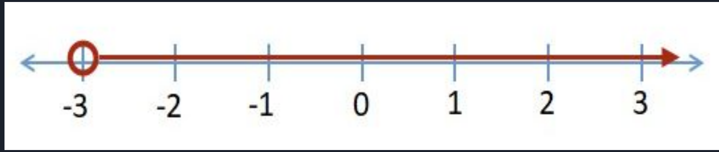


Why is the circle on the -3 left open?

- An open circle indicates that the value is NOT included in the solution.
- You use an open circle with the inequality does not include “equal to”.

Graphing Linear Inequalities

How do you graph for x > -3 ?



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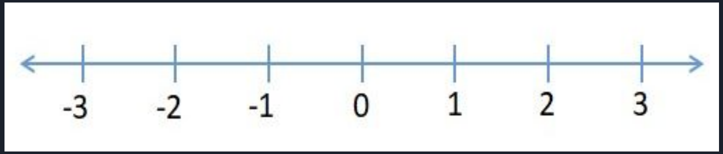
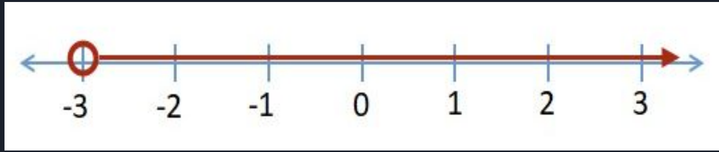
How do you graph for x ≤ 2 ?



Graphing Linear Inequalities

How do you graph for x > -3 ?



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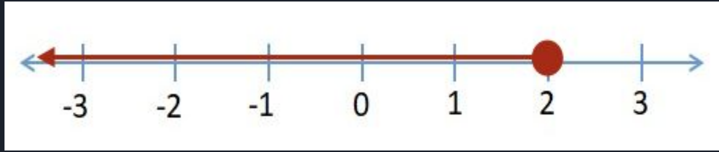
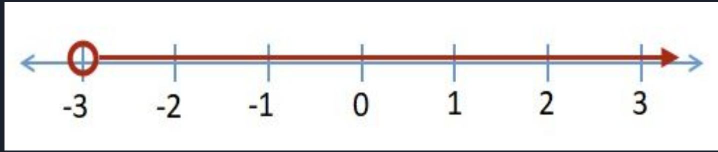


Graphing Linear Inequalities

How do you graph for $x > -3$?



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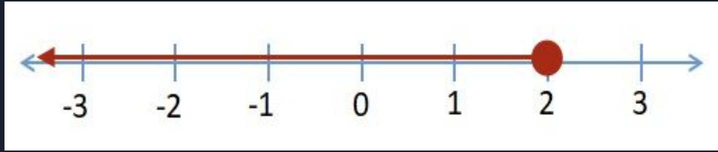
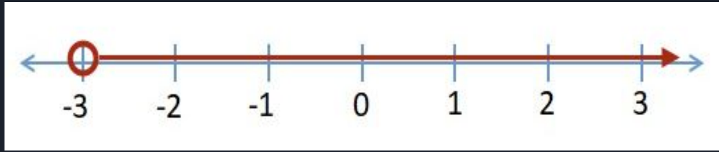
How do you graph for $x \leq 2$?



Why is the circle on the 2 coloured in?

Graphing Linear Inequalities

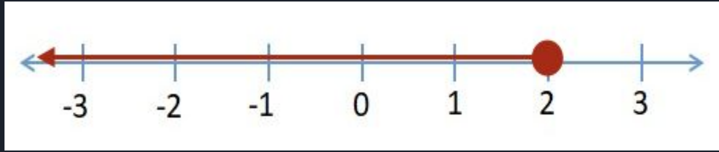
How do you graph for $x > -3$?



Why is the circle on the -3 left open?

- An open circle indicates that the value is NOT included in the solution.
- You use an open circle with the inequality does not include “equal to”.

How do you graph for $x \leq 2$?



Why is the circle on the 2 coloured in?

- An closed circle indicates that the value IS included in the solution.
- You use a closed circle with the inequality does include “equal to”.

Linear Inequalities

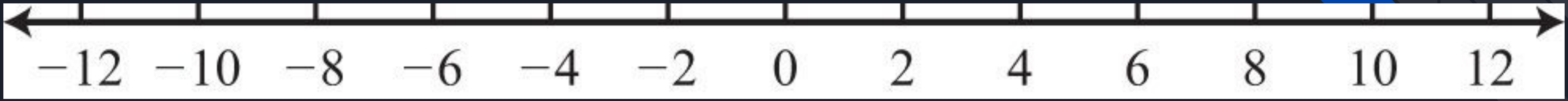
Solving Linear Inequalities:

Solving Linear Inequalities is identical to the process of solving linear equations. The only difference is you have an inequality sign rather than an equal sign.

** If you multiply or divide by a negative value, the inequality flips directions.

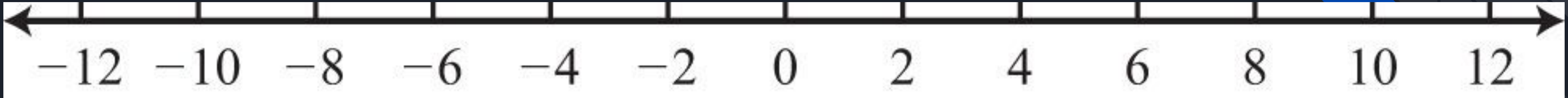
Practice

$-2\,(x + 2) > 4 - x$



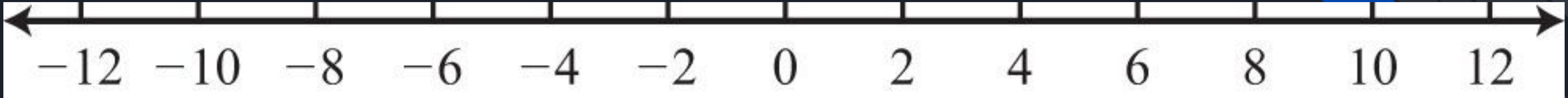
Practice

$-2(x + 3) < 10$



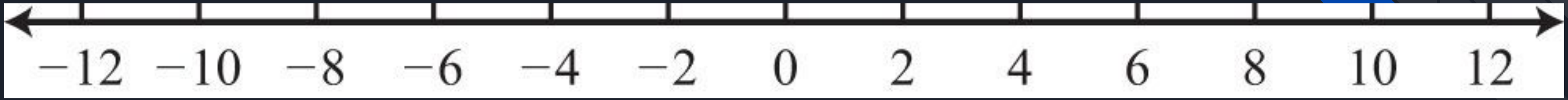
Practice

$-3x + 3 \le 12$



Practice

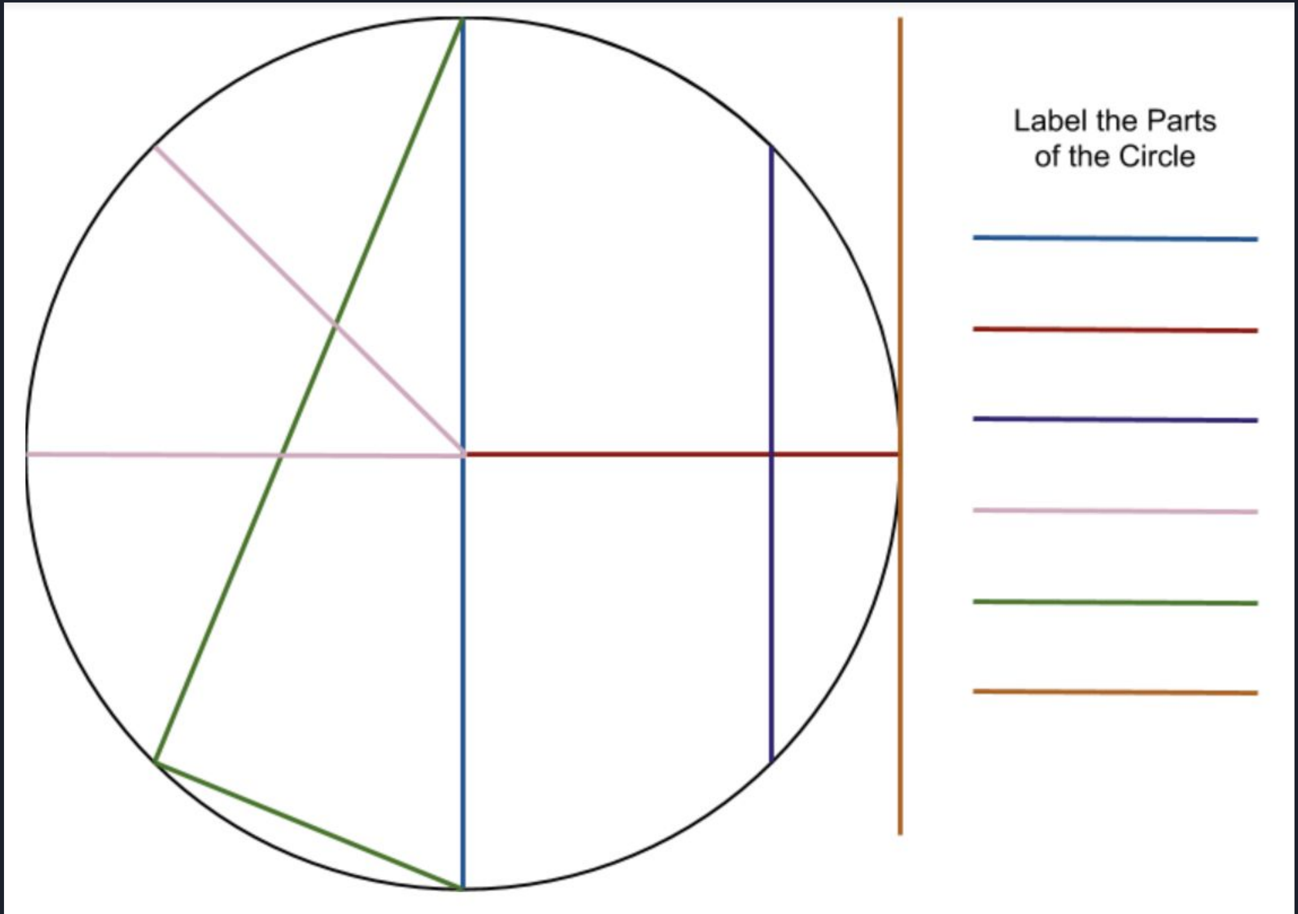
$\frac{1}{4}x - 4 > -7$



Circle Geometry

Chapter 10 Review

Parts of the Circle



Parts of the Circle - Define the Following Terms

Radius - ____

Diameter - ____

Chord - ____

Arc of Circle - ______________________________________

Endpoints - ____

Parts of the Circle - Define the Following Terms

Radius - A line going from the center of the circle to the circumference.

Diameter - ____

Chord - ____

Arc of Circle - ____

Endpoints - ____

Parts of the Circle - Define the Following Terms

Radius - A line going from the center of the circle to the circumference.

Diameter - A line going from one side of the circle to the other, passing through the center.

Chord - ____

Arc of Circle - ____

Endpoints - ____

Parts of the Circle - Define the Following Terms

Radius - A line going from the center of the circle to the circumference.

Diameter - A line going from one side of the circle to the other, passing through the center.

Chord - A line going from one side of the circle to the other, without passing through the center.

Arc of Circle - ________________________________

Endpoints - __________________________________

Parts of the Circle - Define the Following Terms

Radius - A line going from the center of the circle to the circumference.

Diameter - A line going from one side of the circle to the other, passing through the center.

Chord - A line going from one side of the circle to the other, without passing through the center.

Arc of Circle - A portion of the circumference of the circle.

Endpoints - ____

Parts of the Circle - Define the Following Terms

Radius - A line going from the center of the circle to the circumference.

Diameter - A line going from one side of the circle to the other, passing through the center.

Chord - A line going from one side of the circle to the other, without passing through the center.

Arc of Circle - A portion of the circumference of the circle.

Endpoints - The starting and ending points of an angle.

Parts of the Circle - Define the Following Terms

Inscribed Angle - ____________________________________

Central Angle - ____________________________________

Bisector - ____________________________________

Tangent - ____________________________________

Perpendicular - ____________________________________

Parts of the Circle - Define the Following Terms

Inscribed Angle - An angle where all three points are touching the circumference of the circle.

Central Angle - ___________________________________

Bisector - ___________________________________

Tangent - ___________________________________

Perpendicular - ___________________________________

Parts of the Circle - Define the Following Terms

Inscribed Angle - An angle where all three points are touching the circumference of the circle.

Central Angle - An angle where two points are touching the circumference of the circle and the 3rd is in the center.

Bisector - ____

Tangent - ____

Perpendicular - ____

Parts of the Circle - Define the Following Terms

Inscribed Angle - An angle where all three points are touching the circumference of the circle

Central Angle - An angle where two points are touching the circumference of the circle and the 3rd is in the center

Bisector - A radius that evenly splits a chord and meets at a 90° angle.

Tangent - ____

Perpendicular - ________________________________

Parts of the Circle - Define the Following Terms

Inscribed Angle - An angle where all three points are touching the circumference of the circle

Central Angle - An angle where two points are touching the circumference of the circle and the 3rd is in the center

Bisector - A radius that evenly splits a chord and meets at a 90° angle.

Tangent - A line that touches the outside of the circle in one spot and is <u>perpendicular</u> to the radius.

Perpendicular - ____

Parts of the Circle - Define the Following Terms

Inscribed Angle - An angle where all three points are touching the circumference of the circle

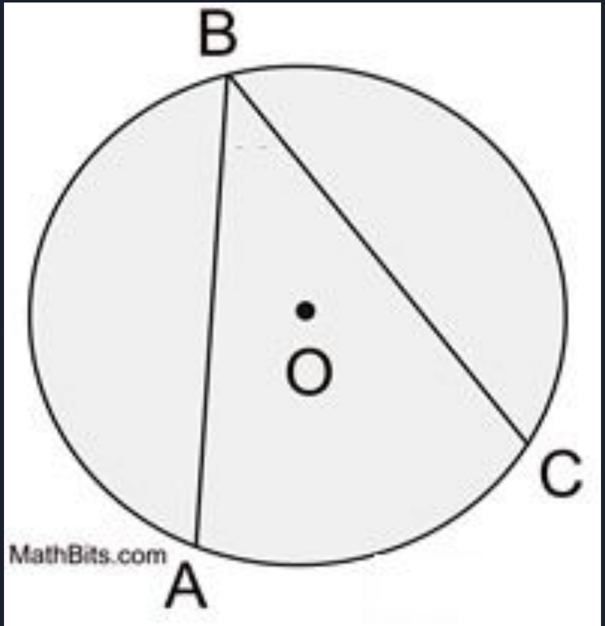
Central Angle - An angle where two points are touching the circumference of the circle and the 3rd is in the center

Bisector - A radius that evenly splits a chord and meets at a 90° angle.

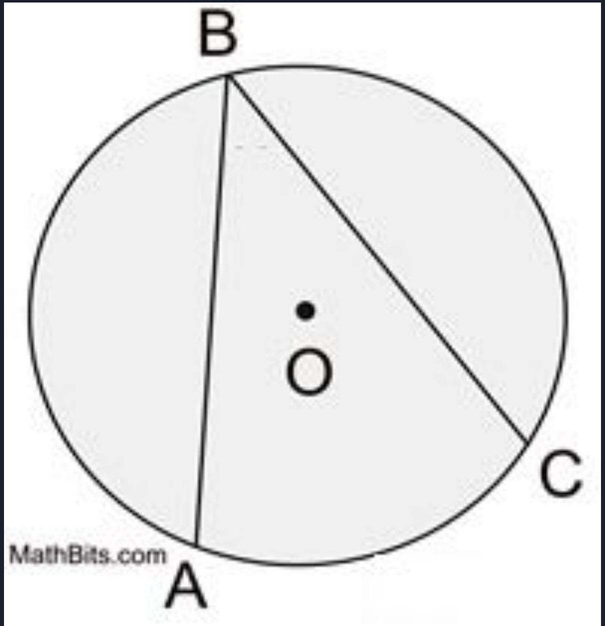
Tangent - A line that touches the outside of the circle in one spot and is <u>perpendicular</u> to the radius.

Perpendicular - Meets at a 90° angle.

How to write angles

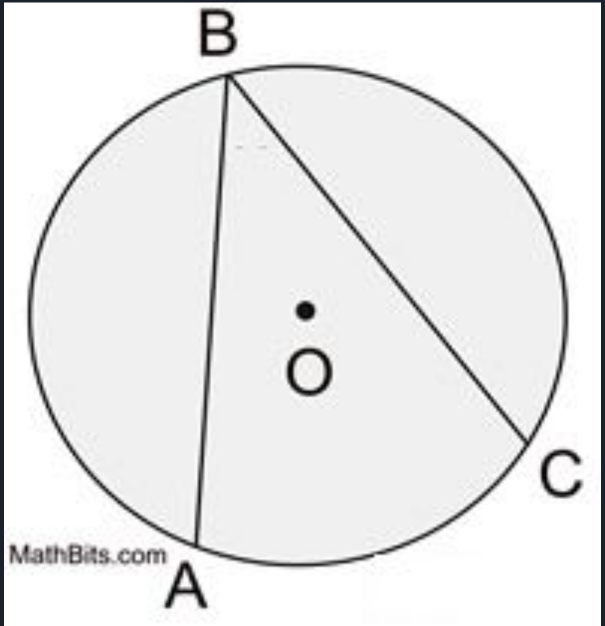


How to write angles



What can writing down the angle help us with?

How to write angles



What can writing down the angle help us with?

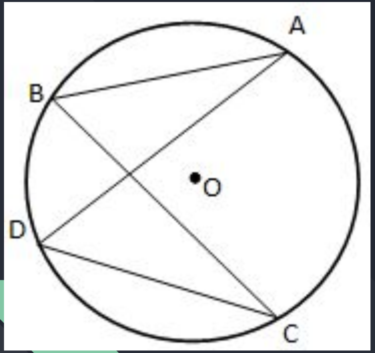
- By writing down the angle, you could more clearly see common end points, therefore helping you determine the angle measurements.

Relationships Between Angles

Two Inscribed Angles ______________________________

____

____

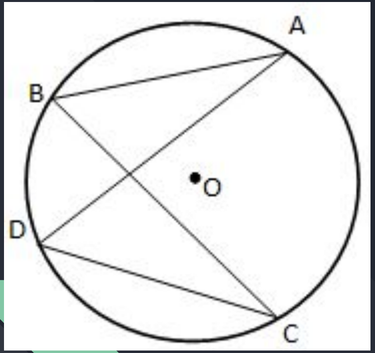


Relationships Between Angles

Two Inscribed Angles that have the same end points

Also share the same measurement. <A*B*C and <A*D*C

both have the endpoints A and C, so *B* and *D* are equal.



Relationships Between Angles

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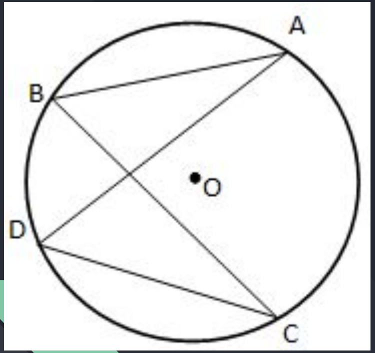
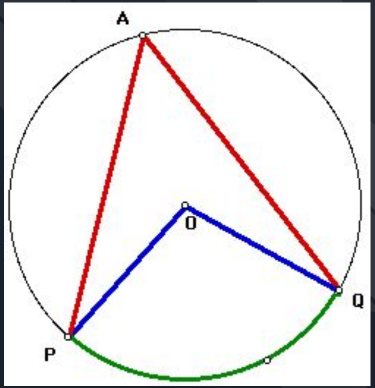


A Central and Inscribed Angle: ______________________

____

____

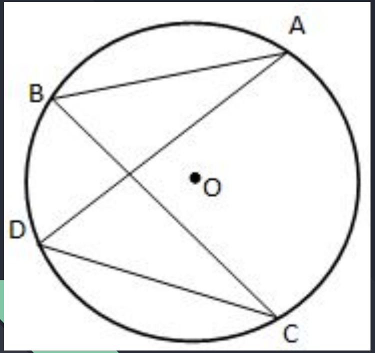


Relationships Between Angles

Two Inscribed Angles that have the same end points

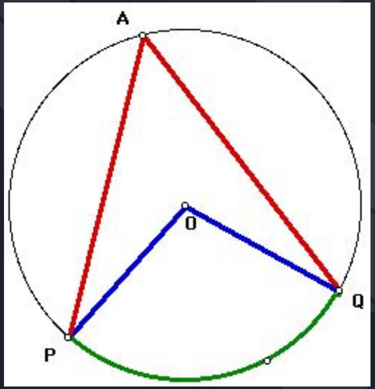
Also share the same measurement. <ABC and <ADC

both have the endpoints A and C, so *B* and *D* are equal.



A Central and Inscribed Angle that have the same end points are proportional by a factor of 2. The Central angle is always double the inscribed.

<QAP and <QOP both have the same end points (Q P), so *O* is double the value of *A*



Pythagorean Theorem

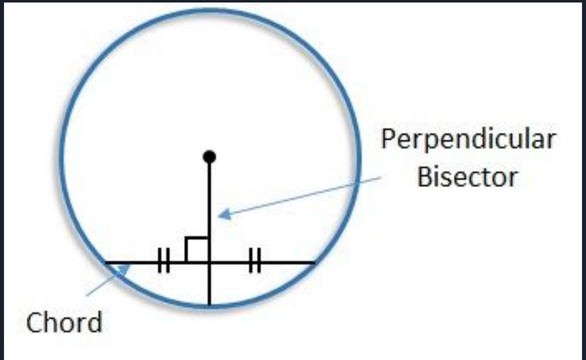
Use pythagoras to find the length of a line within a circle.

$a^2 + b^2 = c^2$ → c is always the hypotenuse, the longest side, across from the right angle.

$c^2 - b^2 = a^2$ → If you have the longest side, subtract the square of the Shorter side you have.

Bisectors

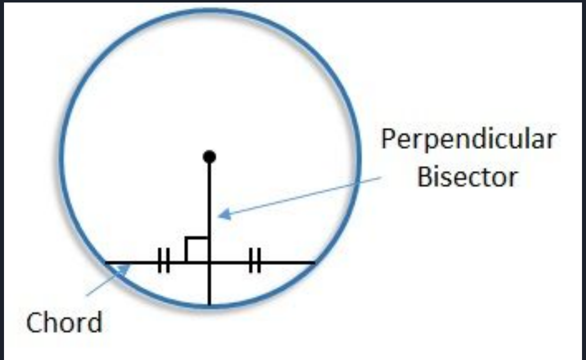
What is a bisector?



Bisectors

What is a bisector?

A bisector is a radius that splits a chord into 2 even parts.



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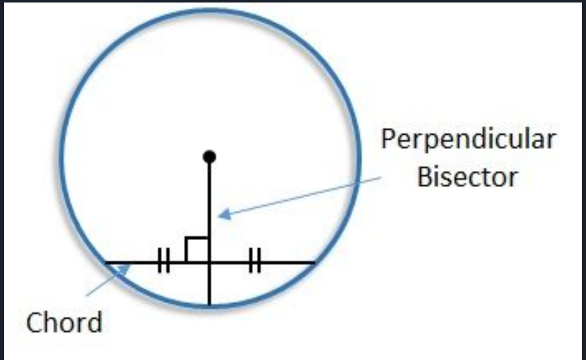

A bisector always:

Bisectors

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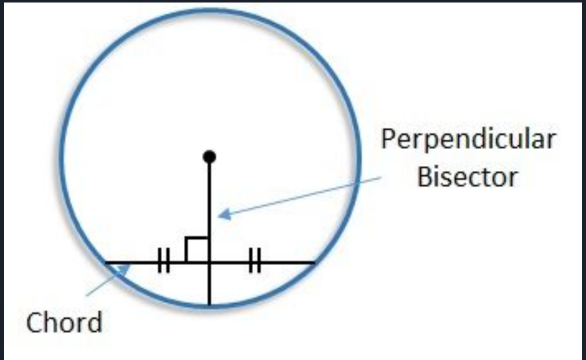

A bisector always:

- Splits a chord into two equal parts
- Meets at a 90° angle
- Goes through the center of a circle (a radius)

Bisectors

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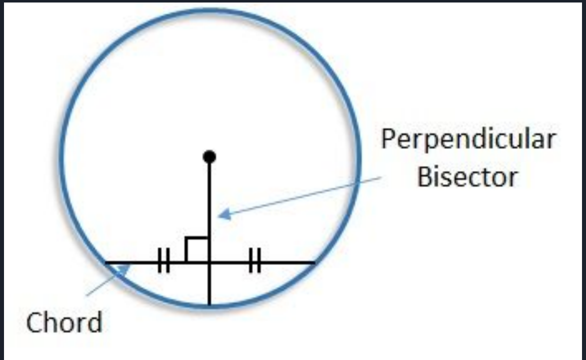


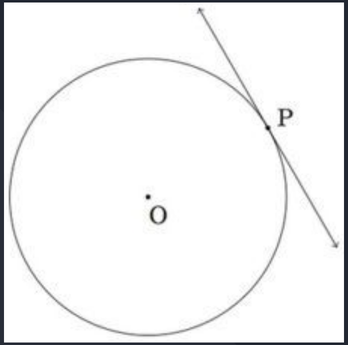
A bisector always:

- Splits a chord into two equal parts
- Meets at a 90° angle
- Goes through the center of a circle (a radius)

** If you have a chord within a circle, bisect it and create a triangle with the radius. You can then do Pythagoras to find the missing length.

Tangents

What are tangents?



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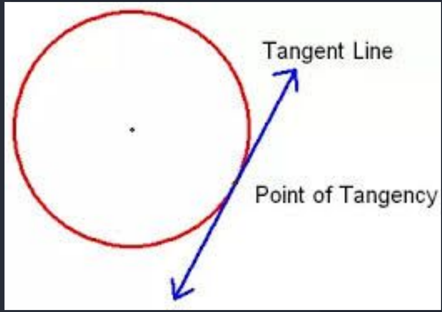
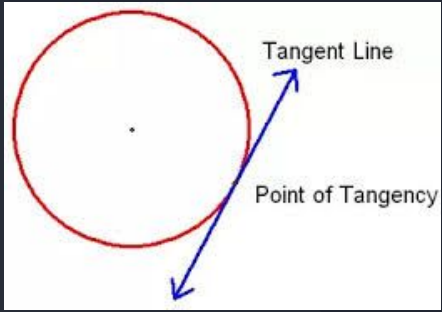


Tangents are straight lines on the outside of the circle that touch the circumference at only one point, meeting at a 90° angle.

Tangents



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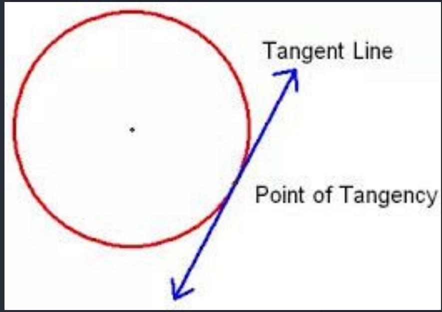
Tangents



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Tangents are straight lines on the outside of the circle that touch the circumference at only one point, meeting at a 90° angle.

What do Tangents always do?

- Touch only one point of the circle (at the point of tangency)
- Are perpendicular to the radius of the circle (meets at a 90° angle)

Tangents

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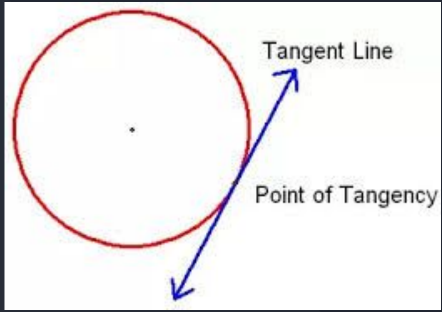

What do Tangents always do?

- Touch only one point of the circle (at the point of tangency)
- Are perpendicular to the radius of the circle (meets at a 90° angle)

** If you have a tangent on the outside of a circle, draw a radius to the point of tangency and complete the triangle with a third line. Then use Pythagoras to solve for the length of the missing side..

Data Analysis

Chapter 11 Review

Influencing Factors

Influencing factors affect how data is collected or how responses are obtained. They may unknowingly make people biased to specific responses.

Types of Influencing Factors

Bias -

Timing -

Use of Language -

Ethics -

Cost -

Privacy -

Types of Influencing Factors

Bias - Does the question show a preference for a specific product?

Timing -

Use of Language -

Ethics -

Cost -

Privacy -

Types of Influencing Factors

Bias - Does the question show a preference for a specific product?

Timing - Does the time the survey is given influence results?

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Cost -

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Types of Influencing Factors

Bias - Does the question show a preference for a specific product?

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Bias - Does the question show a preference for a specific product?

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Bias - Does the question show a preference for a specific product?

Timing - Does the time the survey is given influence results?

Use of Language - Does the language use influence people? Does the question make sense?

Ethics - Does the question refer to inappropriate/illegal behaviour?

Cost - The the cost of the study outweigh the benefits?

Privacy - Do people have a right to refuse? Can they respond anonymously?

Population vs. Sample

Population vs. Sample

Population is everyone who is being surveyed.

Population vs. Sample

Population is everyone who is being surveyed.

A Sample is a portion of the population.

Forms of Data Collection

Systematic:

Stratified:

Convenience:

Random:

Voluntary:

Forms of Data Collection

Systematic: Using a list and choosing people at equal intervals.

Stratified:

Convenience:

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Forms of Data Collection

Systematic: Using a list and choosing people at equal intervals.

Stratified: Splitting the population into groups and choose equal percentages from each group.

Convenience:

Random:

Voluntary:

Forms of Data Collection

Systematic: Using a list and choosing people at equal intervals.

Stratified: Splitting the population into groups and choose equal percentages from each group.

Convenience: Choosing people to survey who are easy to access.

Random:

Voluntary:

Forms of Data Collection

Systematic: Using a list and choosing people at equal intervals.

Stratified: Splitting the population into groups and choose equal percentages from each group.

Convenience: Choosing people to survey who are easy to access.

Random: Choosing people at random from the population, where each member has an equal chance of being chosen.

Voluntary:

Forms of Data Collection

Systematic: Using a list and choosing people at equal intervals.

Stratified: Splitting the population into groups and choose equal percentages from each group.

Convenience: Choosing people to survey who are easy to access.

Random: Choosing people at random from the population, where each member has an equal chance of being chosen.

Voluntary: Inviting everyone to participate and allowing people to volunteer their responses.

Review Activities

Your Turn!

Symmetry & Surface Area

Your Turn!

Practice

1. Using the Pattern Blocks provided, create a design which has…
   - Line Symmetry
   - Rotational Symmetry

* Be sure you are able to describe the symmetry present in your design.

2. Using the Lego blocks, create a 3D object and determine the surface area of your object.

** You may use the provided markers to describe your designs or calculate your object's surface area on your desk.

Rational Numbers

Your Turn!

Practice

Integer/Fraction Operations:

Materials: Dominos (fractions), Three different coloured dice

Choose two dominos and roll your three dice

- Die 1 → Domino Fraction 1 (Even = Positive, Odd = Negative)
- Die 2 → Domino Fraction 2 (Even = Positive, Odd = Negative)
- Die 3 → Operation (1 = Add, 2 = Subtract, 3 = Multiply, 4 = Divide, 5/6 = Your choice)

Use the dice rolls to determine what you will do with the dominos that you choose.

** You may use the provided markers to do the calculations on your desk.

Exponents & Exponent Laws

Your Turn!

Practice

Play Laws of Exponent Rolling Review

1. Partner A rolls two dice. Find the two squares on the board which correspond to the numbers on the dice. For example, a (3, 1) would correspond to the following problems:
    - Column 3, Row 1 for Partner A
    - Column 1, Row 3 for Partner B
2. □□□□Player A and B should get the same answer. If not, work together to identify any mistakes.
3. Partner B rolls following the same instructions as above.
4. □□□□Work together to fill the entire board.

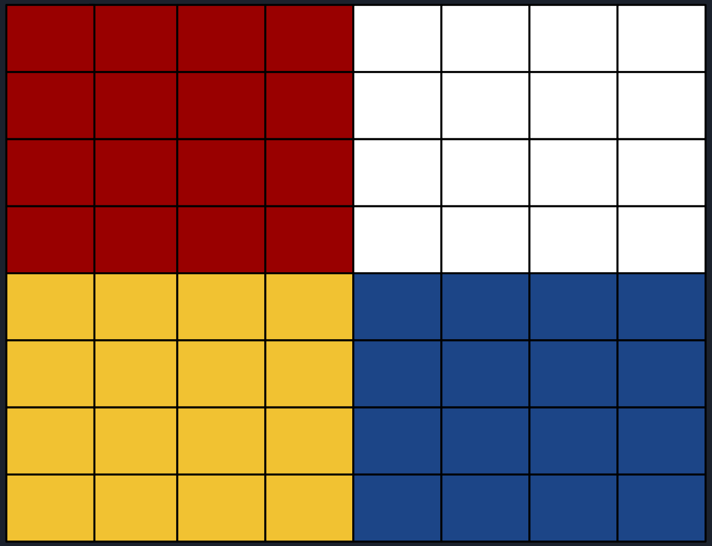
** You may use the provided markers to do your work on your desks.

Scale Images

Your Turn!

Practice

1. Using the Lego provided, create any object.
2. Roll a die and use the value of the roll as your scale factor.
3. Create a second object that is a scale factor of your original.



Adding & Subtracting Polynomials

Your Turn!

Practice

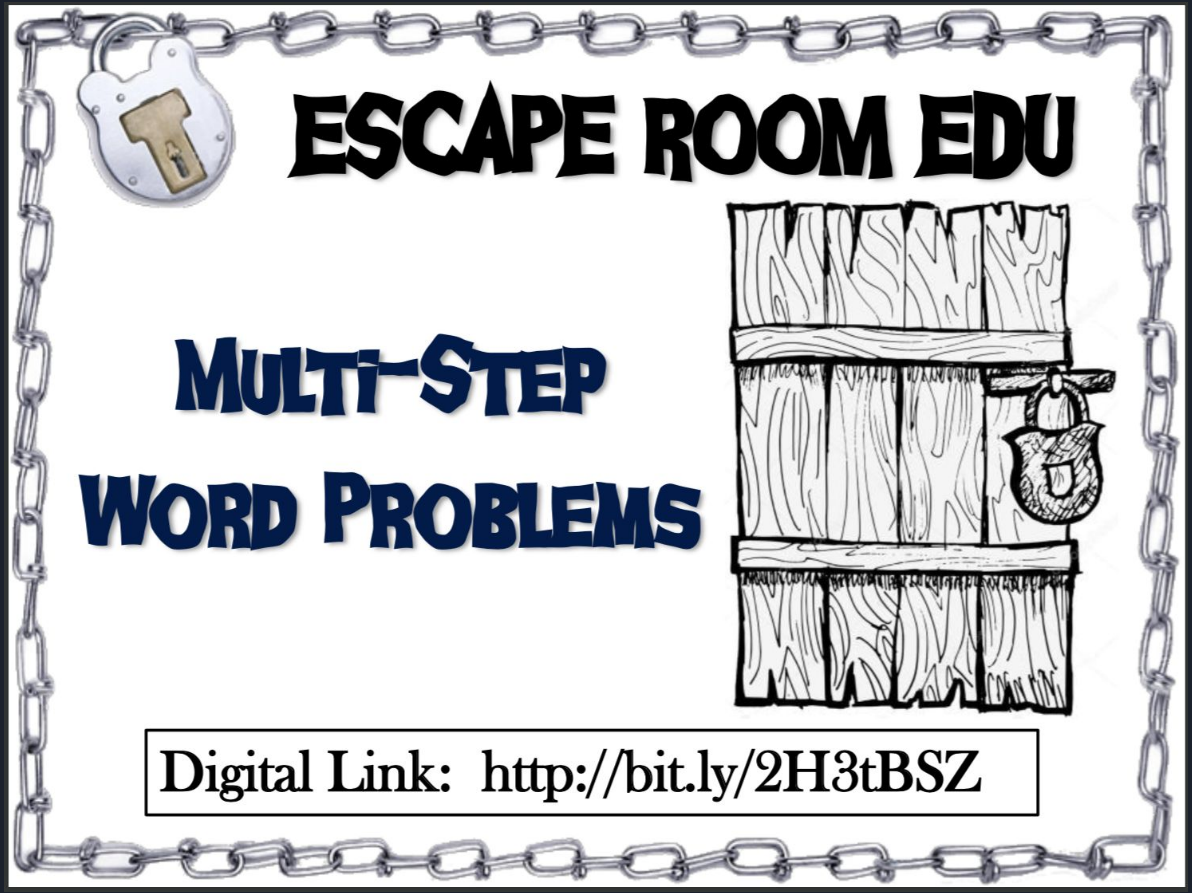
Adding and Subtracting Polynomials Practice Sheets

(Ask Ms. Rae if you wanted to practice with these)

Multiplying & Dividing Polynomials

Your Turn!

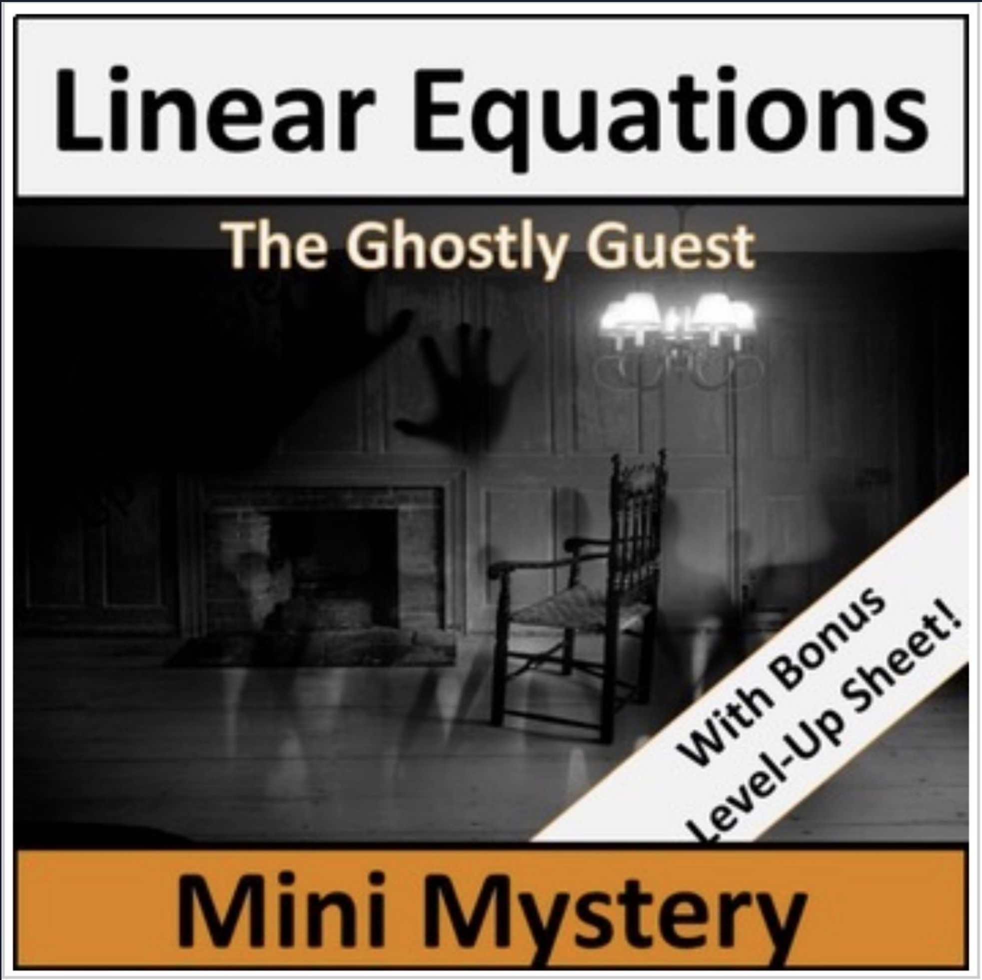
Practice...see Ms. Rae for escape room problems.



Linear Relations

Your Turn!

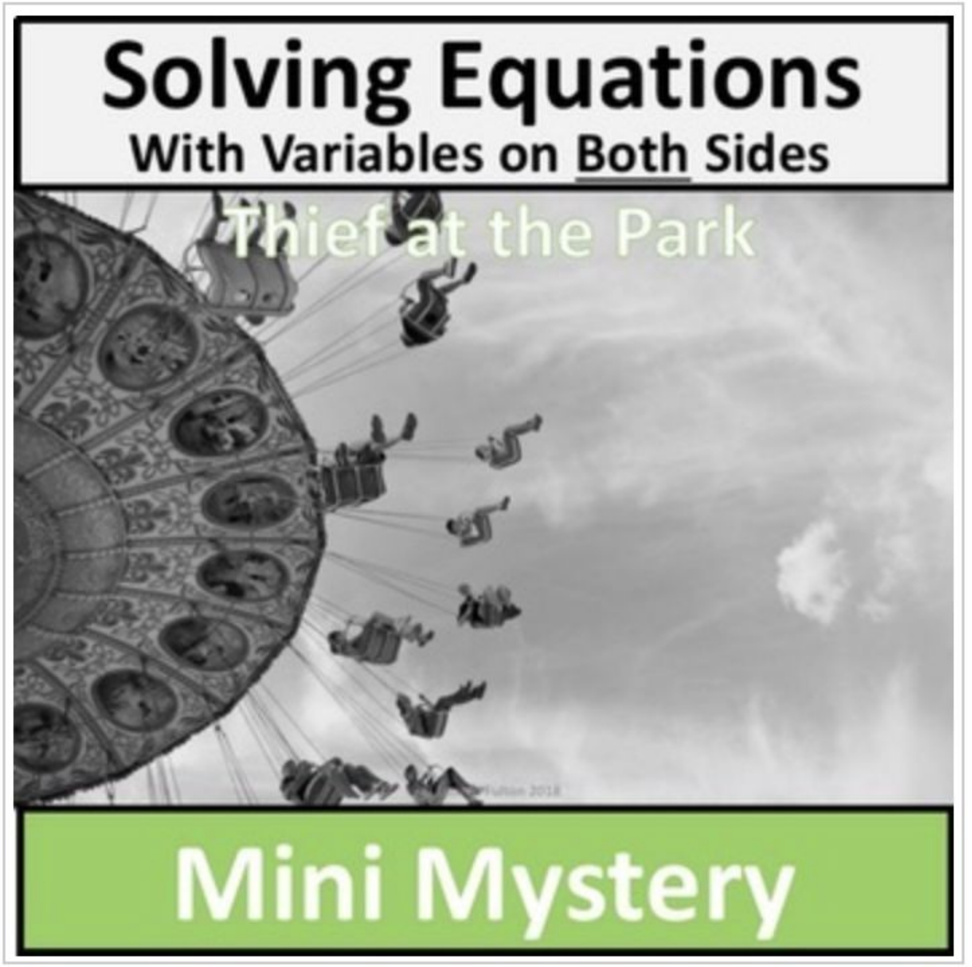
Practice...see Ms. Rae for Mini Mystery problems.



Linear Equations

Your Turn!

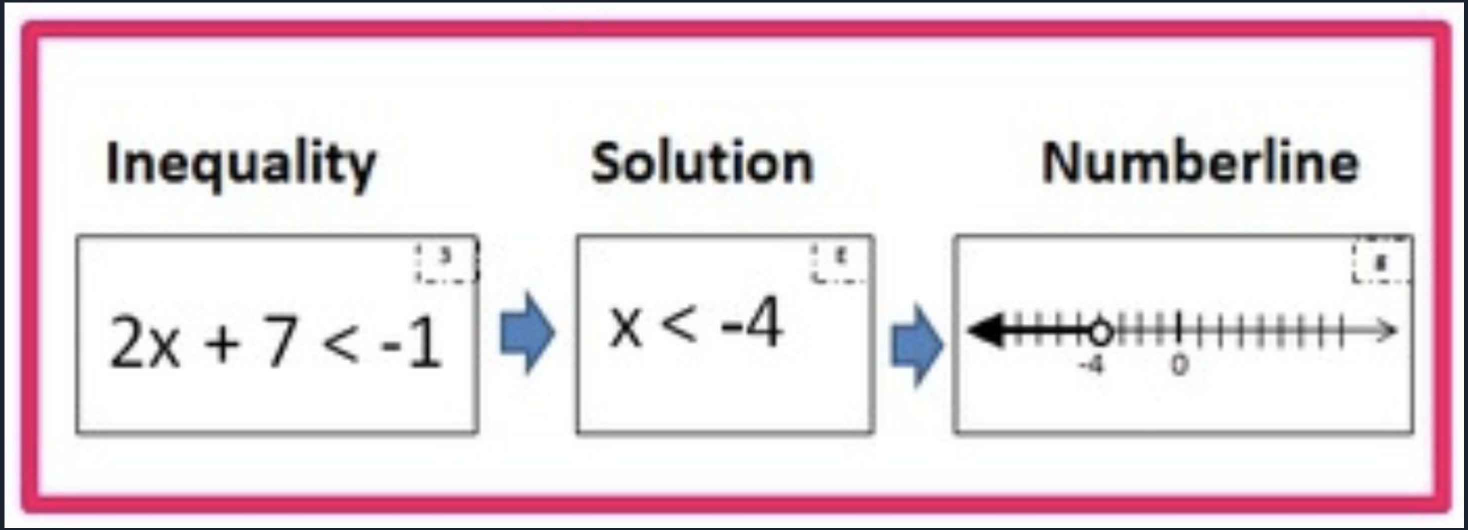
Practice...see Ms. Rae for Mini Mystery problems.



Linear Inequalities

Your Turn!

Practice...see Ms. Rae if you wanted to practice with these



Circle Geometry

Your Turn!

Practice...see Ms. Rae if you wanted to practice with these