

3.7 13. Expand, then simplify and verify.

a) $(3m + 2)(2m^2 + m + 5)$
 $= 3m(\underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}}) + 2(\underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}})$
 $= \underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}}$
 $= \underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}}$
 $= \underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}}$

Verify. Substitute $m = 2$.

Left side

$$\begin{aligned} & (3m + 2)(2m^2 + m + 5) \\ &= (\underline{\hspace{1cm}} \times 2 + \underline{\hspace{1cm}})(\underline{\hspace{1cm}} \times 2^2 + \underline{\hspace{1cm}} \times 2 + \underline{\hspace{1cm}}) \\ &= (\underline{\hspace{1cm}} + \underline{\hspace{1cm}})(\underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}}) \\ &= (\underline{\hspace{1cm}})(\underline{\hspace{1cm}}) \\ &= \underline{\hspace{1cm}} \end{aligned}$$

Right side

$$\begin{aligned} &= \underline{\hspace{1cm}} \times 2^3 + \underline{\hspace{1cm}} \times 2^2 + \underline{\hspace{1cm}} \times 2 + \underline{\hspace{1cm}} \\ &= \underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}} \\ &= \underline{\hspace{1cm}} \end{aligned}$$

The numbers match, so the product is likely correct.

b) $(3z - 2)(z^2 - 3z - 4) = \underline{\hspace{1cm}}(\underline{\hspace{1cm}} - \underline{\hspace{1cm}} - \underline{\hspace{1cm}}) - \underline{\hspace{1cm}}(\underline{\hspace{1cm}} - \underline{\hspace{1cm}} - \underline{\hspace{1cm}})$

$= \underline{\hspace{2cm}}$
 Verify. Substitute $z = 2$.

Left side

Right side

The numbers match, so the product is likely correct.

3.8 14. Factor.

a) $4c^2 + 20c + 25$

This is a perfect square trinomial.
 The 2nd term is $20c$,
 so the factors of $4c^2 + 20c + 25$ are $(2c + 5)^2$.

$$\begin{aligned} & 4c^2 + 20c + 25 \\ & \uparrow \qquad \qquad \uparrow \\ & (\underline{\hspace{1cm}})^2 \quad (\underline{\hspace{1cm}})^2 \\ & \text{So, } 4c^2 + 20c + 25 = \underline{\hspace{2cm}} \\ & \qquad \qquad \qquad = \underline{\hspace{2cm}} \end{aligned}$$

b) $16m^2 - 81$

This is a difference of two squares.
 $16m^2 = \underline{\hspace{1cm}}$
 $81 = \underline{\hspace{1cm}}$
 So, $16m^2 - 81 = \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}}$