

Learning Goals: *I will learn to*

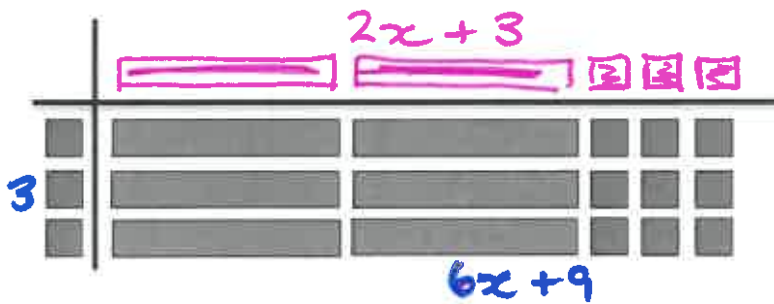
- use different strategies to divide a polynomial by a monomial
- solve problems involving division of a polynomial by a monomial

Develop Understanding

Example 1: Divide a Polynomial by a Monomial Using Algebra Tiles

What division statement do the algebra tiles represent? Determine the quotient.

a)



division statement:

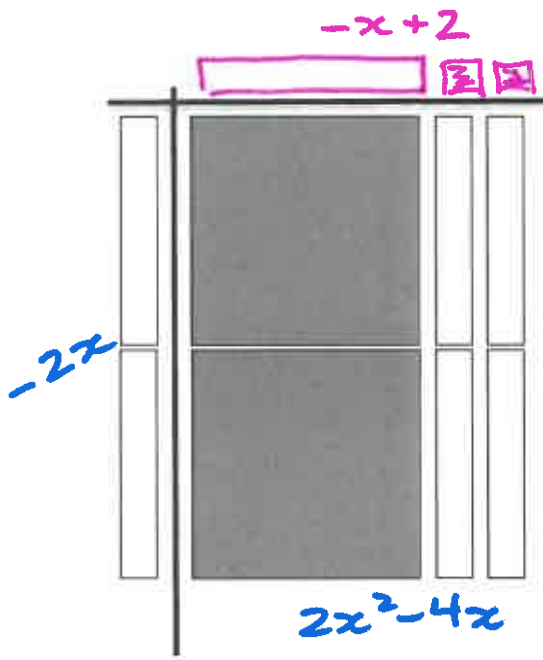
$$\frac{6x+9}{3}$$

must have brackets to be correct!

Ⓞ $(6x+9) \div 3$

quotient: $2x + 3$

b)



division statement:

$$\frac{2x^2-4x}{-2x}$$

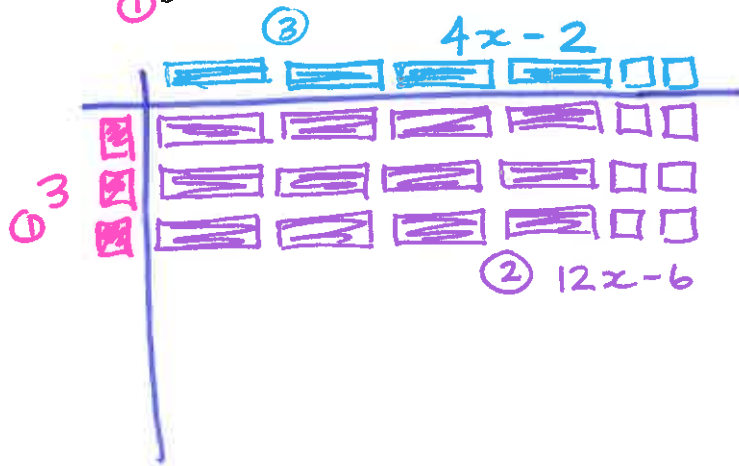
must have brackets to be correct.

Ⓞ $(2x^2-4x) \div -2x$

quotient: $-x + 2$

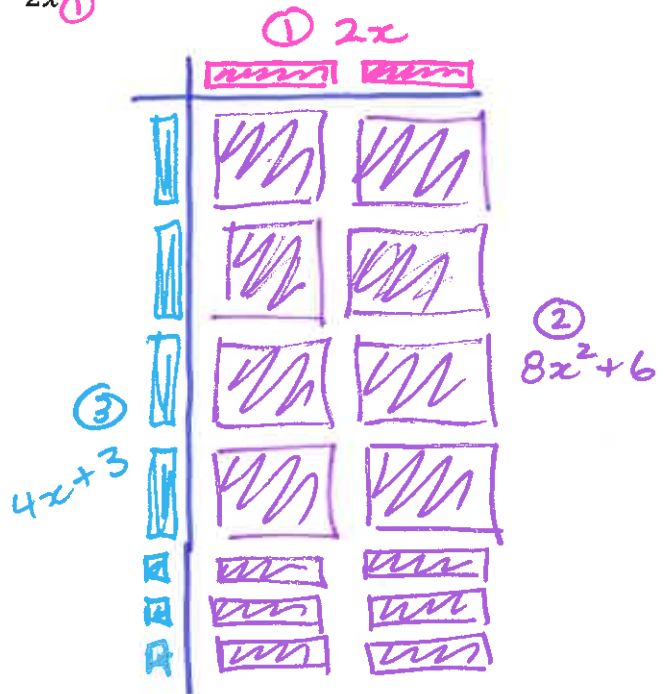
Determine the quotient using algebra tiles.

a) $\frac{12x-6}{3}$



quotient: $4x-2$

b) $\frac{8x^2+6x}{2x}$



quotient: $4x+3$

Example 2: Divide a Polynomial by a Monomial Algebraically

Calculate each quotient algebraically.

a) $\frac{9y^2-6y}{3y}$

$$= \frac{9y^2}{3y} - \frac{6y}{3y}$$

$$= \boxed{3y-2}$$

b) $\frac{12k^2+8k-5}{4}$

$$= \frac{12k^2}{4} + \frac{8k}{4} - \frac{5}{4}$$

$$= \boxed{3k^2+2k-\frac{5}{4}}$$

ⓐ $3k^2+2k-1\frac{1}{4}$

c) $\frac{15x-10}{5}$

$$= \frac{15x}{5} - \frac{10}{5}$$

$$= \boxed{3x-2}$$

d) $\frac{14m^2+8m}{-2m}$

$$= \frac{14m^2}{-2m} + \frac{8m}{-2m}$$

$$= -7m + (-4)$$

$$= \boxed{-7m-4}$$

e) $\frac{6k^2+12k+8}{3}$

$$= \frac{6k^2}{3} + \frac{12k}{3} + \frac{8}{3}$$

$$= \boxed{2k^2+4k+\frac{8}{3}}$$

ⓐ $2k^2+4k+2\frac{2}{3}$

Example 3: Apply Monomial Division

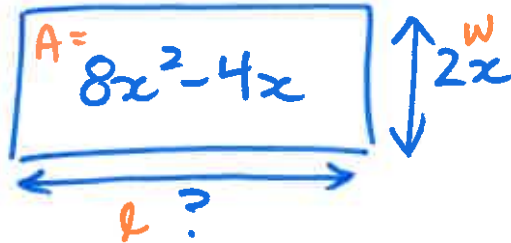
A group of students decides to design a mural to be painted in their school wall. To make sure the initial drawings are made to scale, each student has an area to work with that can be defined by the expression $8x^2 - 4x$ with a height of $2x$.

a) What algebraic expression represents the length of each section of the school mural?

$$A = 8x^2 - 4x$$

$$w = h = 2x$$

$$l = ?$$



$$l = \frac{\text{Area}}{w}$$

$$= \frac{8x^2 - 4x}{2x}$$

$$= \frac{8x^2}{2x} - \frac{4x}{2x}$$

$$\text{LENGTH} \\ \boxed{4x - 2}$$

b) Calculate the area and length of each section of the school mural when the height is 80 cm .

$$w = h = 2x$$

$$80 = 2x \Rightarrow x = 40 \text{ cm}$$

$$\begin{aligned} \text{LENGTH: } & 4x - 2 \\ & = 4(40) - 2 \\ & = 160 - 2 \\ & = \boxed{158 \text{ cm}} \end{aligned}$$

$$\begin{aligned} \text{AREA: } & 8x^2 - 4x \\ & = 8(40)^2 - 4(40) \\ & = 8(1600) - 160 \\ & = 12800 - 160 \\ & = \boxed{12640 \text{ cm}^2} \end{aligned}$$

$$\begin{aligned} \text{check: } & A = l \cdot w \\ & = 158(80) \\ & = 12640 \end{aligned}$$



