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5.3 Dividing Polynomials by Monomials

1. Divide each expression.

a) $\dfrac{9x^2 - 3x}{-3x}$ $\dfrac{9x^2}{-3x}$ $\dfrac{-3x}{-3x}$

$= -3x + 1$

b) $\dfrac{4x^2 + 6x}{2x}$ $\dfrac{4x^2}{2x} + \dfrac{6x}{2x}$

$= 2x + 3$

c) $\dfrac{4x^2 - 6x}{-2x}$ $\dfrac{4x^2}{-2x} - \dfrac{6x}{-2x}$

$-2x + 3$

d) $\dfrac{9x^2 + 6xy}{3x}$ $\dfrac{9x^2}{3x} + \dfrac{6xy}{3x}$

$= 3x + 2y$

2. Find the quotient.

a) $\dfrac{15x^2 - 20x}{5x}$ $\dfrac{15x^2}{5x} - \dfrac{20x}{5x}$

$= 3x - 4$

b) $\dfrac{16m^2 + 20mn}{4m}$ $\dfrac{16m^2}{4m} + \dfrac{20mn}{4m}$

$= 4m + 5n$

c) $\dfrac{18k^2 - 9k}{9k}$ $\dfrac{18k^2}{9k} - \dfrac{9k}{9k}$

$= 2k - 1$

d) $\dfrac{12m + 18mn}{-6m}$ $\dfrac{12m}{-6m} + \dfrac{18mn}{-6m}$ $= -2 - 3n$

$= -3n - 2$

e) $\dfrac{1.4d^2 + 1.8dk - 1.6d}{2d}$ $\dfrac{1.4d^2}{2d} + \dfrac{1.8dk}{2d} - \dfrac{1.6d}{2d}$

$= 0.7d + 0.9k - 0.8$

f) $\dfrac{9c^2 - 12c + 6}{-3}$ $\dfrac{9c^2}{-3} - \dfrac{12c}{-3} + \dfrac{6}{-3}$

$-3c^2 + 4c - 2$

6. You are decorating the bulletin board in your classroom with pictures of your classmates. Each picture covers an area of **4x** cm². The area of the board is **4x² + 16x** cm². Write an expression to represent how many pictures are required to cover the board.

$$\dfrac{4x^2 + 16x}{4x} = \dfrac{4x^2}{4x} + \dfrac{16x}{4x} = x + 4$$

7. A rectangular lawn has a width of **3x** m. The area is **15x² + 45x** m². You wish to put a fence around the lawn.

a) What is an expression to represent the perimeter of the lawn?

$\ell = \dfrac{15x^2 + 45x}{3x} = 5x + 15$

$P = 2(3x) + 2(5x+15) = 6x + 10x + 30 = 16x + 30$

b) You are placing a post every 2 m. Find an expression to represent how many posts will be required.

$\text{\# of posts} = \dfrac{16x + 30}{2} = 8x + 15$

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