SOLUTIONS

9. Let $f(x) = x^2 + 5$ and $g(x) = 2x - 6$

a) Give $\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)} = \frac{x^2+5}{2x-6}$ same as $\frac{x^2+5}{2(x-3)}$

b) What is the domain of $\left(\frac{f}{g}\right)(x)$ found above?

$2x - 6 \neq 0$
$+6 \quad +6$
$\frac{2x}{2} \neq \frac{6}{2}$

$x \neq 3$

domain: $\mathbb{R}$, but $x \neq 3$

10. Give the domain of the function $h(x) = 3x^2 - 4x + 1$

$\mathbb{R}$

11. Many houses in the Annapolis area have wells and are not connected to the city water system. A well drilling company charges its customers a flat fee as well as a fee based on the number of feet it digs into the ground. The company charges \$3040 for a well 60 ft deep and \$7790 for a well 250ft deep. A linear function can be used to model the situation.

a. What does x stand for?

Depth of the well (in ft)

b. What does y stand for?

Total cost of the well (in \$)

c. Use Algebra to find the **slope** of the line that can be used to model the situation.

$(\overset{x_1}{60}, \overset{y_1}{3040})$ $(\overset{x_2}{250}, \overset{y_2}{7790})$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{7790 - 3040}{250 - 60} = \frac{4750}{190} = 25$$

d. Set up the **equation of the line** modeling the cost of a drill in point-slope form.

$y - y_1 = m(x - x_1)$ point $(\overset{x_1}{60}, \overset{y_1}{3040})$

$y - y_1 = 25(x - x_1)$ $y - 3040 = 25(x - 60)$

e. Bring your equation from part (d) into slope-intercept form.

$y - 3040 = 25(x - 60)$
$y - 3040 = 25x - 1500$
$+3040 \qquad +3040$
$y = 25x + 1540$