

**Domain/Range/Word Problem GW Solutions**

1. The domain of the function is  $(-\infty, \infty)$  and the range is  $(-\infty, 3]$ .
2. The domain of the function is  $[-3, 4)$  and the range is  $[-4, 2]$ .
3. The domain of the function is  $(-\infty, 5)$  and the range is  $[-6, \infty)$ .
4. Let  $x$  represent the number of dollars Akram invested at 8% interest and  $y$  represent the number of dollars Akram invested at 12% interest.

The system that models the problem is  $\begin{cases} x + y = 20,000 \\ .08x + .12y = 1890 \end{cases}$ .

Solving  $x + y = 20,000$  for  $y$  we get  $y = 20,000 - x$ .

Substituting  $20,000 - x$  for  $y$  in the equation  $.08x + .12y = 1890$  we have:

$$\begin{aligned} .08x + .12(20,000 - x) &= 1890 \\ .08x + 2400 - .12x &= 1890 \\ -.04x &= -510 \\ x &= \frac{510}{.04} \\ x &= 12750 \end{aligned}$$

Back-substituting into  $y = 20,000 - x$  we get  $y = 20000 - 12750 = 7250$ .

Checking the interest equation:  $.08(12750) + .12(7250) = 1890$ . ✓

So, Akram has \$12,750 invested in the account that earned 8% interest and \$7,250 invested in the account that earned 12% interest.

5. Let  $x$  represent the number of liters of 15% acid solution Jimmy Wong needed to use and  $y$  represent the number of liters of 40% solution he needed to use.

The system that models the problem is 
$$\begin{cases} x + y = 30 \\ .15x + .40y = .25(30) \end{cases}$$

$$\begin{aligned} \begin{cases} x + y = 30 \\ .15x + .40y = 7.5 \end{cases} &\Rightarrow \begin{cases} -.15(x + y) = -.15(30) \\ .15x + .40y = 7.5 \end{cases} \Rightarrow \begin{cases} -.15x - .15y = -4.5 \\ .15x + .40y = 7.5 \end{cases} \\ &\qquad\qquad\qquad \underline{.25y = 3} \\ &\qquad\qquad\qquad y = \frac{3}{.25} \\ &\qquad\qquad\qquad y = 12 \end{aligned}$$

Back-substituting into  $x + y = 30$  we get  $x = 18$ .

Checking the acid equation we get  $.15(18) + .40(12) = 7.5$ . ✓

So, Jimmy Wong needed to use 18 liters of the solution that was 15% acid and 12 liters of the solution that was 40% acid.