

1. Write the equation of the line through the points (1,6) and (7,-12).

$$m = \frac{6+12}{1-7} = \frac{18}{-6} = -3$$

$$y - 6 = -3(x - 1)$$

$$y = -3x + 9$$

$$y + 12 = -3(x - 7)$$

2. Write the equation of the line parallel to the line in #1, through the point (2,-6)

$$m_{\parallel} = -3$$

$$y + 6 = -3(x - 2)$$

$$y = -3x$$

3. Write the equation of the line perpendicular to the line in #1, through the point (3,8). Then transform to standard form.

$$m_{\perp} = \frac{1}{3}$$

$$y - 8 = \frac{1}{3}(x - 3)$$

$$3y - 24 = x - 3$$

$$x - 3y = -21$$

$$3(y - 8) = \frac{1}{3}(x - 3)$$

$$-x + 3y = 21$$

4. Is horizontal and contains (3,7).

$$y = 7$$

5. Has an x-intercept 2 and y-intercept -5.

$$(2, 0)$$

$$y = \frac{5}{2}(x - 2)$$

$$(0, -5)$$

$$m = \frac{5}{2}$$

$$y = \frac{5}{2}x - 5$$

6. Given  $f(x) = x^2 + 5$  and  $g(x) = 2x - 3$ , find:

$$f(-3) = (-3)^2 + 5$$

$$\boxed{14}$$

$$f(g(x)) = (2x - 3)^2 + 5$$

$$= 4x^2 - 12x + 9 + 5$$

$$= \boxed{4x^2 - 12x + 14}$$

7. If  $f(x) = \frac{5x-1}{2}$ , find  $f^{-1}(x)$  algebraically.

$$x = \frac{5y-1}{2}$$

$$2x + 1 = 5y$$

$$\frac{2x+1}{5} = y$$

$$2x = 5y - 1$$

$$\boxed{f^{-1}(x) = \frac{2x+1}{5}}$$

8. Solve the inequality:  $|2x - 7| + 8 \leq 11$

$$|2x - 7| \leq 3$$

$$\begin{array}{ccc} -3 & \leq & 2x - 7 & \leq & 3 \\ +7 & & +7 & & +7 \end{array}$$

$$4 \leq 2x \leq 10$$

$$\boxed{2 \leq x \leq 5}$$

Solve each system.

9.  $5x - 4y = -47$   
 $7x + 6y = 27$

$$x = -3$$
$$y = 8$$

10.  $9x + 3y = 8$   
 $3x + y = 6$

No Solution  
Inconsistent

11.  $3x + 2y + z = 7$   
 $2x - y + 5z = 20$   
 $3x + 2z = 12$

$$x = 2$$
$$y = -1$$
$$z = 3$$

12.  $\frac{3}{x} + \frac{4}{y} = 1$   
 $2\left(\frac{6}{x} - \frac{2}{y} = 7\right)$

$$\frac{3}{x} + \frac{4}{y} = 1$$
$$\frac{12}{x} - \frac{4}{y} = 14$$

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$$\frac{15}{x} = 15$$

$$x = 1$$

$$y = -2$$

13. A movie theater sells tickets for \$8.00 each, with seniors receiving a discount of \$2.00. One evening the theater sold 525 tickets and took in \$3580 in revenue. How many of each type of ticket were sold?

$$x + y = 525$$
$$8x + 6y = 3580$$

$$\# \text{ reg tix} = 215$$
$$\# \text{ senior tix} = 310$$