ICNS 100 Homework 3

Problem 3.1

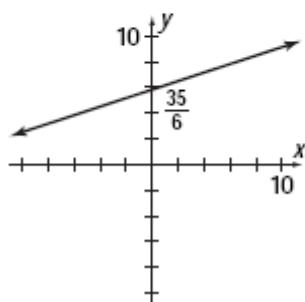**4.** $m = \dfrac{-4-(-4)}{3-2} = \dfrac{0}{1} = 0$

12.
$$y-5 = \frac{1}{3}\left[x-\left(-\frac{5}{2}\right)\right]$$
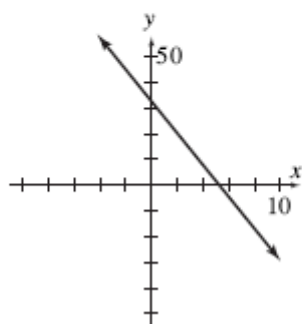$$6(y-5) = 2\left[x+\frac{5}{2}\right]$$
$$6y-30 = 2x+5$$
$$2x-6y+35 = 0$$

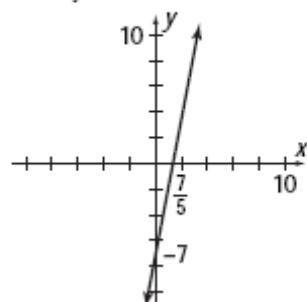**14.** $m = \dfrac{2-(-4)}{5-6} = \dfrac{6}{-1} = -6$
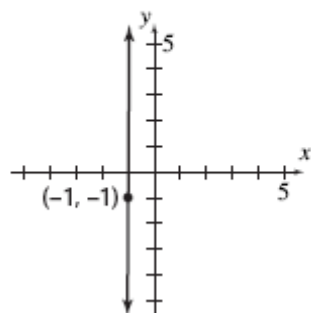$$y-2 = -6(x-5)$$
$$y-2 = -6x+30$$
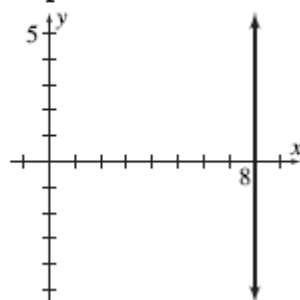$$6x+y-32 = 0$$

18.
$$y = 5x-7$$
$$5x-y-7 = 0$$

22. A vertical line has the form $x = a$. Thus $x = -1$, or $x + 1 = 0$.

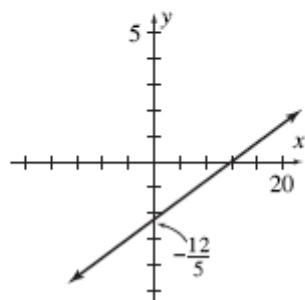**26.** $x - 2 = 6$ or $x = 8$, is a vertical line. Thus the slope is undefined. There is no y-intercept.

30. $x - 9 = 5y + 3$
$5y = x - 12$
$$y = \frac{1}{5}x - \frac{12}{5}$$
$$m = \frac{1}{5}, \; b = -\frac{12}{5}$$
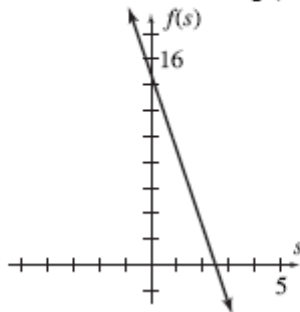

38. $3(x - 4) - 7(y + 1) = 2$
$3x - 12 - 7y - 7 = 2$
$3x - 7y - 21 = 0$ (general form)

$-7y = -3x + 21$, or $y = \dfrac{3}{7}x - 3$ (slope-intercept form)

56. $y = -4$ is a horizontal line. The perpendicular line must be vertical and has an equation of the form $x = a$. Since that line passes through $(1, 1)$, its equation is $x = 1$.

4. $f(s) = 3(5 - 2s) = 15 - 6s$ has the form
$f(s) = as + b$ where $a = -6$ (slope) and $b = 15$ (the
vertical-axis intercept).

8. Let $y = f(x)$. The points $(0, 3)$ and $(4, -5)$ lie on
the graph of f. $m = \dfrac{-5-3}{4-0} = -2$. Thus
$y - 3 = -2(x - 0)$, so
$y = -2x + 3 \Rightarrow f(x) = -2x + 3$.

10. $f(x) = ax + b = -2x + b$.
Since $f\left(\dfrac{2}{5}\right) = -7$, we have
$$-7 = -2\left(\frac{2}{5}\right) + b$$
$$b = -7 + \frac{4}{5} = -\frac{31}{5}$$
so $f(x) = -2x - \dfrac{31}{5}$.

16. The line passes through $(26{,}000, 12)$ and
$(10{,}000, 18)$, so
$$m = \frac{18-12}{10{,}000 - 26{,}000} = -0.000375. \text{ Then}$$
$p - 18 = -0.000375(q - 10{,}000)$ or
$p = -0.000375q + 21.75$.

20. The line passing through $(100, 79)$ and $(400, 88)$
has slope $\dfrac{88-79}{400-100} = 0.03$, so an equation for
the line is
$c - 79 = 0.03(x - 100)$
$c = 0.03x + 76$

26. The line has slope $\dfrac{245,000}{15} = \dfrac{49,000}{3}$ and y-intercept 245,000. So

$$y = f(x) = \dfrac{49,000}{3}x + 245,000.$$