A kitchen appliance manufacturer determines that the total cost C (in dollars) of producing n blenders is given by $C = 25n + 3,500$ (where $n > 0$). Explain what the slope and C − intercept measure.

THE SLOPE TELLS US IT COSTS $25 TO PRODUCE 1 BLENDER

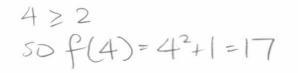THE C-INTERCEPT TELLS US IT COSTS $3,500 TO PRODUCE 0 BLENDERS (EG, RENT, UTILITIES, MACHINES)

A real estate office handles an apartment complex with 60 units. When the rent per unit is $\$940$, all the units are occupied. However, when the rent is $\$1000$, the number of occupied units drops to 55. Assume that the relationship between the monthly rent p and the demand x is linear.

[a] Write the **point-slope form** of the equation of the line giving the demand x in terms of the rent p.

$$m = \frac{x_2 - x_1}{p_2 - p_1} = \frac{55 - 60}{1000 - 940} = \frac{-5}{60} = -\frac{1}{12}$$

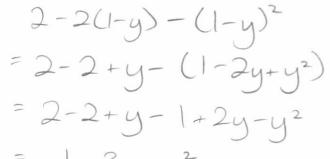$$x - 55 = -\frac{1}{12}(p - 1000) \quad \text{OR} \quad x - 60 = -\frac{1}{12}(p - 940)$$

[b] Use the answer for [a] to predict the number of units occupied when the rent is $\$1036$.

$$x - 55 = -\frac{1}{12}(1036 - 1000) \quad \text{OR} \quad x - 60 = -\frac{1}{12}(1036 - 940)$$

$$x - 55 = -\frac{1}{12}(36) \qquad\qquad x - 60 = -\frac{1}{12}(96)$$

$$x - 55 = -3 \qquad\qquad\qquad x - 60 = -8$$

$$x = 52 \qquad\qquad\qquad\qquad x = 52$$

If $f(x) = \begin{cases} 4 - 5x, & x \le -2 \\ 0, & -2 < x < 2, \\ x^2 + 1, & x \ge 2 \end{cases}$ find $f(4)$.

$4 \ge 2$

so $f(4) = 4^2 + 1 = 17$

If $v(y) = 2 - 2y - y^2$, find $v(1-y)$.

$$2 - 2(1-y) - (1-y)^2$$
$$= 2 - 2 + y - (1 - 2y + y^2)$$
$$= 2 - 2 + y - 1 + 2y - y^2$$
$$= -1 + 3y - y^2$$

If $f(x) = 9 + 5x + 3x^2$ and $g(x) = 4x^2 - 2x - 9$, find all values of x for which $f(x) = g(x)$.   SCORE: _____ / 4 PTS

CHECK ALL ANSWERS THAT ARE INTEGERS.

$$9 + 5x + 3x^2 = 4x^2 - 2x - 9$$
$$0 = x^2 - 7x - 18$$
$$0 = (x - 9)(x + 2)$$
$$x = 9 \text{ or } x = -2$$

$x = -2$
$f(-2) = 9 + 5(-2) + 3(-2)^2 = 9 - 10 + 12 = 11$
$g(-2) = 4(-2)^2 - 2(-2) - 9 = 16 + 4 - 9 = 11$

CHECK:
$x = 9$
$f(9) = 9 + 5(9) + 3(9)^2$
$= 9 + 45 + 243$
$= 297$
$g(9) = 4(9)^2 - 2(9) - 9$
$= 324 - 18 - 9$
$= 297$

Write the **point-slope form** of the equation of the line through $(-4, -1)$ and perpendicular to the line $6x + 2y = 9$.

$$2y = -6x + 9$$

$$y = -3x + \frac{9}{2}$$

$$m_1 = -3$$

$$m_2 = \frac{1}{3}$$

$$y - {}^-1 = \frac{1}{3}(x - {}^-4)$$

$$y + 1 = \frac{1}{3}(x + 4)$$