

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

SCORE: _____ / 2 PTS

$$4 \geq 2$$

$$\text{so } f(4) = 4^2 + 1 = 17$$

SCORE: _____ / 2 PTS

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. SCORE: _____ / 5 PTS

[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.

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

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

$$x - 55 = -3$$

$$x = 52$$

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

$$x - 60 = -8$$

$$x = 52$$

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:

$$x = 9$$

$$f(9) = 9 + 5(9) + 3(9)^2$$

$$= 9 + 45 + 243$$

$$= 297$$

$$g(9) = 4(9)^2 - 2(9) - 9$$

$$= 324 - 18 - 9$$

$$= 297$$

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

SCORE: _____ / 4 PTS

$$\begin{aligned} & 2 - 2(1 - y) - (1 - y)^2 \\ &= 2 - 2 + y - (1 - 2y + y^2) \\ &= 2 - 2 + y - 1 + 2y - y^2 \\ &= -1 + 3y - y^2 \end{aligned}$$

SCORE: _____ / 3 PTS

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

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

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

$$m_1 = -3$$

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

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

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