

If $f(x) = 3x^2 - x - 18$ and $g(x) = 6 - 6x + 2x^2$, find all values of x for which $f(x) = g(x)$.

SCORE: _____ / 4 PTS

CHECK ALL ANSWERS THAT ARE INTEGERS.

$$3x^2 - x - 18 = 6 - 6x + 2x^2$$

$$x^2 + 5x - 24 = 0$$

$$(x + 8)(x - 3) = 0$$

$$x = -8 \text{ or } x = 3$$

$$x = 3$$

$$f(3) = 3(3)^2 - 3 - 18 = 27 - 3 - 18 = 6$$

$$g(3) = 6 - 6(3) + 2(3)^2 = 6 - 18 + 18 = 6$$

CHECK:

$$x = -8$$

$$f(-8) = 3(-8)^2 - (-8) - 18$$

$$= 192 + 8 - 18$$

$$= 182$$

$$g(-8) = 6 - 6(-8) + 2(-8)^2$$

$$= 6 + 48 + 128$$

$$= 182$$

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

SCORE: _____ / 4 PTS

$$\begin{aligned} & 2 - (2 - y) - (2 - y)^2 \\ &= 2 - 2 + y - (4 - 4y + y^2) \\ &= 2 - 2 + y - 4 + 4y - y^2 \\ &= -4 + 5y - y^2 \end{aligned}$$

SCORE: _____ / 3 PTS

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

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

$$y = -\frac{1}{3}x + \frac{3}{2}$$

$$m_1 = -\frac{1}{3}$$

$$m_2 = 3$$

$$y - -4 = 3(x - -1)$$

$$y + 4 = 3(x + 1)$$

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 56. 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 .

$$m = \frac{x_2 - x_1}{p_2 - p_1} = \frac{56 - 60}{1000 - 940} = \frac{-4}{60} = -\frac{1}{15}$$

$$x - 56 = -\frac{1}{15}(p - 1000)$$

OR

$$x - 60 = -\frac{1}{15}(p - 940)$$

- [b] Use the answer for [a] to predict the number of units occupied when the rent is \$1045.

$$x - 56 = -\frac{1}{15}(1045 - 1000) \quad \text{OR} \quad x - 60 = -\frac{1}{15}(1045 - 940)$$

$$x - 56 = -\frac{1}{15}(45)$$

$$x - 60 = -\frac{1}{15}(105)$$

$$x - 56 = -3$$

$$x - 60 = -7$$

$$x = 53$$

$$x = 53$$

If $f(x) = \begin{cases} 4 - 5x, & x \leq -2 \\ 0, & -2 < x < 2, \\ x^2 + 1, & x \geq 2 \end{cases}$ find $f(-3)$.

SCORE: _____ / 2 PTS

$$-3 \leq -2$$

$$\text{so } f(-3) = 4 - 5(-3) = 19$$

The cost C (in dollars) of producing n tablet stands is given by $C = 1.05n + 14,750$ (where $n > 0$).

SCORE: _____ / 2 PTS

Explain what the slope and C -intercept measure.

THE SLOPE TELLS US THAT EACH TABLET STAND COSTS \$1.05
TO PRODUCE

THE C -INTERCEPT TELLS US THAT IT COSTS \$14,750
TO PRODUCE NO TABLET STANDS (EG. RENT, MACHINES)