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.

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

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

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

$x = -8$ or $x = 3$

CHECK:

$x = -8$

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

$= 192 + 8 - 18$

$= 182$

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

$= 6 + 48 + 128$

$= 182$

$x = 3$

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

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

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

SCORE: ______ / 4 PTS

$$2-(2-y)-(2-y)^2$$

$$= 2-2+y-(4-4y+y^2)$$

$$= 2-2+y-4+4y-y^2$$

$$= -4+5y-y^2$$

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

SCORE: ______ / 3 PTS

$6y = -2x + 9$

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

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

$m_2 = 3$

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

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

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 $\$1045$.

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

$$x - 56 = -\frac{1}{15}(45) \qquad x - 60 = -\frac{1}{15}(105)$$

$$x - 56 = -3 \qquad x - 60 = -7$$

$$x = 53 \qquad x = 53$$

If $f(x) = \begin{cases} 4-5x, & x \le -2 \\ 0, & -2 < x < 2, \\ x^2+1, & x \ge 2 \end{cases}$ find $f(-3)$. **SCORE: ______ / 2 PTS**

$-3 \le -2$

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)