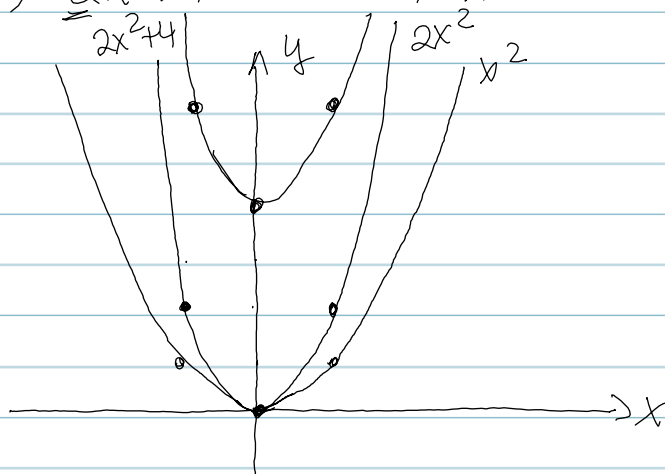


GRAPH THE FUNCTION $f(x) = 2x^2 + 4$ USING TRANSFORMATION!

1 P.F: x^2

2 V stretch by 2

3. V shift 4 units up



GRAPH THE FUNCTION $f(x) = -2x^2 + 6x + 2$ BY WRITING $f(x)$ IN STANDARD FORM $f(x) = a(x-h)^2 + k$

$$f(x) = -2 \left(x^2 - 3x + \frac{9}{4} - \frac{9}{4} \right)$$

$$2 \cdot x \cdot \frac{3}{2} = 3x$$

$$y = \frac{3}{2} \quad y^2 = \frac{9}{4}$$

$$= -2 \left(x^2 - 3x + \frac{9}{4} \right) + \left(\frac{9}{2} + 2 \right)$$

$$f(x) = -2 \left(x - \frac{3}{2} \right)^2 + \frac{13}{2}$$

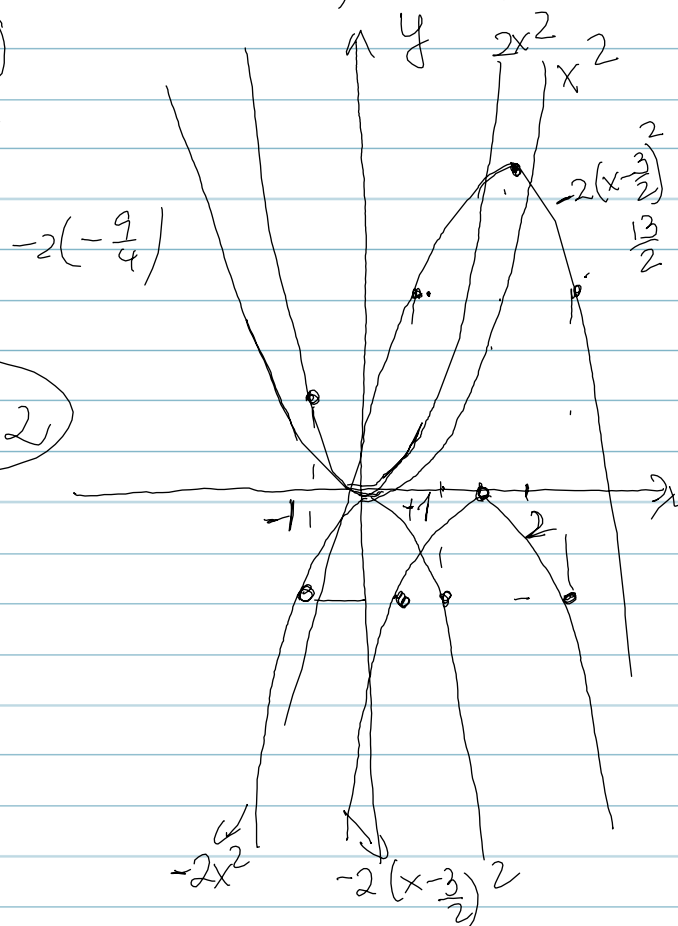
1 P.F x^2

2 Vertical stretch by 2

3 Reflexion over x-axis

4 H shift $\frac{3}{2}$ units right

5 V shift $\frac{13}{2}$ units up



$$f(x) = x^2 + 6x + 9$$

a) FIND THE VERTEX AND AXIS OF SYMMETRY OF THE PARABOLA

$$V: \left(-\frac{b}{2a}, f\left(-\frac{b}{2a}\right) \right) = (-3, 0) \quad x = -3$$

$$-\frac{b}{2a} = -\frac{6}{2 \cdot 1} = -3 \quad f(-3) = 9 - 18 + 9 = 0$$

b) FIND y-intercept AND x-intercept(S) IF ANY

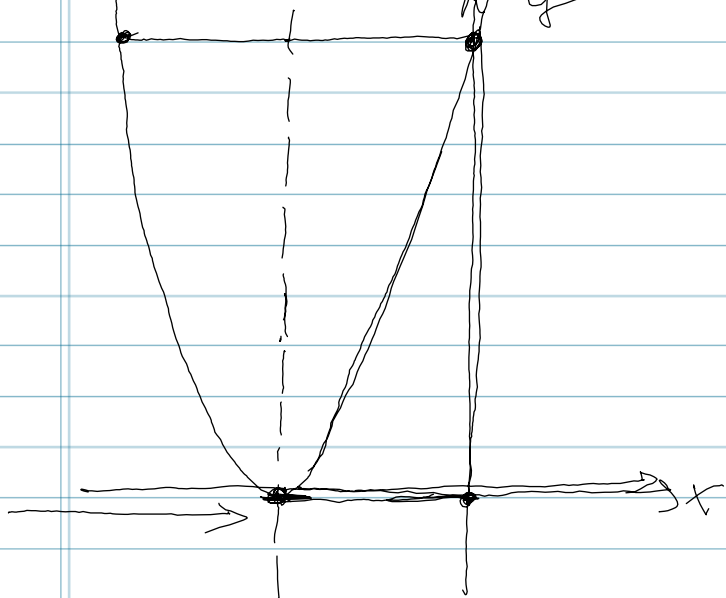
$$\text{y-int} \quad f(0) = 0^2 + 6 \cdot 0 + 9 = 9 \quad (0, 9)$$

$$\text{x-int} \quad x^2 + 6x + 9 = 0$$

$$x = \frac{-6 \pm \sqrt{36 - 36}}{2} = \frac{-6 \pm 0}{2} = -3 \text{ D.S.}$$

$$(-3, 0)$$

c) GRAPH THE FUNCTION



d) DOMAIN AND RANGE

$$D: (-\infty, \infty)$$

$$R: [0, \infty)$$

e) DETERMINE WHERE THE FUNCTION IS INCREASING AND WHERE IT IS DECREASING

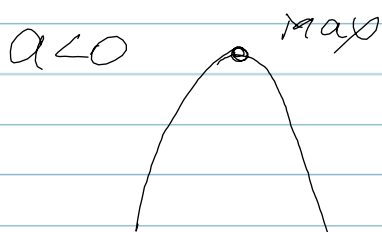
$$\text{INC: } (-3, \infty)$$

$$\text{DEC: } (-\infty, -3)$$

THE JOHN DEERE COMPANY HAS FOUND THAT THE REVENUE, IN DOLLARS, FROM SALES OF RIDING MOWERS, IS A FUNCTION OF THE UNIT PRICE p , IN DOLLARS, THAT IT CHARGES. IF THE REVENUE IS

$$R(p) = -\frac{1}{2}p^2 + 1900p$$

WHAT UNIT PRICE p SHOULD BE CHARGED TO MAXIMIZE REVENUE? WHAT IS THE MAXIMUM REVENUE?

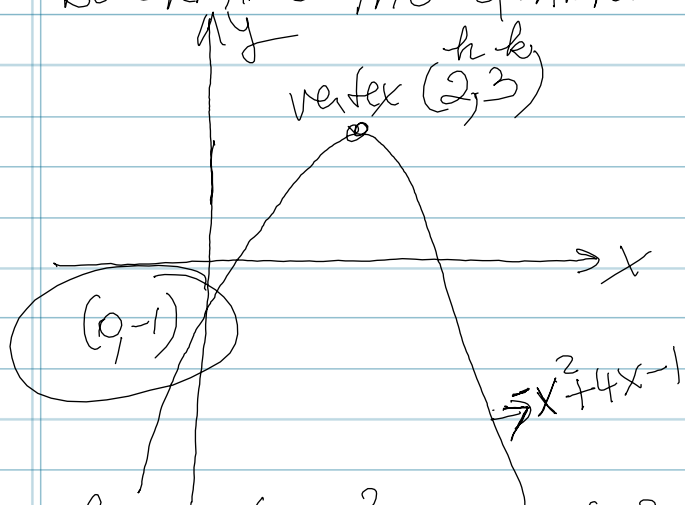


$$-\frac{b}{2a} = -\frac{1900}{2(-\frac{1}{2})} = 1900 \Rightarrow p = \$1900$$

$$\begin{aligned} R(1900) &= -\frac{1}{2}(1900)^2 + 1900(1900) \\ &= \left(-\frac{1}{2}\right)(1900)^2 + (1900)^2 \\ &= (1900)^2\left(-\frac{1}{2} + 1\right) = 1900^2 \cdot \frac{1}{2} \\ &= 1,805,000 \end{aligned}$$

$$R = \$1,805,000$$

DETERMINE THE QUADRATIC FUNCTION WHOSE GRAPH IS GIVEN



$$f(x) = a(x-h)^2 + k$$

$$\Rightarrow f(x) = a(x-2)^2 + 3$$

$$f(0) = -1$$

$$f(0) = a(0-2)^2 + 3 = 4a + 3$$

$$4a + 3 = -1 \Rightarrow 4a = -4$$

$$a = -1$$

$$f(x) = -1(x-2)^2 + 3 = -1(x^2 - 4x + 4) + 3 = -x^2 + 4x - 4 + 3$$

$$f(x) = -x^2 + 4x - 1$$