

Module 8 Review Solutions

1. a.) $(0, -6)$ b.) $(-2.5, 0), (2.5, 0)$ c.) $(0, -6)$
 d.) $X = (-\infty, \infty)$ or All Real Numbers e.) $y = [-6, \infty)$
 or $y \geq -6$
 f.) $f(-1) = -5, f(1) = -5$

2. $f(x) = -2x^2 + 9x + 5$

a.) Vertex is a maximum

$$X_v = \frac{-b}{2a} = \frac{-9}{2(-2)} = \frac{-9}{-4} = \frac{9}{4} = 2.25$$

$$y_v = f\left(\frac{9}{4}\right) = -2\left(\frac{9}{4}\right)^2 + 9\left(\frac{9}{4}\right) + 5 = 15.125$$

Vertex:
 $(2.25, 15.125)$

b.) X intercepts $\rightarrow f(x) = 0$

$$0 = -2x^2 + 9x + 5 \rightarrow 0 = 2x^2 - 9x - 5$$

$$0 = \underline{2x^2 - 10x} + \underline{x - 5}$$

$$0 = 2x(x-5) + 1(x-5)$$

$$0 = (x-5)(2x+1)$$

$$x-5=0$$

$$\boxed{x=5}$$

$$2x+1=0$$

$$2x=-1$$

$$\boxed{x=-\frac{1}{2}}$$

factors of $(2x-5)$	Sum to -9
-10	-9
$(-10)(1)$	$-10+1=-9$

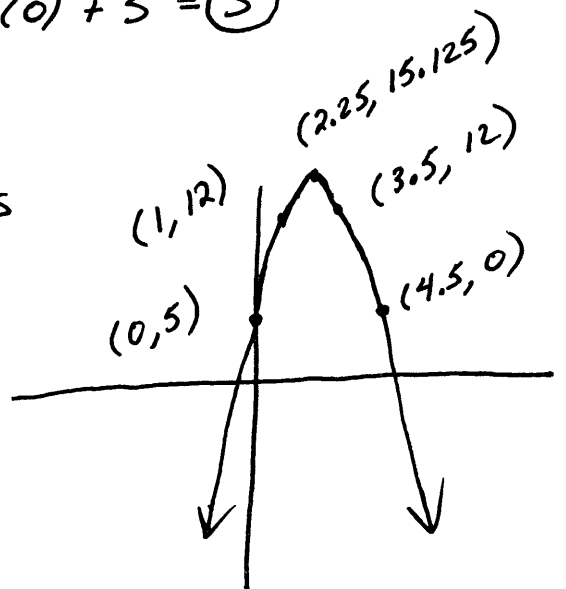
c.) y intercepts $\rightarrow x=0$

$$y = -2x^2 + 9x + 5 \rightarrow y = -2(0)^2 + 9(0) + 5 = \boxed{5}$$

d.) $(1, 12), (3.5, 12)$

e.) $x = (-\infty, \infty)$ or All Real Numbers

f.) $y = (-\infty, 15.125]$ or $y \leq 15.125$



$$3. 6X^2 + 13X - 5 = 0 \rightarrow X = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-13 \pm \sqrt{13^2 - 4(6)(-5)}}{2(6)}$$

$$X = \frac{-13 \pm \sqrt{289}}{12} = \frac{-13 \pm 17}{12} \quad X = \frac{4}{12} = \frac{1}{3}$$

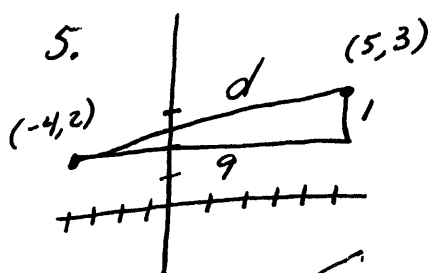
$$X = \frac{-30}{12} = -\frac{5}{2}$$

$$4. 3X^2 - 7X - 5 = 0$$

$$X = \frac{7 \pm \sqrt{(-7)^2 - 4(3)(-5)}}{2(3)} = \frac{7 \pm \sqrt{109}}{6}$$

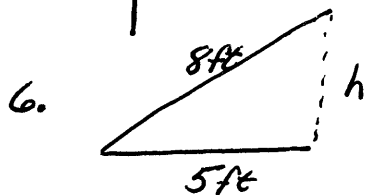
$$X = \frac{7 + \sqrt{109}}{6} = 2.91$$

$$X = \frac{7 - \sqrt{109}}{6} = -0.57$$



$$d^2 = 1^2 + 9^2$$

$$d^2 = 82 \rightarrow d = \sqrt{82} = 9.06 \text{ miles}$$



$$h^2 = 8^2 - 5^2$$

$$h^2 = 64 - 25$$

$$h^2 = 39 \rightarrow h = \sqrt{39} = 6.24 \text{ ft.}$$

$$7. P(x) = -2x^2 + 44x + 24$$

$$\text{Vertex} \rightarrow X_v = \frac{-44}{2(-2)} = \frac{-44}{-4} = 11 \text{ (thousand cars)}$$

$$y_v = P(11) = -2(11)^2 + 44(11) + 24 = 266 \text{ (\$ hundred thousand)}$$

$(11, 266) \rightarrow$ Maximum profit of \$26,600,000 occurs when 11,000 cars are sold.

$P(x) = 0$ when no profit occurs

$$0 = -2x^2 + 44x + 24 \rightarrow x = \frac{-44 \pm \sqrt{44^2 - 4(-2)(24)}}{2(-2)}$$

$$x = -0.5326 \quad x = 22.533$$

$x = 22.533 \rightarrow 22,533 \rightarrow$ when 22,533 cars are sold no profit is made.

$$8. \quad S = -16t^2 + V_0 t + S_0$$

$$3000 = -16t^2 + 0t + 18000$$

$$3000 = -16t^2 + 18000$$

$$-15000 = -16t^2$$

$$937.5 = t^2 \rightarrow t = \sqrt{937.5} = \text{30.62 secs.}$$