Sean and Mason run out of gas while fishing from their boat in the bay. They set off an emergency flare with an initial vertical velocity of 30 meters per second. The height of the flare in meters can be modeled by $h(t) = -5t^2 + 30t$, where t represents the number of seconds after launch.

$15 = -5t^2 + 30t$

$\frac{15}{-5} = \frac{-5t^2}{-5} + \frac{30t}{-5}$

$t^2 - 6t + 9 = -3 + 9$

$\sqrt{(t-3)^2} = \sqrt{6}$

$t - 3 = \pm\sqrt{6}$

1. Sean thinks the flare should reach at least 15 meters to be seen from the shore. They want to know how long the flare will take to reach this height.
   a. Write an equation to determine how long it will take the flare to reach 15 meters.

      $15 = -5t^2 + 30t$

   b. Simplify the function so you can complete the square.

      $(t-3)^2 = 6$

   c. Solve the equation by completing the square.

      $3 \pm \sqrt{6}$

   d. Mason thinks that the flare will reach 15 meters in 5.4 seconds. Is he correct? Explain.

      No, it reach 15m in .55 sec. and continues

      $3+\sqrt{6} = 5.449 \quad 3-\sqrt{6} = .55$ is about 15 m until 5.449

   e. Sean thinks the flare will reach 15 meters sooner, but then the flare will stay above 15 meters for about 5 seconds. Is he correct? Explain.

Oct 15-8:28 AM

2. Sean wants to know how high the flare will reach above the surface of the water.
   a. Write the function in vertex form, factoring so the coefficient of t^2 is 1.

      $-5(t^2 - 6t)$

   b. Complete the square using the vertex form of the function.

      $-5(t-3)^2 + 45$

   c. How high will the flare reach?

      45 m

$-5x^2 + 30x = 0$

$-5(x^2 - 6x + 9) = 0 - 45$

$-5(x-3)^2 = -45$

$-5(x-3)^2 + 45 = 0$

(h, k)

Oct 15-8:29 AM

Choose the letter for the best answer.

3. Use the vertex form of the function to determine how long after firing the flare it will reach its maximum height.

~~A 3 s~~

B 5 s

C 9 s

D 15 s

4. The boys fire a similar flare from the deck 5 meters above the water level. Which statement is correct?

A The flare will reach 45 m in 3 s.

~~B The flare will reach 50 m in 3 s.~~

C The flare will reach 45 m in 3.5 s.

D The flare will reach 50 m in 3.5 s.

$h(t) = -5t^2 + 30t + 5$

Oct 15-8:30 AM

Complete the square for each expression. Write the resulting expression as a binomial squared.

$x^2 - 22x + \underline{121}$ $\left(\frac{b}{2}\right)^2$ $\left(\frac{-22}{2}\right)^2$ $(-11)^2$ $(x-11)^2$

$x^2 + 9x + \_\_\_$

Oct 15-8:31 AM

Solve each equation by completing the square.

$14x + x^2 = 24$ $\left(\frac{b}{2}\right)^2$ $2x^2 - 8x = -2$

$x^2 + 14x - 24 = 0$

$x^2 + 14x + 49 = 24 + 49$

$\sqrt{(x+7)^2} = \sqrt{73}$

$x + 7 = \pm\sqrt{73}$

$-7 \quad -7$

$x = -7 \pm \sqrt{73}$

Oct 15-8:31 AM

Write each function in vertex form, and identify its vertex.

$f(x) = x^2 - 4x - 17$

$g(x) = x^2 - \frac{1}{2}x + 1$

$-\frac{16}{16} + \frac{1}{16}$

$x^2 - \frac{1}{2}x + \frac{1}{16} = -1 + \frac{1}{16}$

(h, k)

$\left(\frac{1}{4}, \frac{15}{16}\right)$

$\left(x - \frac{1}{4}\right)^2 = \frac{-15}{16}$

$\left(x - \frac{1}{4}\right)^2 + \frac{15}{16}$

Oct 15-8:32 AM

$h(x) = 3x^2 - 24x + 15$

$\left(\frac{-8}{2}\right)^2 = 16$

$0 = 3(x^2 - 8x + 5 + 11)$ (+33)

$33 = 3(x-4)^2$

$3(x-4)^2 - 33$

$3(x - \ )^2$

Oct 15-8:32 AM

13.)

$2x^2 + 8x - 15 = 0$

$\frac{8}{2}$ $\frac{15}{2}$

$\frac{15}{2} + \frac{8}{2}$

$\frac{23}{2}$

$x^2 + 4x - \frac{15}{2} = 0$

$x^2 + 4x + 4 = \frac{15}{2} + 4$

$\sqrt{(x+2)^2} = \sqrt{\frac{23}{2}}$

$x + 2 = \pm\sqrt{\frac{23}{2}}$

$-2 \quad -2$

$x = -2 \pm \sqrt{\frac{23}{2}}$

Oct 15-12:30 PM

Solve.

11. Write a quadratic equation with the vertex (3, 1) and $a = 1$ in standard form. _____

12. What is the y-intercept for the graph of the function $f(x) = 2(x + 2)^2 + 9$? _____

13. The value of a stock is given by $S(t) = t^2 - 6t + 13$, where t is the number of days after the purchase.

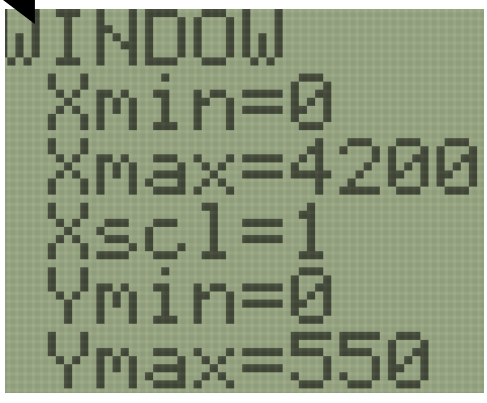
    a. Complete the square and write the function in vertex form. _____

    b. What is the value of the stock at $t = 0$? At what other time will the stock have this same value? _____

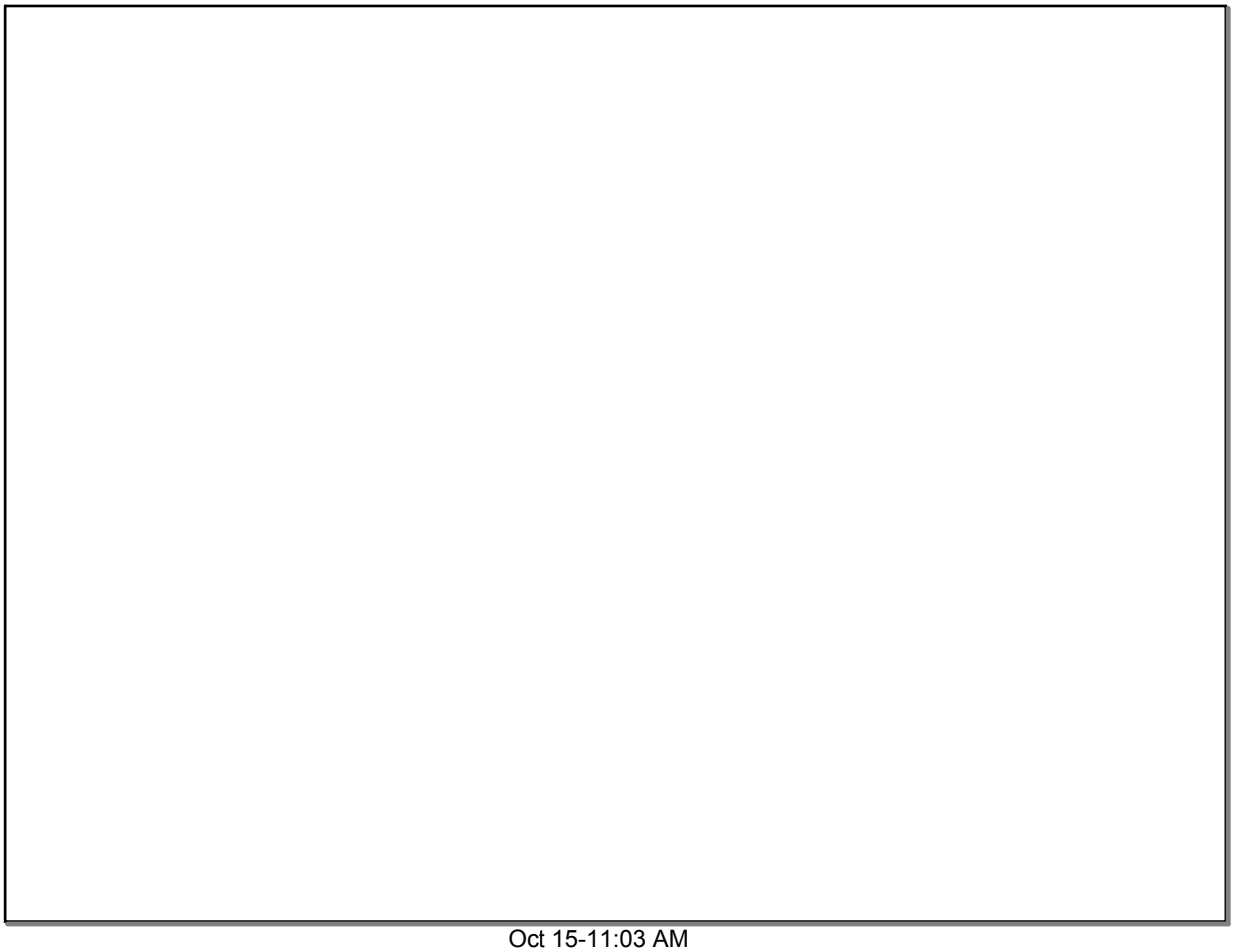
    c. What is the vertex? What does the vertex represent in terms of the stock price? _____

Oct 15-8:34 AM

HW p. 345 #2-10 even, 11, 13, 14, 16, 26, 28, 31, 33, 38, 60, 64, 73-76



Oct 15-10:57 AM



Oct 15-11:03 AM