Name _____

2-6 Lesson Master

PROPERTIES Objective E   *a = 2   b = 3   c = -2*

1. Consider the function *f* with equation $f(x) = 2x^2 + 3x - 2$.

   a. Find its *y*-intercept. $y = 2(0)^2 + 3(0) - 2 = -2$ $x = \frac{3}{4}$ $y = -2$

   $y = 0$ $x = \frac{-(3) \pm \sqrt{(3)^2 - 4(2)(-2)}}{2(2)}$ $x = \frac{-3 \pm 5}{4}$

   b. Find its *x*-intercept. $x = \frac{-3 \pm 5}{4}$ $x = 0.5$, $x = -2$

   $0 = 2x^2 + 3x - 2$ $x = -3 \pm \sqrt{25}$ $x = \frac{-3-5}{4}$

   c. Tell whether the graph has a maximum or minimum
      point and find its coordinates. $x = \frac{-3}{2(2)} = \frac{-3}{4}$ $x = -\frac{8}{4}$ min. $(-0.75, -3.125)$

   $y = 2(-0.75)^2 + 3(-0.75) - 2$

   $y = -3.125$

USES Objective F

2. The table below shows the height in feet of a ball above ground level *t* seconds
   after it has been thrown from a point 5 feet above the top of a cliff.

t (sec)	1	2	3	5	6
h (ft)	410	427	412	286	175

   $0 = -16x^2 + 65x + 361$

   $x = \frac{-(65) \pm \sqrt{(65)^2 - 4(-16)(361)}}{2(-16)}$

   $x = \frac{-65 \pm \sqrt{27329}}{-32}$

   ☆ USE CALC ☆

   a. Find the quadratic equation that fits this data. $x = 11.17 sec$ $y = -16x^2 + 65x + 361$

   b. How tall is the cliff? $y-int$ $(x = 0)$ $x = 7.20 sec$ 361 ft

   c. To the nearest tenth of a second, when does the
      ball hit the ground? $x-int$ $(y = 0)$ 7.20 sec

   d. What is the maximum height reached by the ball, to
      the nearest foot? vertex $x = \frac{-65}{2(-16)} = 2.03$ 427.02 ft

   $y = -16(2.03)^2 + 65(2.03) + 361$

   $y = 427.02$

3. The inner surface of a round wooden bowl is carved so that the
   depth measured from the top of the bowl is given by the equation
   $d = 0.6x^2 - 5x + 1$, where *x* (in inches) is the horizontal distance
   from the outer edge of the bowl.

   a. Using a graphing utility, graph the inner surface of the
      bowl. What is the appropriate domain for this function?

   $0.205 \le x \le 8.128$

   b. How deep is the bowl at *x* = 2? 6.6 inches deep

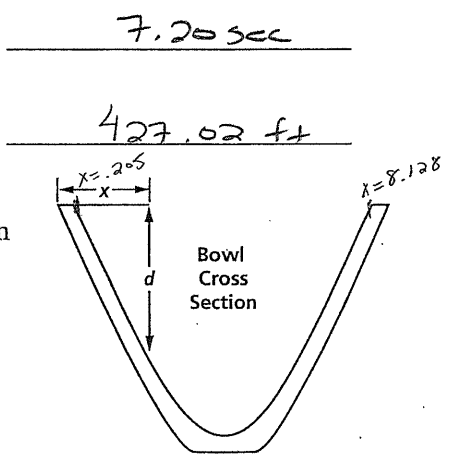   c. How deep is the bowl at its deepest point?   9.417 inches

   d. How wide (thick) is the wood at the top of the bowl?   0.205 inches

   e. What is the interior diameter at the top of the bowl? $8.128 - 0.205 = 7.923$ inches

Bowl Cross Section