

1. For each quadratic function, find the vertex, identify it as a maximum or minimum, find the actual maximum /minimum value. Round answers to two decimal places.

a.  $f(x) = x^2 - 4x + 7$  vertex:  $(2, 3)$  max or min:  $\text{min}$  max/min value:  $3$

$$\frac{-b}{2a} = \frac{4}{2(1)} = 2$$

$$f(2) = 3$$

b.  $f(x) = -2x^2 + 4x + 1$  vertex:  $(1, 3)$  max or min:  $\text{max}$  max/min value:  $3$

$$\frac{-b}{2a} = \frac{-4}{2(-2)} = 1$$

$$f(1) = 3$$

c.  $f(x) = -2x^2 - 8x$  vertex:  $(-2, 8)$  max or min:  $\text{max}$  max/min value:  $8$

$$\frac{-b}{2a} = \frac{8}{2(-2)} = -2$$

$$f(-2) = 8$$

d.  $f(x) = -2.2x^2 + 6.1x + 1.4$  vertex:  $(1.39, 5.63)$  max or min:  $\text{max}$  max/min value:  $5.63$

$$\frac{-b}{2a} = 1.39$$

$$f(1.39) = 5.63$$

e.  $f(x) = -16t^2 + 100t + 3$  vertex:  $(3.13, 159.25)$  max or min:  $\text{max}$  max/min value:  $159.25$

$$\frac{-b}{2a} = \frac{-100}{2(-16)} = 3.13$$

$$f(3.13) = 159.25$$

f.  $f(x) = 7.8s^2 - 514s + 8734$  vertex:  $(32.95, 266.18)$  max or min:  $\text{min}$  max/min value:  $266.18$

$$\frac{-b}{2a} = \frac{514}{2(7.8)} = 32.95$$

$$f(32.95) = 266.18$$

2. Solve the following quadratic equations. Use your calculator to approximate all solutions to two decimal places.

a.  $3x^2 - 6x - 1 = 0$

Solution(s):

$2.15, -0.15$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{6 \pm \sqrt{48}}{6}$$

b.  $2p^2 - 8p = -3p$

Solution(s):

$2.5, 0$

$$2p^2 - 5p = 0$$

$$\frac{5 \pm \sqrt{25 - 4(2)(0)}}{4} = \frac{5 \pm 5}{4}$$

c.  $27 = 16t^2 + 2t$

Solution(s):

$1.24, -1.36$

$$0 = 16t^2 + 2t - 27$$

$$\frac{-2 \pm \sqrt{4 - 4(16)(-27)}}{32} = \frac{-2 \pm \sqrt{1732}}{32}$$

$$\frac{-2 + \sqrt{1732}}{32} = 1.24$$

$$\frac{-2 - \sqrt{1732}}{32} = -1.36$$

d.  $0 = -16t^2 + 96t$

Solution(s):

$6, 0$

$$\frac{-96 \pm \sqrt{96^2 - 4(-16)(0)}}{2(-16)} = \frac{-96 \pm 96}{-32}$$

e.  $0 = x - 0.0005x^2$

Solution(s):

$0, 2000$

$$-0.0005x^2 + x = 0$$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-1 \pm \sqrt{1 - 4(-0.0005)(0)}}{2(-0.0005)}$$

$$\frac{-1 \pm \sqrt{1 - 4(-0.0005)(0)}}{2(-0.0005)} = \frac{-1 \pm 1}{-0.001}$$

f.  $5 = -16t^2 + 96t$

Solution(s):

$0.05, 5.95$

$$0 = -16t^2 + 96t - 5$$

$$\frac{-96 \pm \sqrt{96^2 - 4(-16)(-5)}}{2(-16)} = \frac{-96 \pm \sqrt{8896}}{-32}$$