ALGEBRA 2 **SEC 6.2 APPS** **NAME:**

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1. Jesse throws rocks into a quarry lake from the top of a 65 foot high wall. The chart gives the horizontal distance, x (in feet), the rock has traveled from Jesse and the height, y (in feet), of the rock above the lake.

distance, x	17	27	44	58
height, y	75.62	78.90	79.46	75.17

Choose the equation that best fits the path of the rock from Jesse to the lake below?

[A] $y = -0.011(x+37)^2 + 80$ **[B]** $y = -0.011x^2 + 0.81x + 65$

[C] $y = -0.021x^2 + 0.78x + 65$ **[D]** $y = -0.021(x+36)^2 + 80$

2. In an experiment, a petri dish with a colony of bacteria is exposed to cold temperatures and then warmed again. Find a quadratic equation that models the data shown. What is the coefficient of the x^2 term?

Time (hrs.)	0	1	2	3	4	5	6
Population (1000s)	6.5	5.07	4.38	4.43	5.22	6.75	9.02

[A] 0.29 **[B]** 0.42 **[C]** 0.38 **[D]** 0.37

3. Determine whether the given quadratic function has a maximum or a minimum value, then find the value: $f(x) = 10x + x^2 + 23$

4. Find the real roots of the equation by graphing: $y = 3x^2 + x + 6$

5. Find a quadratic model for the set of values.

x	-4	-3	-2	-1
$f(x)$	88	50	22	4

[A] $f(x) = 5x^2 - 3x - 4$ **[B]** $f(x) = -3x^2 - 4x + 5$ **[C]** $f(x) = 5x^2 - 4x - 3$ **[D]** $f(x) = -4x^2 + 5x - 3$

6. A biologist took a count of the the number of migrating waterfowl at a particular lake, and recounted the lake's population of waterfowl on each of the next six weeks.
a. Find a quadratic function that models the data shown as a function of *x*, the number of weeks.
b. Use the model to estimate the number of waterfowl at the lake on week 8.

Week	0	1	2	3	4	5	6
Population	522	449	478	609	842	1177	1614

[A] $P(x) = 54x^2 - 136x + 516;\ 2884$ **[B]** $P(x) = 53x^2 - 136x + 522;\ 2826$

[C] $P(x) = 51x^2 - 124x + 522;\ 2794$ **[D]** $P(x) = 50x^2 - 117x + 516;\ 2780$

7. A manufacturer determines that the number of cabinets it can sell is given by the formula $D = -3p^2 + 252p - 160,$ where p is the price of the cabinets in dollars.
a. At what price will the manufacturer sell the maximum number of cabinets?
b. What is the maximum number of cabinets that can be sold?

8. A manufacturer determines that the number of motors it can sell is given by the formula $D = -3p^2 + 474p - 240$, where p is the price of the motors in dollars.
a. At what price will the manufacturer sell the maximum number of motors?
b. What is the maximum number of motors that can be sold?

9. Dalco Manufacturing estimates that its weekly profit, P, in hundreds of dollars, can be approximated by the formula $P = -5x^2 + 10x + 3$, where x is the number of units produced per week, in thousands.
a. How many units should the company produce per week to earn the maximum profit?
b. Find the maximum weekly profit.

[A] a. 1000 units
b. \$800

[B] a. 10 units
b. \$200

[C] a. 1 unit
b. \$700

[D] a. 100 units
b. \$1200

10. An arrow shot into the air is modeled by the equation $y = 96t - 16t^2$
where y is the number of feet the arrow is above ground t seconds after it is released. Graph the equation to find what period of time the arrow is above 128 feet.

[A] Between 2 and 4 seconds

[B] Between 2 and 2 seconds

[C] Between 2 and 8 seconds

[D] Between 4 and 8 seconds

11. A model for the demand for motors is $d = -3p^2 + 162p - 280$
where d is the number of motors a manufacturer can sell at a price of p dollars each. Use a graphing utility to graph the equation. Then find the price that results in the maximum demand for motors.

[A] \$54 **[B]** \$27 **[C]** \$46.67 **[D]** None of these

12. The height of a diver jumping from a diving platform is about $h = -16.1t^2 + 11t + 30.9$
where h is the height of the diver in feet above the water and t is the time measured in seconds, when diving from a platform about 30.9 feet above the water with an initial upward velocity of 11 ft/sec.

(a) Sketch a graph the equation from $t = 0.0$ to $t = 2.0$.
(b) After how many seconds is the diver's height above the water 30 feet? Round your answer to the nearest tenth of a second.
(c) After how many seconds is the diver's height above the water 32 feet? Round your answer to the nearest tenth of a second.

13. A rocket is launched from atop a 39-foot cliff with an initial velocity of 89 feet per second. The height of the rocket t seconds after launch is given by the equation $h = -16t^2 + 89t + 39$. Graph the equation to find out how long after the rocket is launched it will hit the ground. Estimate your answer to the nearest hundredth of a second.

14. Solve the equation by graphing. If necessary, round your answer to the nearest hundredth.
$-2x^2 - 3x = -3$

15. A rocket is launched from atop a 200-meter cliff with an initial velocity of 75 meters per second. Graph the equation to find out how long after the rocket is launched it will hit the ground. Estimate your answer to the nearest hundredth of a second. Find the maximum height of the rocket.

Reference: [5.8.1.155]

[1] [B]

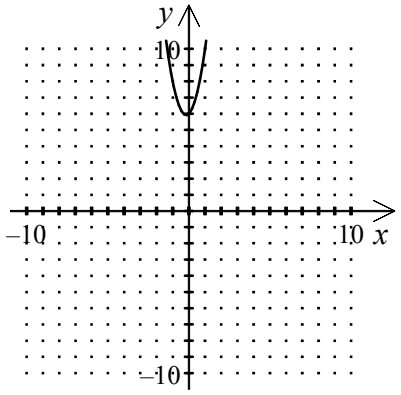
Reference: [5.8.2.156]

[2] [D]

Reference: [6.1.2.4]

[3] minimum, –2

Reference: [6.2.1.6]



[4] The equation has no real roots.

Reference: [5.1.2.7]

[5] [A]

Reference: [5.1.2.9]

[6] [C]

Reference: [5.2.2.22]

a. $42

[7] b. 5132 cabinets

Reference: [5.2.2.22]

a. $79

[8] b. 18,483 motors

Reference: [5.2.2.23]

[9] [A]

Reference: [0.2.3.36]

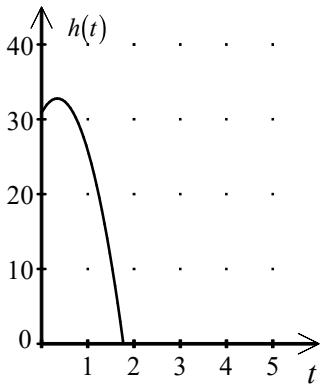
[10] [A]

Reference: [0.2.3.38]

[11] [B]

Reference: [0.2.3.40]

(a)



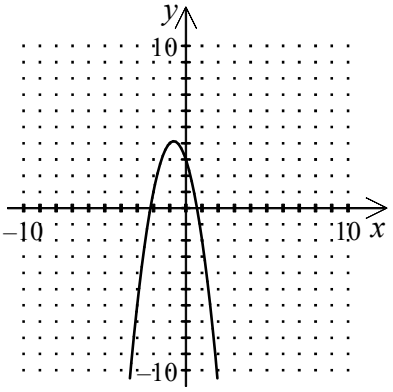
(b) Approximately 0.8 sec

[12] (c) Never

Reference: [5.5.2.50a]

[13]

Reference: [5.5.2.52]



[14] 0.69, –2.19

Reference: [5.5.2.50b]

[15]