

8.1A Homework Answers:

1) The graph of the function g is shown below. Use it to answer parts (a) through (e).

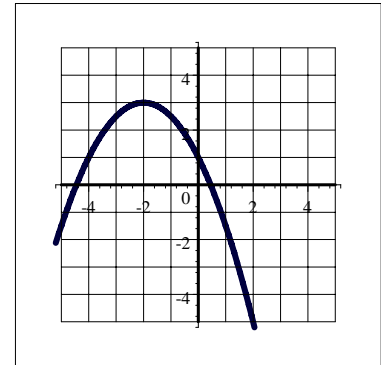
a) $g(0) = \underline{\text{1}}$

b) $g(-4) = \underline{\text{1}}$

c) $g(2) = \underline{\text{-5}}$

d) $g(-3) = \underline{\text{2.5}}$

e) e) If $g(x) = 3$ then what are the possible values of x ? $\underline{x = -2}$



Graph	Concave Up Or Down?	Coordinates Of Vertex?	Maximum Or Minimum?	x-intercept(s)	y-intercept	Range	Axis of Symmetry
#1	CD	(0, 4)	Max	(2,0) (-2, 0)	(0, 4)	$(-\infty, 4]$	$X = 0$
#2	CU	(1, -4)	Min	(-2.5,0)(4.5,0)	(0,-3.5)	$[-4, \infty)$	$X = 1$
#3	CD	(-1,-1)	Max	None	(0,-1.2)	$(-\infty, -1]$	$X = -1$
#4	CU	(2,0)	Min	(2,0)	(0,2)	$[0, \infty)$	$X = 2$
#5	CU	(-2,-4.5)	Min	(-3.5,0) (-0.5,0)	(0,3.5)	$[-4.5, \infty)$	$X = -2$
#6	CD	(3,5)	Max	(-1,0)(7,0)	(0,2)	$(-\infty, 5]$	$X = 3$

8.2A Homework Answers

Use your calculator to work the following exercises.

- 1) If $f(x) = 2x^2 - 3x - 10$, find a) $f(-1) = \underline{-5}$ b) $f(6) = \underline{44}$ c) $f(3\frac{1}{3}) = \underline{\frac{20}{9}}$
- 2) If $g(x) = 3.5 - 2.4x - 1.2x^2$, find a) $f(-4) = \underline{-6.1}$ b) $f(24.6) = \underline{-781.7}$ c) $f(0) = \underline{3.5}$

3) For each of the following functions, determine the vertex, y-intercept, and x-intercepts. State the range of each and the equation of the axis of symmetry. Graph each using a table of values to create the graph

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

Vertex: $\underline{(2, -4)}$

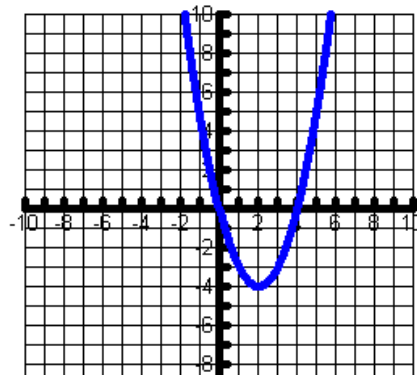
y-int: $\underline{(0, 0)}$

x-int(s): $\underline{(0, 0) (4, 0)}$

Range: $\underline{[-4, \infty)}$

Axis of Symmetry: $\underline{x = 2}$

X	Y
0	0
1	-3
2	-4
3	-3
4	0



b) $g(x) = \frac{1}{2}x^2 + 2x - 3$

Vertex: $\underline{(-2, -5)}$

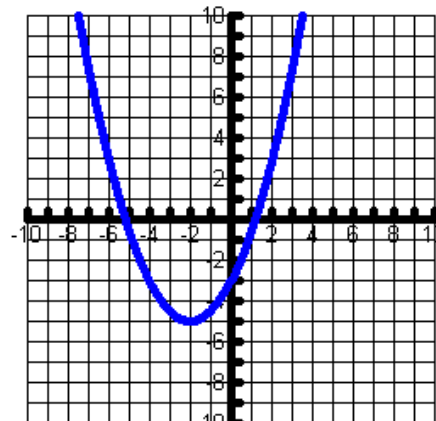
y-int: $\underline{(0, -3)}$

x-int(s): $\underline{(1.16, 0) (-5.16, 0)}$

Range: $\underline{[-5, \infty)}$

Axis of Symmetry: $\underline{x = -2}$

X	Y
-2	3
0	-3
2	-5
4	-3
6	3



c) $y = 4 - 7x - x^2$

Vertex: $\underline{(-3.5, 16.25)}$

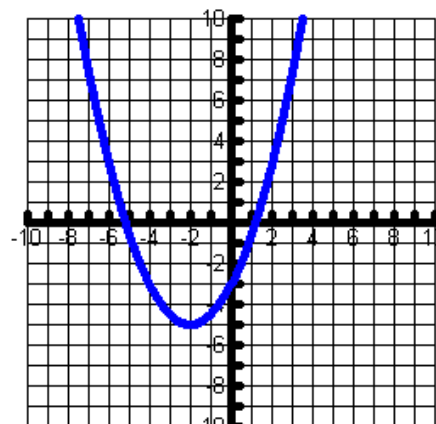
y-int: $\underline{(0, 4)}$

x-int(s): $\underline{(-7.53, 0) (0.53, 0)}$

Range: $\underline{(-\infty, 16.25]}$

Axis of Symmetry: $\underline{x = -3.5}$

X	Y
-5	14
-4	16
-3	16
-2	14
-1	10



8.3A Homework Answers

Be sure to show ALL ALGEBRAIC WORK for the following exercises.
Use may use your calculator to check the answers.

1) Text page 566: # 1 – 16 odd *Answers in text*

2) Text page 552: # 29 – 44 odd *Answers in text*

3) Text page 567: # 19 – 25 odd *Answers in text*

4) For the following functions, determine the x- and y-intercepts. Where necessary, give both exact and approximate answers, correct to 2 decimals:

a) $f(x) = x^2 - 16$ *xint: (4, 0) and (-4, 0)* *yint: (0, -16)*

b) $y = x^2 - 3x$ *xint: (0, 0) and (0, 3)* *yint: (0, 0)*

c) $f(x) = x^2 - 4x - 12$ *xint: (-2, 0) and (6, 0)* *yint: (0, -12)*

d) $f(x) = 2x^2 + 9x - 5$ *xint: (1/2, 0) and (-5, 0)* *yint: (0, -5)*

e) $y = x^2 + 2x - 2$ *xint: $(-1 + \sqrt{2}, 0)$ and $(-1 - \sqrt{2}, 0)$ or (0.41, 0) and (-2.41, 0)*
yint: (0, -2)

f) $f(x) = 1 - 6x - 2x^2$ *xint: $(\frac{3 + \sqrt{11}}{-2}, 0)$ and $(\frac{3 - \sqrt{11}}{-2}, 0)$ or (-3.16, 0) and (0.16, 0)*
yint: (0, 1)

5) For the function $f(x) = 5 - 8x - 4x^2$, determine the x- and y-intercepts, the vertex, and the direction of opening. Plot and label these points on the axes at right, and sketch the parabola. Mark on the axis of symmetry, and state its equation. Verify your result by graphing using the calculator.

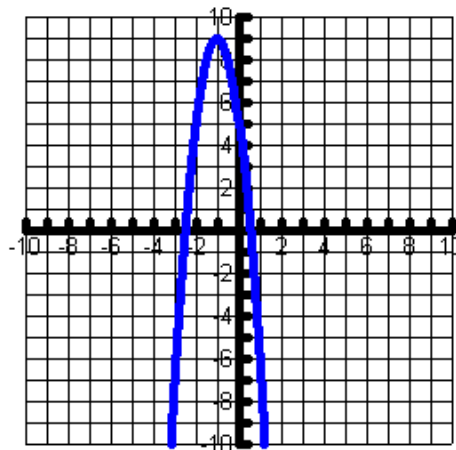
Xint: (-2.5, 0) and (0.5, 0)

Yint: (0, 5)

Vertex: (-1, 9)

Concave Down

Axis of Symmetry: $x = -1$



11.1A Homework Answers

For the following questions, refer to the graphs below:

- 1) Determine the break-even points for this company. *50,000 and 200,000 widgets*
- 2) How many widgets should they produce for maximum profit? What will the maximum profit be?
150,000 widgets will produce a maximum profit of \$6000.
- 3) What is the maximum revenue? *\$31,000*
- 4) What is the revenue generated when the company has a maximum profit? *\$28,000*
What is the best selling price for this company's widgets? *$\$6000 / 150,000 \text{ widgets} = \0.04 per widget*

11.2A Homework Answers

GRAPH 2

The graph below represents the height of an object above ground level at any time after it is released.

- 1) What is the height after 3sec? *300ft* b) After 10 sec? *225ft*
- 2) a) When is the object 200 ft above ground? *1.8 sec and 10.2 sec*
b) When is it 500 ft above ground? *never*
- 3) When does it return to the ground? *12 sec*
- 4) What is the maximum height it reaches? *400ft* When does it reach this height? *6 sec*

GRAPH 3

The graph above gives the vertical position, in feet above ground level, for an object thrown upward from a cliff, for any time, in seconds, after it is released. Use the graph to determine the following information.

- 5) What was the initial position of the object? *105ft* What does this mean? *80ft*
- 6) How far above ground is the object after 2.5 sec? *80ft*
- 7) a) When is the object 20 ft above ground? *3.25sec*
b) When is the object 20 ft. below its initial position? *2.5sec*
- 8) When does this object reach its maximum height? *1sec* What is the maximum height above ground? *125ft*
- 9) When does the object hit the ground? *3.5 sec*

11.3A Homework Answers

1. $t =$ time in seconds $s(t) =$ position "height" in meters
 $t = \frac{-91.2}{(2 \cdot -4.9)} = 9.31$ $s(9.31) = -4.9(9.31)^2 + 91.2(9.31) + 100 = 524.36$
**The signal flare reaches a maximum height of 524.36 meters in 9.31 seconds.
2. $x =$ #of computers $P(x) =$ profit \$
 $x = \frac{-100}{(2 \cdot -0.025)} = 2000$ $P(2000) = 100(2000) - 0.025(2000)^2 = 100,000$
**The maximum monthly profit of \$100,000 is reached when 2000 computers are produced and sold.
3. $t =$ time in seconds $s(t) =$ position "height" in feet
 $t = \frac{-60}{(2 \cdot -16)} = 1.875$ $s(1.875) = -16(1.875)^2 + 60(1.875) + 110 = 166.25$
**The egg reaches a maximum height of 166.25 feet in 1.875 seconds.
4. $t =$ time in seconds $s(t) =$ position "height" in meters
 $t = \frac{-14}{(2 \cdot -4.9)} = 1.43$ $s(1.43) = -4.9(1.43)^2 + 14(1.43) + 60 = 70$
**The water balloon reaches a maximum height of 70 meters in 1.43 seconds.
5. $t =$ time in seconds $s(t) =$ position "height" in feet
 $t = \frac{-8}{(2 \cdot -16)} = 0.25$ $s(0.25) = -16(0.25)^2 + 8(0.25) + 24 = 25$
**The apple will reach a maximum height of 25 feet in 0.25 seconds.
6. $t =$ time in seconds $s(t) =$ position "height" in feet
 $t = \frac{-80}{(2 \cdot -16)} = 2.5$ $s(2.5) = -16(2.5)^2 + 80(2.5) = 100$
**The football will reach a maximum height of 100 feet in 2.5 seconds.
7. $x =$ width $A(x) =$ Area square feet
 $x = \frac{-140}{(2 \cdot -1)} = 70$ $A(70) = 140(70) - (70)^2 = 4900$
**The maximum area of 4900 square feet is reached when the width is 70 feet.
8. $x =$ # Sponge Bob's $R(x) =$ revenue \$
 $x = \frac{-46}{(2 \cdot -1)} = 23$ $R(23) = 46(23) - (23)^2 = 529$
**A maximum revenue of \$529 is reached when 23 Sponge Bob's are sold.
9. $x =$ # DVD's $P(x) =$ Profit \$
 $x = \frac{-6}{(2 \cdot -0.05)} = 60$ $P(60) = 6(60) - 0.05(60)^2 - 6 = 174$
**A maximum profit of \$174 is reached when 60 DVD's are produced and sold.

Vertical Position

$$\begin{aligned}1. \quad 0 &= -16t^2 + 400 \\ -400 &= -16t^2 \\ \frac{-400}{-16} &= \frac{-16t^2}{-16} \\ t^2 &= 25 \\ t &= \sqrt{25} \\ t &= 5\end{aligned}$$

**It takes 5 seconds for the balloon to reach the ground

$$\begin{aligned}5. \quad 5000 &= -16t^2 + 12000 \\ -7000 &= -16t^2 \\ \frac{-7000}{-16} &= \frac{-16t^2}{-16} \\ t^2 &= 437.5 \\ t &= \sqrt{437.5} \\ t &\approx 20.92\end{aligned}$$

** It will take the skydiver 20.92 sec to descend from 12,000 to 5,000 ft.

$$\begin{aligned}2. \quad 0 &= -16t^2 + 576 \\ -576 &= -16t^2 \\ \frac{-576}{-16} &= \frac{-16t^2}{-16} \\ t^2 &= 358.5 \\ t &= \sqrt{358.5} \\ t &\approx 18.93\end{aligned}$$

**It takes 18.93 seconds for the brick to reach the ground

$$\begin{aligned}6. \quad 3500 &= -16t^2 + 11000 \\ -7500 &= -16t^2 \\ \frac{-7500}{-16} &= \frac{-16t^2}{-16} \\ t^2 &= 468.75 \\ t &= \sqrt{468.75} \\ t &\approx 21.65\end{aligned}$$

** It will take the skydiver 21.65 sec to descend from 11,000 to 3,500 ft.

$$\begin{aligned}3. \quad 0 &= -16t^2 + 350 \\ -350 &= -16t^2 \\ \frac{-350}{-16} &= \frac{-16t^2}{-16} \\ t^2 &= 21.875 \\ t &= \sqrt{21.875} \\ t &\approx 4.68\end{aligned}$$

**The ketchup will take 4.68 seconds to reach the ground

$$\begin{aligned}7. \quad 4000 &= -16t^2 + 15000 \\ -11000 &= -16t^2 \\ \frac{-11000}{-16} &= \frac{-16t^2}{-16} \\ t^2 &= 687.5 \\ t &= \sqrt{687.5} \\ t &\approx 26.22\end{aligned}$$

** It will take the skydiver 26.22 sec to descend from 15,000 to 4000 ft..

$$\begin{aligned}4. \quad 0 &= -16t^2 + 250 \\ -250 &= -16t^2 \\ \frac{-250}{-16} &= \frac{-16t^2}{-16} \\ t^2 &= 15.625 \\ t &= \sqrt{15.625} \\ t &= 3.95\end{aligned}$$

**The toilet paper will take 3.95 sec to unravel and reach the ground

$$\begin{aligned}8. \quad 4500 &= -16t^2 + 13000 \\ -8500 &= -16t^2 \\ \frac{-8500}{-16} &= \frac{-16t^2}{-16} \\ t^2 &= 531.25 \\ t &= \sqrt{531.25} \\ t &\approx 23.05\end{aligned}$$

** It will take the skydiver 23.05 sec to descend from 13,000 to 4,500 ft.