

Good morning!

1. "Here"

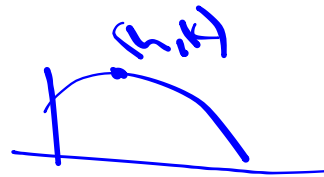
2. Review for the Unit 2 Part 3 Test

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Quadratic Word Problems (Profit/Gravity)

Mar 24, 11:38:29 AM

Watch help video Problem types



A rocket is launched from a tower. The height of the rocket, y in feet, is related to the time after launch, x in seconds, by the given equation. Using this equation, find out the time at which the rocket will reach its max. to the nearest tenth of a second.

$h \leftarrow$ vertex (h, k)

$$y = -16x^2 + 263x + 92$$

$$h = \frac{-b}{2a} = \frac{-(263)}{2(-16)} = \frac{-263}{-32}$$

$$\begin{aligned} a &= -16 \\ b &= 263 \\ c &= 92 \end{aligned}$$

$$\boxed{h = 8.22} \text{ sec}$$

A company sells widgets. The amount of profit, y , made by the company, is related to the selling price of each widget, x , by the given equation. Using this equation, find out the maximum amount of profit the company can make, to the nearest dollar.

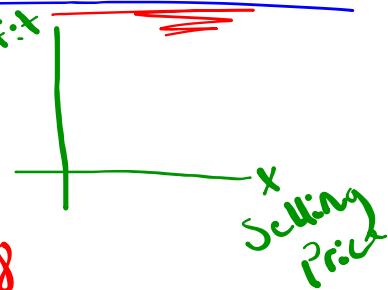
Vertex
(h, k)

$$y = -15x^2 + 1039x - 7988$$

$$\textcircled{1} h = \frac{-b}{2a} = \frac{-(1039)}{2(-15)} = 34.6\bar{3}$$

$$\textcircled{2} k = -15(34.6\bar{3})^2 + 1039(34.6\bar{3}) - 7988$$

$$k \approx 10,004$$



A rocket is launched from a tower. The height of the rocket, y in feet, is related to the time after launch, x in seconds, by the given equation. Using this equation, find the time that the rocket will hit the ground, to the nearest 100th of second.

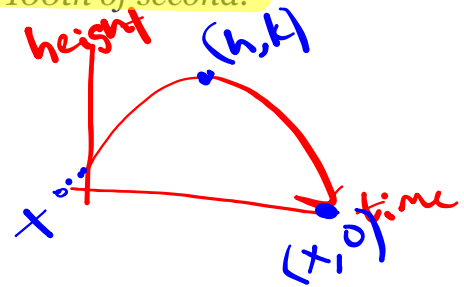
x

$x = \text{int}$

$$y = -16x^2 + 247x + 141$$

$$a = -16 \quad b = 247 \quad c = 141$$

$$x = \frac{-247 \pm \sqrt{247^2 - 4(-16)(141)}}{2(-16)}$$



Algebra I
Unit 3C – Test Review

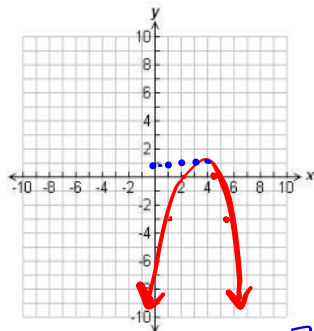
Name: _____

Part One: Graphing Quadratics

Graph the following quadratic functions.

1) $f(x) = -x^2 + 6x - 8$ *y-intercept*

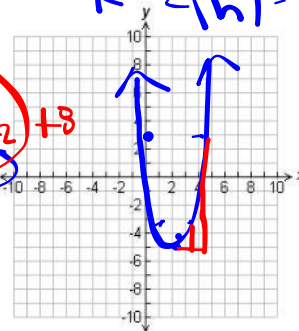
x	f(x)
1	-3
2	0
3	1
4	0
5	-3



y: range (-∞, 1]

2) $f(x) = 2x^2 - 8x + 3$

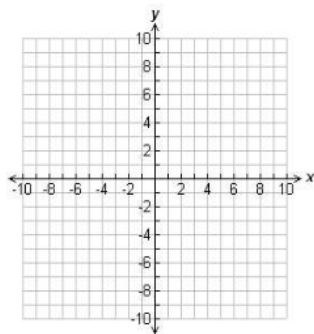
x	f(x)
0	3
1	-3
2	-5
3	-3
4	3



h = -b/2a
k = 2(h)^2 - 8(h) + 3

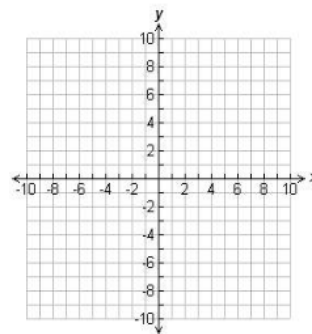
3) $f(x) = \frac{1}{2}(x - 6)^2 + 4$

x	f(x)



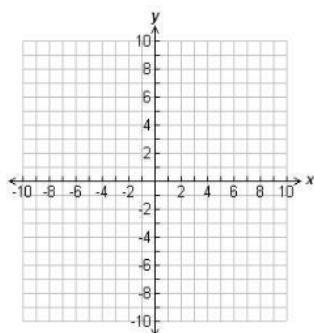
4) $f(x) = x^2 - 3$

x	f(x)



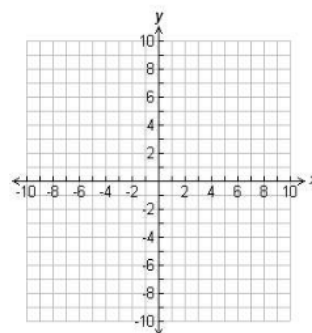
5) $f(x) = (x + 2)^2 - 1$

x	f(x)



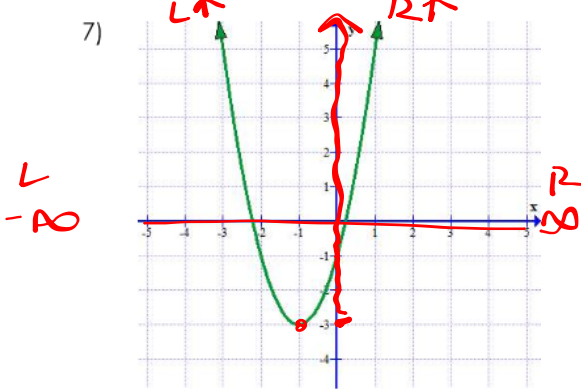
6) $f(x) = -4x^2 + 8$

x	f(x)

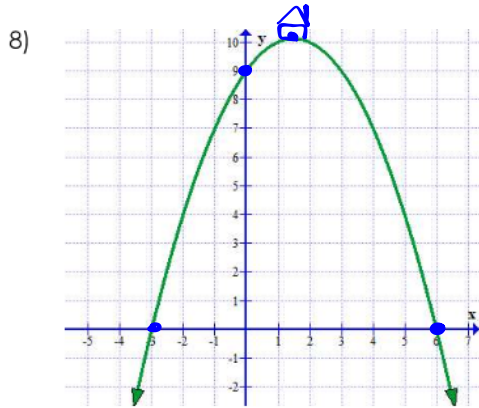


Part Two: Characteristics of Graphs

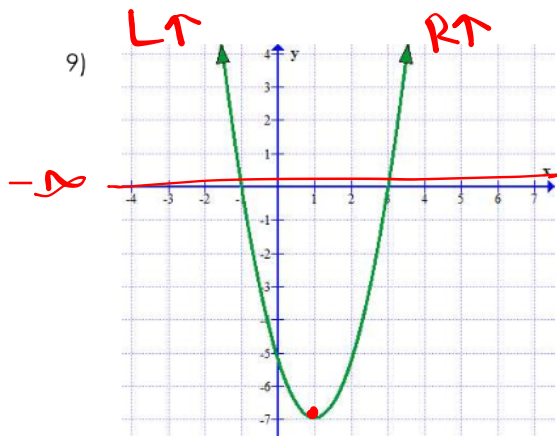
Identify the listed characteristics for each graph.



Domain: $(-\infty, \infty)$ } Intervals
 Range: $[-3, \infty)$ }
 Vertex: $(-1, -3)$ Point
 Extrema/extrema value: **Minimum $y = -3$**
 Axis of Symmetry: **$x = -1$**



Y-Intercept: $(0, 9)$
 X-Intercept(s): $(6, 0), (-3, 0)$
 Solution(s): **$x = -3, 6$**
 Extrema type: **maximum**



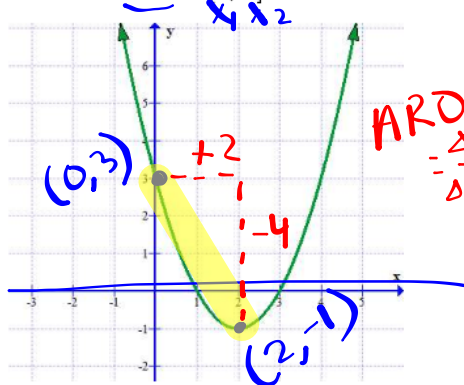
Domain: $(-\infty, \infty)$
 Range: $[-7, \infty)$
 Vertex: $(1, -7)$
 Axis of Symmetry: **$x = 1$**
 Y-Intercept: $(0, -5)$
 X-Intercept(s): $(-1, 0), (3, 0)$
 Extrema/extrema value: **min $y = -7$**
 Solution(s): **$x = -1, 3$**



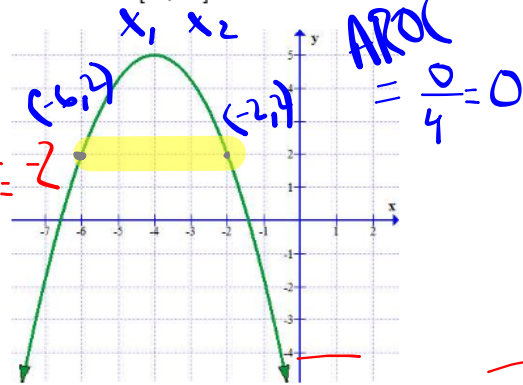
Part Three: Average Rate of Change

Find the average rate of change indicated for each function below.

10) Find the average rate of change over the interval $[0, 2]$.



11) Find the average rate of change over the interval $[-6, -2]$.



Part Four: Transformations of Quadratic Functions

Identify the transformations for each function below from the parent function $f(x) = x^2$.

12) $f(x) = -x^2 + 5$

V. reflection, $a < 0$
 V. shift up 5

14) $f(x) = -3(x-6)^2 - 2$

$a < 0$
 -3 V. reflection
 $|a| > 1$ V. stretch
 H. shift right 6
 V. shift down 2

16) $f(x) = 4(x+3)^2 + 1$

13) $f(x) = 2(x+4)^2$

15) $f(x) = (x+1)^2$

$y = a(x-h)^2 + k$

17) $f(x) = -\frac{1}{2}(x-4)^2 - 3$

$y = a(x-h)^2 + k$
 $a < 0$: V. reflection
 $|a| < 1$: V. shrink
 $h = 4$ H. shift right 4
 V. shift down 3

Part Five Vertex, Axis of Symmetry, and Extrema *or U*

For the following functions, identify the vertex, axis of symmetry and extrema.

18) $f(x) = x^2 - 6x + 1$ $v(3, -8)$ $19) f(x) = -2x^2 + 12x$

$a=1$ $b=-6$ $c=1$ $h = \frac{-b}{2a} = \frac{-(-6)}{2(1)} = 3$ $Axis\ x=3$

$k = (3)^2 - 6(3) + 1 = -8$ $\min\ y = -8$

$k = -8$

20) $f(x) = 3(x+4)^2 - 1$ $21) f(x) = -2(x-3)^2 + 5$

$g(x-h)^2 + k$

$v(h, k)$ $Axis\ x = h$

$(-4, -1)$ $min\ y = k$

$y = -1$

Part Six: Converting Between Different Forms of Quadratics

Convert the following quadratic functions from vertex form to standard form.

22) $f(x) = -0.5(x+4)^2 - 2$ 23) $f(x) = 3(x-1)^2 + 4$

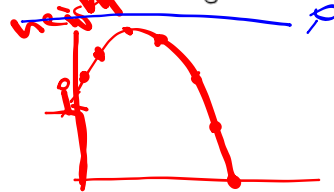
Convert the following quadratic functions from standard form to vertex form.

24) $f(x) = 2x^2 + 8x - 6$ 25) $f(x) = -x^2 + 6x + 3$

Part Seven: Applications of Quadratic Functions

Solve the following word problems.

26) A person standing at the edge of a building throws a baseball vertically upward. The quadratic function $f(x) = -16x^2 + 64x + 32$ models the baseball's height above the ground, $f(x)$ in meters, x seconds after it was thrown.



a) From what height was the baseball thrown?

32 m

b) When did the baseball hit its maximum height?

$$\bar{x} \rightarrow h = \frac{-b}{2a}$$

c) What was the baseball's maximum height?

$$k = -16(h)^2 + 64(h) + 32$$

d) A bird is flying 100 ^m feet above the ground – is the bird in danger of being hit?

e) When did the baseball land?

x - int .

Jennifer hit a golf ball from the ground and it followed the projectile $h(t) = -16t^2 + 100t$, where t is the time in seconds, and h is the height of the ball.

a) When did the ball hit its maximum height?

b) What was the maximum height?

c) When did the golfball land?