# Today's Learning Goal(s):

By the end of the class, I will be:

a) ready for the Unit 4 Summative

***Complete the 3 graphs on the handout as a warm-up!***

Unit Review

Date: April 20, 2017

Review Quiz 1 and Quiz 2

$y = 3x$

Recognizing a Quadratic Relation

from the equation $y = x^2$, $y = 3x^2$, $y = (x-2)^2 + 7$, $y = 3x(x-1)$

from a table of values if 2nd differences are constant

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

$y = -2(x-3)^2 + 5$ $y = 2(x+4)^2 + 7$ $y = \frac{1}{4}(x-5)^2 - 6$

vertex h, k — V(3, 5) V(-4, 7) V(5, -6)

moving left/right vs. up/down — 3 right, 5 up — 4 left, 7 up — 5 right, 6 down

recognizing a: max vs. min — max: a is neg. — min: a is positive — min: a is positive

What IS the max/min value? — max is 5 — min is 7 — min is -6

direction of opening — down — up — up

stretch vs. compression — stretch — stretch — compression

Sketching curves in vertex form $y = a(x-h)^2 + k$

Word Problems ... see "Understanding" above

Determining the equation of a parabola

start with the vertex, then substitute another known point for $(x, y)$ and solve to get "$a$" by itself

write the equation as your conclusion

x y

vertex is (8, -2) through point (1, 3)

$y = a(x-8)^2 - 2$

$3 = a(1-8)^2 - 2$

$3 = a(-7)^2 - 2$

$3 = 49a - 2$

$3 + 2 = 49a$

$5 = 49a$

$\frac{5}{49} = a$

$\therefore y = \frac{5}{49}(x-8)^2 - 2$ is the equation

Determining the $y$-intercept

let $x = 0$, then solve for $y$

$y = 2x^2 - 7x - 9$

$= 2(0)^2 - 7(0) - 9$

$= -9$

$y = 2(x-3)^2 + 1$

$= 2(0-3)^2 + 1$

$= 2(-3)^2 + 1$

$= 2(9) + 1$

$= 18 + 1$

$= 19$

Review Homework:

p. 226 #1, 2, 10* ***see below***, 12

* After you do a rough sketch, find the parabola's equation in the form: $y = a(x-h)^2 + k$

3 graphs (see below)

p. 228 #1 to 6, 11

***Correct Last Day's Homework:*** ***(at end of file)***

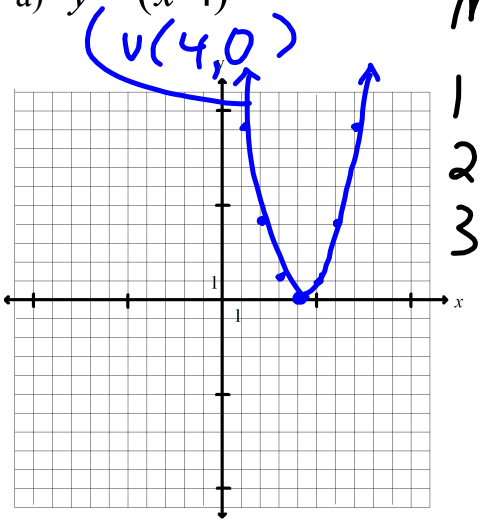
***p. 216 #9abc***

***p. 222 # 1aceg, 2ab, 4, 5*, 7***

****(use graph paper for #5)***

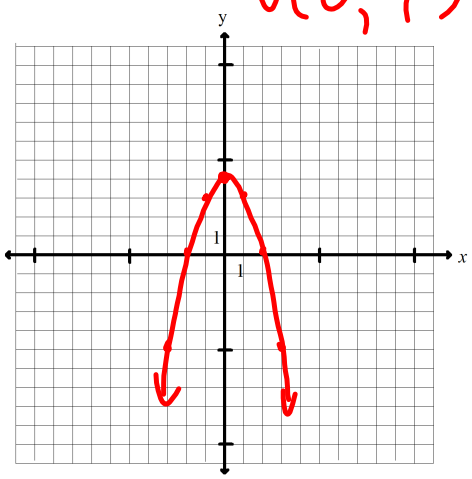
***p. 228 #9***

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



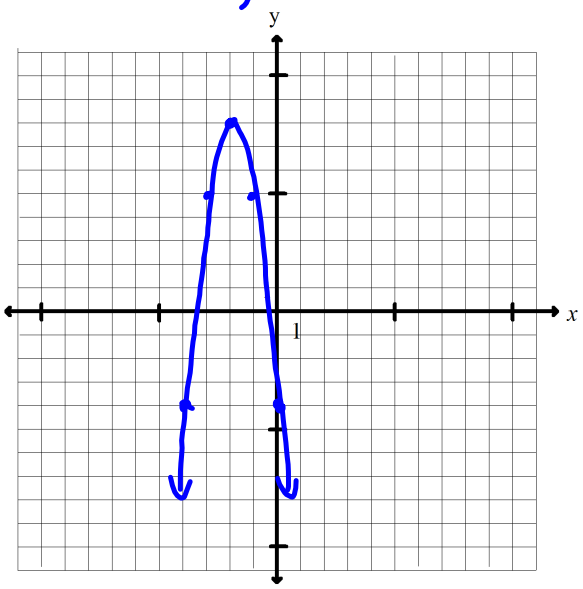

| M | G |
|---|---|
| 1 | 1 |
| 2 | 4 |
| 3 | 9 |

b) $y = -x^2 + 4$



c) $y = -3(x+2)^2 + 8$

V (-2, 8)




M G -3x

1 → 3

2 → 12

3 → 27

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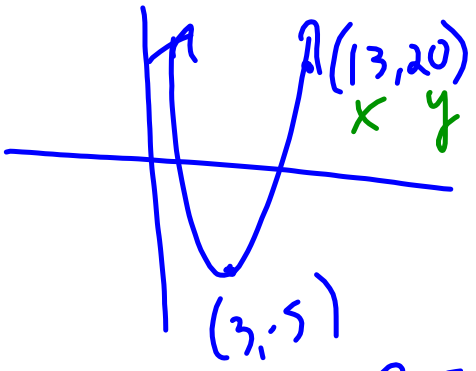
**10.** Sketch the graph of each parabola. Then, determine its equation.

**a)** opens upward, vertex is (3, −5), passes through point (13, 20)

**b)** opens downward, vertex is (−4, 7), passes through point (0, −39)




$y = a(x-3)^2 - 5$

$20 = a(13-3)^2 - 5$

p. 228

**For questions 1 to 6, choose the best answer.**

1. Which of these relations is quadratic?
   - A $y = 0.5x - 7$
   - B $y = 5.8x + 3x^2 - 9$
   - C $y = 4x^4 + 2x^2 - 5x + 1$
   - D $3x + 2y + 10 = 0$

2. Which of these relations is not quadratic?
   - A the path of a ball thrown in the air
   - B the distance a car travels when it is accelerating
   - C the distance travelled when running at a constant speed
   - D the shape of a satellite dish

3. Which parabola has its vertex 3 units above the $x$-axis?
   - A $y = 3(x - 5)^2 + 4$
   - B $y = 5(x + 4)^2 - 3$
   - C $y = 0.1(x - 15)^2 + 3$
   - D $y = 0.3(x + 3)^2 - 10$

4. Which parabola has its vertex farthest from the $y$-axis?
   - A $y = 3(x - 5)^2 + 4$
   - B $y = 5(x + 4)^2 - 3$
   - C $y = 0.1(x - 15)^2 + 3$
   - D $y = 0.3(x + 0.8)^2 - 10$

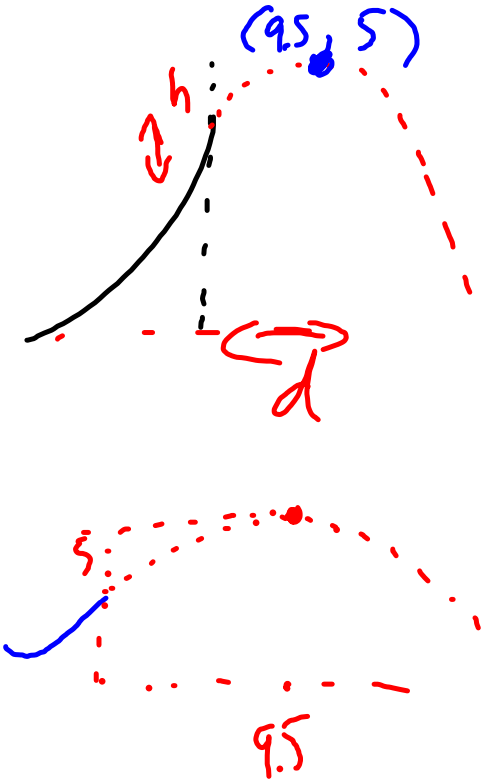
5. Which parabola is the most vertically stretched?
   - A $y = 3(x - 5)^2 + 4$
   - B $y = 5(x + 4)^2 - 3$
   - C $y = 0.1(x - 15)^2 + 3$
   - D $y = 0.3(x + 0.8)^2 - 10$

6. The parabola represented by the relation $y = -8(x + 15)^2 + 12$ has which vertex?
   - A $(-8, 15)$
   - B $(-15, 12)$
   - C $(-15, -12)$
   - D $(-8, -12)$

*Correct Last Day's Homework:*

p.216 9abc

$h = -0.03(d-9.5)^2 + 5$




a) find h, if d=0

$h = -0.03(0-9.5)^2 + 5$

$= -0.03(-9.5)^2 + 5$

$\doteq 2.2925$

$\doteq 2.3\text{m}$

p.224 #4 Fireworks

$h = -4.9(t-2)^2 + 169.6$

a) the max. height is 169.6 m

it takes 2 sec. to reach the max. height

4b) how high after 5 seconds?

if $t=5$, find $h$.

$h = -4.9(t-2)^2 + 169.6$

$= -4.9(5-2)^2 + 169.6$

$= -4.9(3)^2 + 169.6$

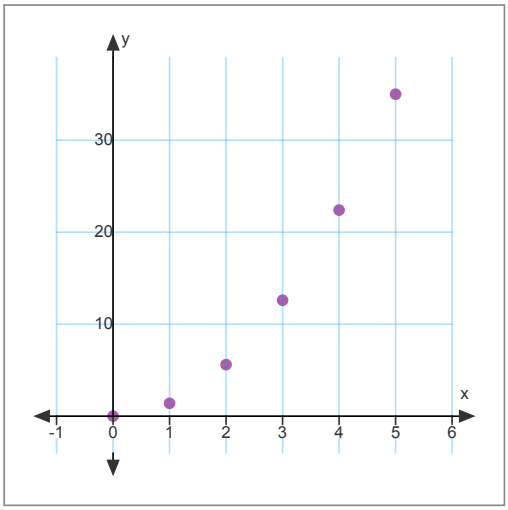
$\doteq 125.5$ ∴ at 5 seconds the rocket is 125.5 m above the water

From the 4.5 homework:
p.224 #5 Comparing Cars

Smart Car For two: $d=1.4t^2$

$d=14(\ )^2$

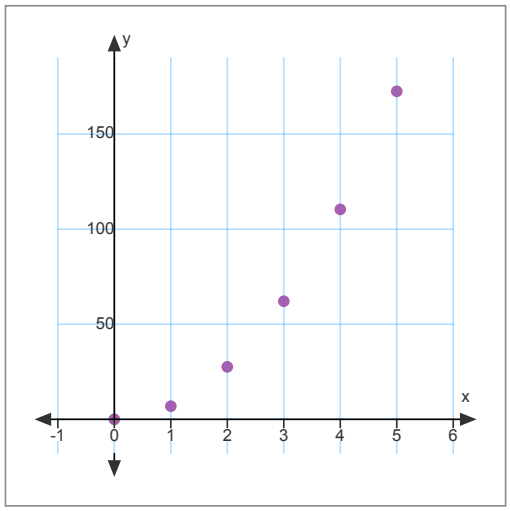
| t | d |
|---|---|
| 0 | 0 |
| 1 | 1.4 |
| 2 | 5.6 |
| 3 | 12.6 |
| 4 | 22.4 |
| 5 | 35 |

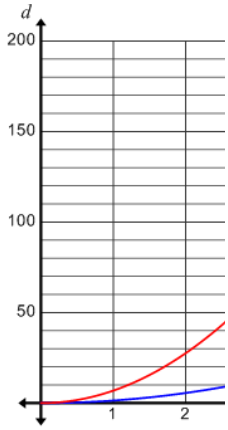



c)
speed =
$\frac{22.4-1.4}{4-1}$
$= \frac{21}{3}$
$= 7\ m/s$

Tesla Roadster: $d=6.9t^2$

| t | d |
|---|---|
| 0 | 0 |
| 1 | 6.9 |
| 2 | 27.6 |
| 3 | 62.1 |
| 4 | 110.4 |
| 5 | 172.5 |

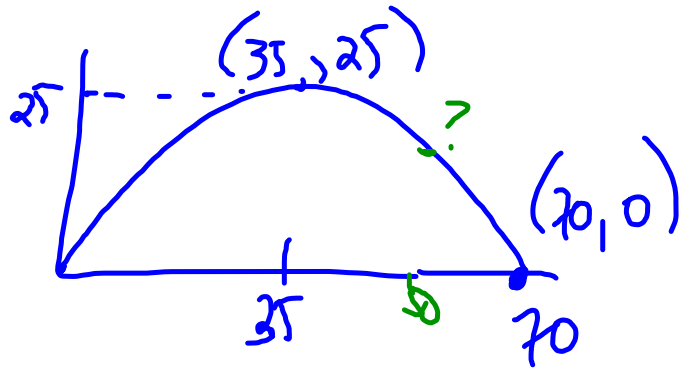



c) speed $= \frac{\Delta d}{\Delta t}$
$= \frac{110.4-6.9}{4-1}$
$= \frac{103.5}{3}$
$= 34.5\ m/s$

b) $172.5-35$
$\therefore$ difference $= 137.5\ m$

From the 4.5 homework:
p.228 #9




a) $y = a(x-h)^2 + k$ - 9 1

$y = a(x-35)^2 + 25$

$0 = a(70-35)^2 + 25$

$-25 = a(35)^2$

$-25 = a(1225)$

$\frac{-25}{1225} = a$

$a \doteq -0.0204$

$\therefore y = -0.0204(x-35)^2 + 25$

b) $x = 50$

$y = -0.0204(50-35)^2 + 25$

$= -0.0204(15)^2 + 25$

$=$

p. 226 #1 today's work

a) $y = 3x - 15$ NO!

b) $y = 4x^2 - 2x + 8$ Yes!

c)

| x | y |
|---|---|
| -5 | 1 |
| 0 | 4 |
| 5 | 16 |
| 10 | 64 |
| 15 | 256 |

1st Differences: $4-1=3$, $16-4=12$, $64-16=48$, 192

2nd Diff.: 9, 36, 144

∴ 2nd Diff. are NOT constant

∴ the table does not represent a quadratic.