

Full Name: _____ Period: _____ ID: A

Directions: Show all thinking for maximum credit. You may not use a graphing calculator on this test.
“Tell the truth - all the time!”

FFPC Unit Practice Test Algebra 8r (Mazzeo 2011)

1. Find the key feature the graph of $y = 8x^2 - 20x - 12$. Show or explain how each is found. (worth 40 points)

y-intercept:

line of symmetry:

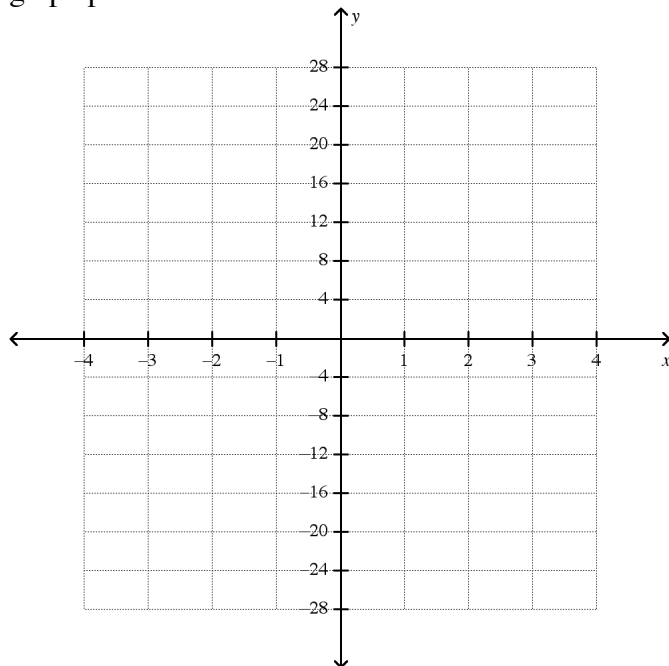
vertex: (10 points)

2 random points:

x-intercepts: (10 points)

x		
y		

graph parabola:



2. Write the expression in expanded form: $(2x - 7)^2$

.

3. Completely factor the expression: $15w^2 - 19w + 6$

.

4. **a.** Draw a rectangle divided to show that its area is represented by the expression $(3x + 4)(x + 2)$. Label the lengths and areas on your drawing.

b. Write an equivalent expression in expanded form.

.

5. One of the equations below represents the height, h , in feet of a thrown baseball as it changes over time, t , in seconds. The ball starts about shoulder height, rises to a maximum, and then falls to the ground.

$$h = 16t^2 + 40t + 4$$

$$h = -16t^2 + 40t + 4$$

$$h = 16t$$

$$h = 16^2 + 4$$

- a. Which of these equations is a reasonable model for the given situation? Explain your choice.

- b. How is “shoulder height” represented in the correct equation?

- c. What maximum height will the ball reach? Explain how you found your solution.

6. A ship conducting oceanographic research drops anchor offshore Honiara, the capitol of the Solomon Islands in the South Pacific. When the anchor is tossed into the water, the depth in feet D it has descended after t seconds is given by the equation $D = -4t^2 + 12t$.

- a. If it takes the anchor 10 seconds to reach the bottom, how deep is the water where the ship has dropped anchor?

- b. If the ship moves to another location and the anchor takes 8.5 seconds to reach the bottom, how deep is the water in that spot?

- c. If the ship anchors in the harbor of Honiara, where the water is 72 feet deep (that is, $D = -72$), how long will it take for the anchor to reach the bottom when it is dropped?

7. For this problem, use the equation $y = -3x^2$.

a. Copy and complete this table:

x	0	1	2	3	4
y					

b. What are the first differences in your table for the y values as x increases by 1?

c. What are the second differences in your table for the y values as x increases by 1?

d. Describe any patterns in the values you found in part (c) for the second differences.

.

8. 1. A signal flare is fired into the air from a boat. The height h of the flare in feet after t seconds is $h = -16t^2 + 160t$

a. How high will the flare travel? When will it reach this maximum height?

b. When will the flare hit the water?

c. Explain how you could use a table and a graph to answer the questions in parts (a) and (b).

FFPC Unit Practice Test Algebra 8r (Mazzeo 2011)

Answer Section

SHORT ANSWER

1. y-int (0, -12)
L.O.S.. $x=1.25$
vertex (1.25, -24.5)
random points will vary
x0int (-0.5, 0) and (3,0)

graph will be a parabola that opens up and has all the features above

2. $4x^2 - 28x + 49$
3. $(3w - 2)(5w - 3)$
4. a. one side of rectangle will have length of x and 2 while other side will have side of $3x$ and 4 with inside areas labeled

b. $3x^2 + 10x + 8$
5. a. The first two equations represent quadratic relationships, but only $h = -16t^2 + 40t + 4$ has a maximum so it is the correct equation. The equation $h = 16t^2 + 40t + 4$ is quadratic but has a minimum (which occurs when t is a negative number). The third equation is linear, and the fourth equation is exponential.

b. The shoulder height is represented by the "+ 4." This constant term shows how high off the ground the baseball is when it is released. This height can be found by substituting the value of 0 into the equation, which represents time = 0.

c. The maximum height is 29 ft. Students may find this in several ways. They could graph the function on a calculator and trace the graph. They could look at a table of values to find the greatest value for h . They could look at the table or the graph to find where $h = 4$ again (at $t = 2.5$), then use what they know about symmetry of parabolas to reason that the maximum would occur when $t = 1.25$, and substitute this value into the equation.
6. a. $D = -4(10)^2 + 12(10) = -280$ ft, or 280 ft deep
b. $D = -4(8.5)^2 + 12(8.5) = -187$ ft, or 187 ft deep
c. It will take 6 seconds because $D = -4(6)^2 + 12(6) = -72$ ft, or 72 ft deep
7. a.

x	0	1	2	3	4
y	0	-3	-12	-27	-48

 b. The first differences are -3, -9, -15 and -21.

 c. The second differences are all -6.

 d. The second differences are all the same since $y = -3x^2$ is a quadratic relationship.

8. 1. a. At 5 seconds, the flare will have traveled to a maximum height of 400 ft.
- b. The flare will hit the water when the height is 0 ft, which will occur at 10 s.
- c. In a graph, the maximum point represents the maximum height of the flare, and the right-hand x-intercept represents the point at which the flare hits the water. In a table, the entry for when the height is its greatest represents the maximum height reached by the flare, and the entry for when the height is once again 0 represents the point at which the flare hits the water.