Name_____

QUADRATICS REVIEW PACKET

Enclosed is a packet of Quadratics Review that you need to complete for a quiz grade. This will be due at the beginning of class on Wednesday, 2/17 (you may want to work on some at home as HW if you feel you are falling behind). You may work with your group members if you are stuck on a problem, but please exercise your own knowledge. Mr. Bricker has answers that you may reference, but remember, I will be looking for work to be shown. Please use your class time wisely.

Place your answers below. I will be checking work, but similar to test, the answers below are the only answers I will check (unless otherwise stated like pg. 1 #14-16):

PAGE 2: Graphing Quadratics

1.	6	11
2.	7	14 WRITE ON PG. 1
3.	8	15 WRITE ON PG. 1
4	9	16 WRITE ON PG. 1
5	10	17a. b.

PAGE 3: Quadratic Regression

Model that Fits Data	Predicted Number
1.	
2.	
3.	
4.	
5.	

PAGE 4: Vertex Form + Quadratic Application Questions

1.	5
2	6
3	7
4	8
Quadratic (Bottom of Page):	
1	5
2	6
3	7
4	

PAGE 5: NCFE Practice Questions

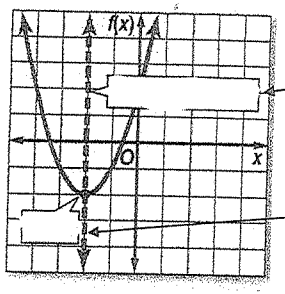
1	3	5
2	4	6

Page 6: Projectile Motion

1 a. b. c.	4
2 a. b. c. d.	5
3 a. b.	6

1. Standard form of a quadratic function is y = _____

2. The shape of a quadratic equation is called a _____



3. _____

4. _____

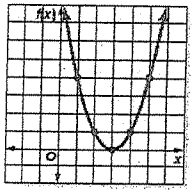
5. When the vertex is the highest point on the graph, we call that a _____.

6. When the vertex is the lowest point on the graph, we call that a _____.

7. Our solutions are the _____.

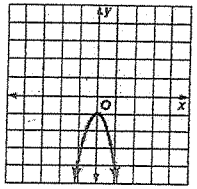
8. Solutions to quadratic equations are called _____.

Determine whether the quadratic functions have two real roots, one real root, or no real roots. If possible, list the zeros of the function.



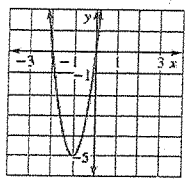
9. Number of roots: _____

Zero(s): _____



10. Number of roots: _____

Zero(s): _____



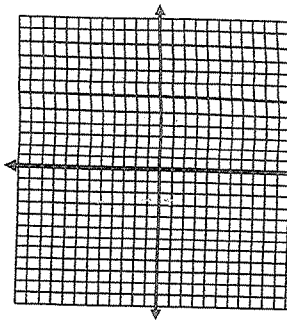
11. Number of roots: _____

Zero(s): _____

(skipped 12+13)

#14-16 Graph & Answer Questions

14. $y = -x^2 - 4x + 5$



Identify the zeros/roots: _____ and _____

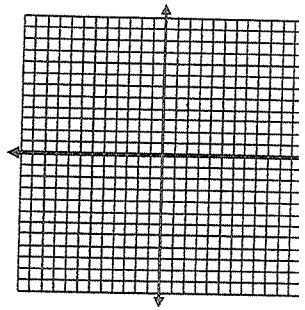
Does it have a minimum or maximum? _____

Axis of symmetry: _____ Vertex: _____

y-intercept: _____ Graph at least 5 points

Domain: _____ Range: _____

15. $y = x^2 + 4x + 7$



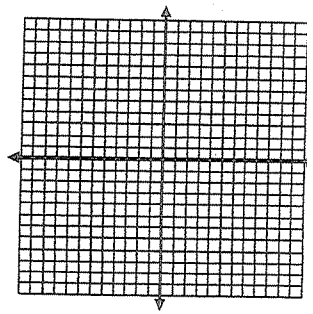
zeros/roots: _____

Axis of symmetry: _____ Vertex: _____

Max or Min? _____

y-intercept: _____ Graph at least 3 points

16. $y = -x^2 - 2x + 2$



zeros/roots: _____

Axis of symmetry: _____ Vertex: _____

Max or Min? _____

y-intercept: _____ Graph at least 5 points

17. A bottlenose dolphin jumps out of the water. The path the dolphin travels can be modeled by $h = -0.2d^2 + 2d$, where h represents the height of the dolphin and d represents horizontal distance.

a. What is the maximum height the dolphin reaches?

b. How far did the dolphin jump?

Problems

1. The table below lists the total estimated numbers of United States AIDS cases, by year of diagnosis. Find the linear and quadratic regression equations and correlation coefficients. State which model, linear or quadratic, best fits the data. Predict the number of aids cases for the year 2006.

Year	AIDS Cases
1999	41,356
2000	41,267
2001	40,933
2002	41,289
2003	43,171

2. The table below lists temperatures measured in Fahrenheit and Celsius. Find the linear and quadratic regression equations and correlation coefficients. State which model, linear or quadratic, best fits the data. Determine the equivalent temperature in Celsius degrees for a body temperature of 98.6 degrees Fahrenheit.

Fahrenheit degrees (°F)	Celsius degrees (°C)
32	0
68	20
86	30
122	50
158	70
194	90
212	100

3. According to Roche Pharmaceuticals, a BMI of 30 or greater can create an increased risk of developing medical problems associated with obesity. The chart below shows the height and weight for individuals with a BMI of 30. Find the linear and quadratic regression equations and correlation coefficients. State which model, linear or quadratic, best fits the data. Determine the weight of a 75-inch tall person who has a BMI = 30.

Height (inches)	Weight (pounds)
61	160
63	170
65	180
67	190
69	200
72	220
73	230

4. The table below lists distances in mega parsecs and velocities for four galaxies moving rapidly away from earth. Find the linear and quadratic regression equations and correlation coefficients. State which model, linear or quadratic, best fits the data. Determine the velocity of Hydra, a galaxy located 776 mega parsecs from earth.

Galaxy	Distance (Mpc)	Velocity (km/sec)
Virgo	15	1000
Ursa Minor	200	15,000
Corona Borealis	290	24,000
Bootes	520	40,000

Source: Astronomical Methods and Calculations (1994)

5. The following data represents approximate heights for a ball thrown by a shot-putter as it travels x meters horizontally. Find the linear and quadratic regression equations and correlation coefficients. State which model, linear or quadratic, best fits the data. What would be the height of the ball if it travels 80 meters?

Distance (m)	Height (m)
7	8
20	15
33	24
47	26
60	24
67	21

Use the information provided to write the vertex form equation of each parabola.

1) $y = x^2 + 16x + 71$

2) $y = x^2 - 2x - 5$

3) $y = -x^2 - 14x - 59$

4) $y = 2x^2 + 36x + 170$

5) $y = x^2 - 12x + 46$

6) $y = x^2 + 4x$

7) $y = x^2 - 6x + 5$

8) $y = (x + 5)(x + 4)$

QUADRATIC WORD PROBLEMS

1. The product of two consecutive integers is 30. Find the integers.

2. An envelope is 4 cm longer than it is wide. The area is 96 cm^2. Find the length & width.

3. Three consecutive even integers are such that the square of the third is 76 more than the square of the second. Find the three integers.

4. There are two squares. In the first square, the side length is 1 foot greater than the length of square two. The combined area of the two squares is 113 square feet. What is the length of the smaller square?

5. Find three consecutive positive odd integers such that the product of the first and third is equal to 1 less than twice the second.

6. The length of a rectangle is 6 inches more than its width. The area of the rectangle is 91 square inches. What are the dimensions?

7. The medium side of a right triangle is 7 more than the shortest side. The longest side is 7 less than 3 times the shortest side. Find the length of the shortest side.

1 Which ex...sion is equivalent to $(3x^5 + 17x^3 - 1) + (^-2x^5 - 6)$?

A $x^5 + 17x^3 - 7$

B $x^5 - 11x^3 - 1$

C $5x^5 + 17x^3 + 7$

D $^-6x^5 + 17x^3 + 6$

2 If t is an unknown constant, which binomial must be a factor of $7m^2 + 14m - tm - 2t$?

A $7m + t$

B $m - t$

C $m + 2$

D $m - 2$

3 Which expression is equivalent to $\left(\frac{16x^{\frac{1}{6}}y^{-2}}{x^{-\frac{1}{6}}y^{6}}\right)^{\frac{3}{2}}$?

A $24x^{\frac{9}{2}}y^{\frac{9}{2}}$

B $\frac{24x^{\frac{3}{4}}}{y^{9}}$

C $\frac{64}{x^{\frac{1}{2}}y^{8}}$

D $\frac{64x^{\frac{1}{2}}}{y^{12}}$

4 Which expression is equivalent to $(8w^7x^{-5}y^3z^{-9})^{-\frac{2}{3}}$?

A $\frac{x^{\frac{10}{3}}z^{6}}{4w^{\frac{14}{3}}y^{2}}$

B $\frac{4w^{\frac{14}{3}}y^{2}}{x^{\frac{10}{3}}z^{6}}$

C $\frac{2w^{\frac{5}{3}}y^{\frac{1}{3}}}{x^{\frac{7}{3}}z^{\frac{11}{3}}}$

D $\frac{x^{\frac{7}{3}}z^{\frac{11}{3}}}{2w^{\frac{5}{3}}y^{\frac{1}{3}}}$

5 A rectangular rug is placed on a rectangular floor. The width of the floor is 4 feet greater than the length, x, of the floor. The width of the rug is 2 feet less than the width of the floor. The length of the rug is 4 feet less than the width of the rug. Which function, $R(x)$, represents the area of the floor ***not*** covered by the rug?

A $R(x) = x^2 - x + 4$

B $R(x) = 2x^2 + 4x - 4$

C $R(x) = 12x - 4$

D $R(x) = 4x + 4$

6 Farmer Brown built a rectangular pen for his chickens using 12 meters of fence.

- He used part of one side of his barn as one length of the rectangular pen.
- He maximized the area using the 12 meters of fence.

Farmer Johnson built a rectangular pen for her chickens using 16 meters of fence.

- She used part of one side of her barn as one length of the rectangular pen.
- The length of her pen was 2 meters more than the length of Farmer Brown's pen.
- The width of her pen was 1 meter more than the width of Farmer Brown's pen.

How much larger is Farmer Johnson's rectangular pen than Farmer Brown's?

A 24 square meters

B 18 square meters

C 16 square meters

D 14 square meters

PROJECTILE MOTION

Name: _____
Date: _____ Period: ___

Quadratic Formula Word Problems

1. Jason jumped off of a cliff into the ocean in Acapulco while vacationing with some friends. His height as a function of time could be modeled by the function $h(t) = -16t^2 + 16t + 480$, where t is the time in seconds and h is the height in feet.

   a. How long did it take for Jason to reach his maximum height?

   b. What was the highest point that Jason reached?

   c. Jason hit the water after how many seconds?

2. If a toy rocket is launched vertically upward from ground level with an initial velocity of 128 feet per second, then its height *h* after *t* seconds is given by the equation $h(t) = -16t^2 + 128t$ (if air resistance is neglected).

   a. How long will it take for the rocket to return to the ground?

   b. After how many seconds will the rocket be 112 feet above the ground?

   c. How long will it take the rocket to hit its maximum height?

   d. What is the maximum height?

3. A rocket is launched from atop a 101 – foot cliff with an initial velocity of 116 ft/s.
   a. Substitute the values into the vertical motion formula $h(t) = -16t^2 + vt + h_0$. Let h(t) = 0
   b. Use the quadratic formula to find out how long the rocket will take to hit the ground after it launched. Round to the nearest tenth of a second.

4. You and a friend are hiking in the mountains. You want to climb to a ledge that is 20 ft. above yo The height of the grappling hook you throw is given by the function $h(t) = -16t^2 - 32t + 5$. What is the maximum height of the grappling hook? Can you throw it high enough to reach the ledge?

5. You are trying to dunk a basketball. You need to jump 2.5 ft. in the air to dunk the ball. The heigh that your feet are above the ground is given by the function $h(t) = -16t^2 + 12t$. What is the maximum height your feet will be above the ground? Will you be able to dunk the basketball?

6. A diver is standing on a platform 24 ft. above the pool. He jumps form the platform with an initi8al upward velocity of 8 ft/s. Use the formula $h(t) = -16t^2 + vt + s$, where h is his height above the water, is the time, v is his starting upward velocity, and s is his starting height. How long will it take for him to hit the water?

Note: We have not done projectile motion in class yet, we will start Wednesday. However, you have the knowledge of graphs to answer these questions, so give it a try. VISUALIZE whats happening as a