PRE CALCULUS 20 - MIDTERM REVIEW

Chp 3 Quadratic Functions

#1. Find the vertex of each quadratic:

a) y = 3x2

b) 

c) y = (x + 1)2 + 2

#2. Write each of the following in vertex-graphing form by completing the square:

a) y = x2 + 4x

b) y = x2 + x – 1

c) y = -3x2 + 12x – 2

#3. Answer the following questions for each quadratic function:

100 – 2x

x

~~~~~River~~~~~

x

a) vertex

b) equation of the axis of symmetry

c) concavity (faces up or down)

d) maximum or minimum value

e) domain and range

f) x and y intercepts

g) sketch the graph

i) y = -3(x + 2)2 + 3

ii) y = x2 + 4x + 3

#4. Write a quadratic equation in vertex graphing form for each of the following:

a) a = 2 vertex is (-1, 2)

b) vertex is (3, 2) and passes through the point (2, -1)

#5. Write the new equation of the parabola y = x2 after the following: (3 marks)

a) a horizontal translation 2 units to the left and a vertical translation 1 unit up

b) a vertical translation 3 units down and a reflection across the x-axis

c) a multiplication of the y-values by -2 and then a horizontal translation 1 unit to the right

#6. A bridge has the shape of a parabola. Its width is 50m and its height is 12m. Find the quadratic equation for this bridge.

#7. The height, “h”, in metres, of a flare “t” seconds after it is fired into the air is given by the equation h(t)=-4.9t2 + 61.25t. At what height is the flare at its maximum height? How many seconds after being shot does this occur?

#8. A farmer has 100m of fencing material to enclose a rectangular field adjacent to a river. No fencing is required along the river. Find the dimensions of the rectangle that will make its area a maximum. What is the maximum Area? (Hint: a diagram of the situation is given below)

Chp 4 Quadratic Equations

#1. Solve the quadratic equations by factoring:

a) 3x2 – 36x = 0

b) 2x2 – 7x – 15 = 0

c) 6x2 – 11x + 3 = 24

#2. Solve the quadratic equations by completing the square: (Write answers in Exact Form)

a) x2 – 6x + 5 = 0

b) x2 + 4x + 1 = 0

c) 3x2 – x – 2 = 0

#3. Solve the quadratic equations using the quadratic formula: (Write answers in Exact Form)

a) x2 + 4x – 96 = 0

b) 3x2 = 4 (Hint: Same as 3x2 – 0x – 4 = 0)

#4. Find the zeros of the function f(x) = x2 – 10x + 16.

#5. Find the quadratic equation with the roots of 

#6. Find the discriminant and state the nature of the roots:

a) x2 – 4x – 5 = 0

b) x2 = -9

c) x2 + 2x + 1 = 0

#7. The hypotenuse of a right triangle is 13. If the sum of the legs is 17, find the legs.

(Hint: Let one leg be x and the other is

therefore 17-x…since the sum is 17.)

#8. If h(t) = 5t2 – 30t + 45, find t when h = 20.

(Hint: 20 = 5t2 – 30t + 45)

Chp 8 Systems

#1. Solve by graphing. Give approximate solutions if needed. Verify your solutions.

y = ½x+2

y + x2 + 2x = 8

#2. Solve algebraically. Verify your solutions.

y = 3x + 1

y = 6x2 + 10x – 4

#3. Solve algebraically. Verify your solutions.

x2 + y – 3 = 0

x2 – y + 1 = 0

#4. Solve algebraically. Verify your solutions.

y = x2 – 4x + 1

2y = -x2 + 4x + 2

Chp 9 Quadratic Inequalities

#1. Solve by graphing:

a) 

b) 3x – 2y ≥ 6

#2. Solve:

a) x2 + x – 12 < 0

b) x2 > 5x

c) x2 – 3x + 6 < 2x

d) 2x2 < 3 – 5x

#3. Solve by graphing:

a) y < (x – 2)2 – 1

b) y + 3 ≥ x2 – 2x