

Due Tues

INTERMEDIATE ALGEBRA

TEST 4

100 / 100

Outstanding! NAME: Antoinette Durden

Be sure to set up each problem before evaluation. Show all work in the space provided for full credit.

1. Graph the following parabola. Label at least three points. Give the vertex, domain, and range. (16 points)

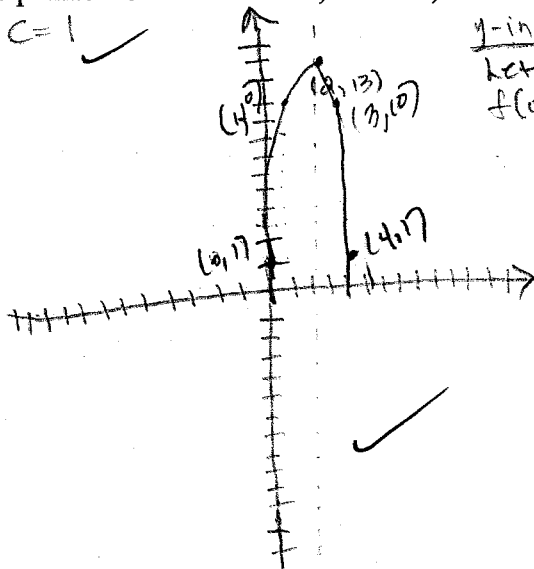
f(x) = -3x^2 + 12x + 1 a = -3 b = 12 c = 1

x = -b / 2a = -12 / 2(-3) = -12 / -6 = 2

x = 2

f(2) = -3(2)^2 + 12(2) + 1 = 13

vertex = (2, 13)



y-intercept let x = 0 f(0) = 1

Table with x and f(x) values: (0, 1), (1, 10), (3, 10), (4, 1)

D: (-infinity, infinity)

R: (-infinity, 13]

2. A rocket is fired upward. After x hour, the height of the rocket is given by f(x) = -4x^2 + 16x. Find the time required in hours for the rocket to reach maximum height, and find the maximum height in kilometers. (12 points)

a = -4 < 0 b = 16 c = 0

x = -b / 2a = -16 / 2(-4) = 2

x = 2 hours

f(2) = -4(2)^2 + 16(2) = 16

f(2) = 16 km

3. Graph each parabola. Plot at least two points in addition to the vertex. Give the vertex, domain, and range. (8 points)

a) f(x) = 4(x-2)^2 (8 points)

a = 4 b = -16 c = 16

x = -b / 2a = -(-16) / 2(4) = 2

x = 2

f(2) = 4(2-2)^2 = 0

b) f(x) = 4(x-2)^2 + 5 (8 points)

a = 4 b = -16 c = 21

x = -b / 2a = -(-16) / 2(4) = 2

f(2) = 4(2-2)^2 + 5 = 5

f(2) = 4(2-2)^2 + 5 = 5

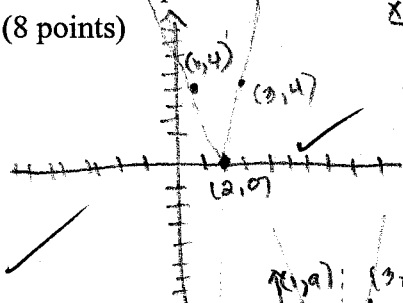


Table with x and f(x) values: (0, 4), (2, 0), (3, 4)

vertex: (2, 0) D: (-infinity, infinity) R: [0, infinity)

v. good!

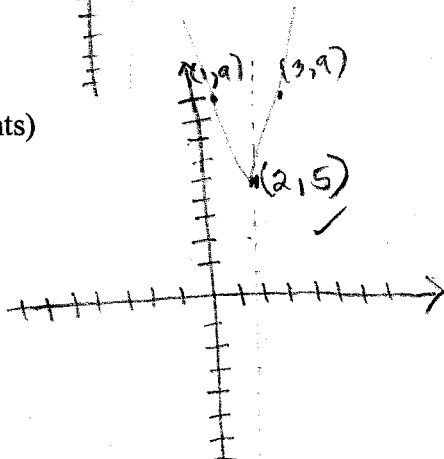


Table with x and f(x) values: (1, 9), (2, 5), (3, 9)

vertex: (2, 5) D: (-infinity, infinity) R: [5, infinity)

4. Use the square root property to solve the following equation and give the solution set. (12 points)

$$\frac{3(x-5)^2}{3} = \frac{27}{3} \quad \checkmark \quad x = 5 + \sqrt{9} \quad \checkmark \quad \text{or} \quad x = 5 - \sqrt{9} \quad \checkmark$$

$$(x-5)^2 = 9 \quad \checkmark \quad = 5+3 \quad = 5-3$$

$$x-5 = \pm\sqrt{9} \quad \checkmark \quad = 8 \quad \checkmark \quad = 2 \quad \checkmark$$

Sol set  $\{2, 8\}$   $\checkmark$

5. Solve the following equation by completing the square and give the solution set. (16 points)

$$\frac{2x^2 - 12x - 14}{2} = \frac{0}{2}$$

$$x^2 - 6x - 7 = 0 \quad \checkmark$$

$$x^2 - 6x + \boxed{9} = 7 + \boxed{9}$$

$$(x-3)^2 = 16 \quad \checkmark$$

$$x-3 = \pm\sqrt{16}$$

$$x = 3 + \sqrt{16} \quad \checkmark \quad \text{or} \quad x = 3 - \sqrt{16} \quad \checkmark$$

$$= 3+4 \quad = 3-4$$

$$= 7 \quad = -1 \quad \checkmark$$

Sol set  $\{7, -1\}$   $\checkmark$

*✓ good!*

6. Solve the following equation using the quadratic formula and give the solution set. (14 points)

$$5x^2 - 2x + 3 = 0 \quad a=5, b=-2, c=3 \quad \checkmark$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad \checkmark$$

$$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(5)(3)}}{2(5)} \quad \checkmark$$

$$x = \frac{2 \pm \sqrt{4 - 60}}{10} \quad \checkmark$$

$$x = \frac{2 \pm \sqrt{-56}}{10} \quad \checkmark$$

$$x = \frac{2 \pm 2i\sqrt{14}}{10} \quad \checkmark$$

$$= \frac{2}{10} \pm \frac{2\sqrt{14}i}{10} \quad \checkmark$$

$$= \frac{1}{5} \pm \frac{\sqrt{14}i}{5} \quad \checkmark$$

Sol set:  $\left\{ \frac{1}{5} \pm \frac{\sqrt{14}i}{5} \right\}$   $\checkmark$

7. Use the discriminant to predict whether the solutions to each equation are  
 A. one real solution; B. two real solutions; C. two complex solutions.

a)  $-2x^2 + 6x + 3 = 0$   $a=-2$   $b=6$   $c=3$  (8 points)

$$b^2 - 4ac$$

$$= (6)^2 - 4(-2)(3)$$

$$= 36 + 24$$

$$= 60 > 0 \quad \checkmark$$

~~A~~  $\checkmark$   
 (B)  $\checkmark$

b)  $x^2 - x + 10 = 0$   $a=1$   $b=-1$   $c=10$  (8 points)

$$b^2 - 4ac$$

$$= (-1)^2 - 4(1)(10)$$

$$= 1 - 40$$

$$= -39 < 0 \quad \checkmark$$

~~B~~  $\checkmark$   
 (C)  $\checkmark$