# Algebra 2    Final Exam Review    Fall 2015

From Test 1    1. State the solution to each compound inequality.

a) $W < 8$    AND    $W > 9$    b) $A \geq -9$    OR    $A \leq 12$

c) $E > 6$    OR    $E > 10$    d) $B > 0$    AND    $B < 2$
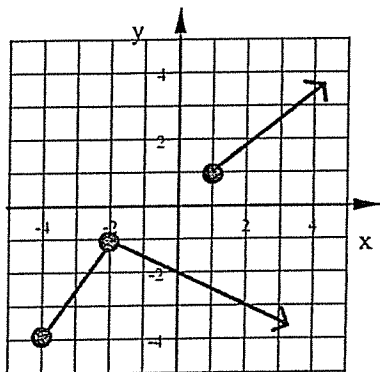
e) $M \leq 6$    AND    $M \leq 20$

2. Solve each equation for $W$. State the restrictions on the variables, if any.

a) $A(W + G) - K = M$    b) $\dfrac{EW - A}{T} + M = C$    c) $MW - RC = HW + AN$

d) $\dfrac{H - C}{W} + R = X$

3. Use the following functions: $f(x) = x^2 - 3x$    $g(x) = \dfrac{5x}{x + 1}$    $h(x) = x + 4$

a) Find $f(h(x))$. Simplify as much as possible.

b) Find $g(h(x))$. Simplify as much as possible.    c) Find $f(h(2))$

4. Find the Domain and Range of the graph shown below.



5. Is each table an example of Direct Variation, Inverse Variation, or neither. If the table represents Inverse or Direct Variaton write a variation equation and find the value of $x$ when $y = 200$.

a)

| $x$ | $y$ |
|---|---|
| 2.5 | 25.6 |
| 8 | 8 |
| 40 | 1.6 |
| 50 | 1.28 |

b)

| $x$ | $y$ |
|---|---|
| 4 | 20 |
| 8 | 30 |
| 12 | 40 |
| 16 | 50 |

c)

| $x$ | $y$ |
|---|---|
| -6 | -45 |
| 8 | 60 |
| 12 | 90 |
| 18 | 135 |

6. The number of tires made varies directly with the number of workers at the factory. When there is 32 workers on the job 776 tires are made.

a) State the variation constant. Inlcude units with your answer.

b) Find the number of workers needed to make 1200 tires.

Solve each.

7. $4x + 6(x - 9) + 12 < 7 + 5(2x - 9) + 3$    8. $|2x - 1| - 5 = 44$

9. $|x + 7.6| + 11 > 40$    10. $|2x + 3| - 4.4 \leq 11$

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Solve each system of equations. State each solution as an ordered pair. Use each of the following methods at least once each: Matrices, Elimination, and Substitution.

Write No Solution or Many Solutions when necessary.

1.

$y = 2x - 3$

$4x - 5y = -15$

2.

$2x + 4y = 12$

$3x + 6y = -24$

3.

$7A + 6B = -36$

$3A - 4B = -22$

4.

$2P + 6Q = 8$

$5P + 15Q = 20$

5.

$4x - 5y + 2z = 26$

$-x + 3y - 6z = -20$

$7x + y = 11$

6. Without actually solving the system of equations state the number of solutions: One, None, or Many

a. # sol:_____

$y = 4x - 9$

$2x + 8y = 24$

b. # sol:_____

$y = -\frac{3}{2}x + 5$

$6x + 4y = 20$

c. # sol:_____

$y = 10$

$10x + 2y = 14$

d. # sol:_____

$y = 2x + 1$

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

7. There are 128 students in a large lecture hall. The number of females is seven less than twice the number of males. Write and solve a system of equations to find the number or females and males in the lecture hall. State the method used to solve the system of equations.

8. At 7-11 I bought 2 Gulps and 5 Big Gulps and spent $8.40. The next day I bought 3 Gulps and 8 Big Gulps and spent $13.23. The prices for were the same both days. Write and solve a system of equations to find the cost of a Gulp and the cost of a Big Gulp. State the method used to solve the system of equations.

# Algebra 2    Final Exam Review    ANSWERS    Fall 2015

Test 1    1. a) No Sol    b) All Real #'s    c) $E > 6$    d) $0 < B < 2$    e) $m \leq 6$

2. a) $W = \dfrac{M+K}{A} - G$    or    $\dfrac{M+K-AG}{A}$    $A \neq 0$

   b) $W = \dfrac{T(C-M)+A}{E}$    $T \neq 0$ and $E \neq 0$

   c) $W = \dfrac{AN+RC}{M-H}$    $M - H \neq 0$    OR    $W = \dfrac{-RC-AN}{H-M}$    $H - M \neq 0$

   d) $W = \dfrac{H-C}{X-R}$    $X - R \neq 0$ and $W \neq 0$

3. a) $x^2 + 5x + 4$    b) $\dfrac{5x+20}{x+5}$    c) 18

4. Domain: $x \geq -4$    Range: $y \leq -1, y \geq 1$

5. a) No    b) No    c) Yes. $y = 7.5x$    $x = 26.67$ when $y = 200$

6. a) $k = 24.25$ tires/worker    b) #workers= $49.49 \rightarrow 50$

7. All Real Numbers    8. $x = -24, 25$    9. $x < -36.6$    $or$    $x > 21.4$

10. $-9.2 \leq x \leq 6.2$

Chapter 3 and Sec 4-7

1. $(5,7)$    2. No Solution    3. $(-6,1)$    4. Many Solutions    5. $(2,-3,1.5)$

6. a. 1 Sol    b. Many Sol    c. 1 Sol    d. No Sol
$x + 2y = 14$            $y + 3 = 2(x-2)$

7. EQ's: $F + M = 128$    &    $F = 2M - 7$    83 females and 45 males

8. EQ's: $2G + 5BG = 8.40$    &    $3G + 8BG = 13.23$
Gulp= $\$1.05$ $each$    Big Gulp= $1.26$ $each$

From Chapter 5

1. Write the equation of this parabola in Vertex Form: $y = a(x - h)^2 + k$



(-4,10)

(-2,-2)
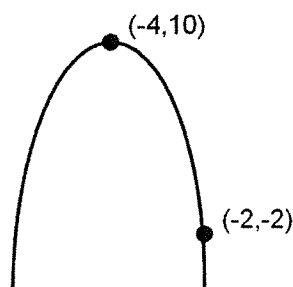
Problems 2 and 3:  For each quadratic answer the following:
a)  State the equation for the line of symmetry
b)  State the coordinates of the vertex
c)  State the y-intercept
d)  Tell if the parabola has a maximum or a minimum.

2. $y = -2x^2 - 16x + 13$

3. $y = 3(x - 1)^2 + 6$

4. Find ALL EXACT solutions, both real and imaginary, by factoring:

a)  $6x^2 - 15x = 0$

b) $2x^2 + 6x - 20 = 0$

c)  $2x^2 + x - 10 = 0$

d)  $2x^3 + 7x^2 - 18x - 63 = 0$

5. Find all real and imaginary solutions using square roots:

a)  $5 + 3x^2 + 57 = 8$

b)  $(x + 3)^2 + 24 = 8$

6. Find all real and imaginary solutions using the quadratic formula.  Give all real solutions rounded to the nearest hundredth and simplify all imaginary solutions.

a)  $4x^2 + 20x - 1 = 0$

b)  $x^2 - 4x + 29 = 0$

7. An object is shot into the air from the top of a 30 foot building.  The following equation models the height of the object as a function of time.    $h(t) = -16t^2 + 200t + 30$
a)  Find the time to reach it's maximum height.
b)  Find the maximum height.
c)  Find the time to return to the ground.
d)  Find the time it takes to reach a height of 100 feet.

8. Find each product:    a)  $(2 + 4i)(5 - 3i)$    b)  $(2 + 7i)^2$    c)  $(6 + 7i)(6 - 7i)$

1.  Find all real and imaginary solutions by factoring.

a) $2x^5 - 10x^3 - 72x = 0$      b) $3x^3 - 2x^2 + 18x - 12 = 0$      c) $5x^5 - 80x = 0$

2.  State the Degree and Leading Coefficient of each polynomial.

a) $5x^3 - 3x^2 + x^5 - 9x + 12$        b) $-10x^2(5x + 6)^2(2x - 1)^3(x + 3)$
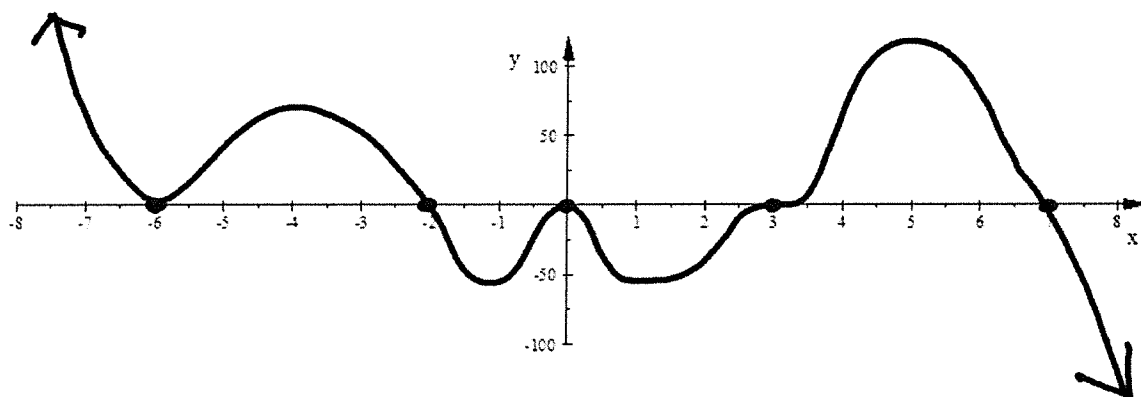
3.  State the end behavior of each polynomial.

a) $y = 5x^4 + 6x^3 - 7x + 1$        b) $y = -x(x + 6)^2(x - 7)^2(x + 4)$

c) $y = -2x^5 + 8x^4 - 9x^2 + 10x$        d) $y = x^3(x + 3)^2(x + 7)(x - 1)$

4.  Write the equation of the polynomial shown in the graph.



5.  Find each quotient.  You can leave a remainder any way you wish.

a) $\dfrac{3x^4 - 8x^3 + 7x^2 + 4x - 9}{x - 2}$      b) $\dfrac{8x^3 + 22x^2 - 25x + 3}{4x - 3}$

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## Chapter 5

1. $y = -3(x+4)^2 + 10$
2.     a) LOS: $x = -4$    b) Vertex $(-4, 45)$    c) $y-int = 13$    d) Max
3.     a) LOS: $x = 1$    b) Vertex $(1, 6)$    c) $y-int = 9$    d) Min
4. a) $x = \frac{5}{2}, 0$    b) $x = 2, -5$    c) $x = 2, -\frac{5}{2}$    d) $x = \pm 3, -\frac{7}{2}$
5. a) $x = \pm 3i\sqrt{2}$    b) $x = -3 \pm 4i$
6. a) $x = -5.05, 0.05$    b) $x = 2 \pm 5i$
7. a) $6.25$ sec    b) $655$ ft    c) $12.65$ sec    d)    $0.36$ and $12.14$ sec
8. a) $22 + 14i$    b) $-45 + 28i$    c) $85$

## Chapter 6

1. a) $x = 0, \pm 3, \pm 2i$    b) $x = \pm i\sqrt{6}, \frac{2}{3}$    c) $x = 0, \pm 2, \pm 2i$
2. a) Degree=5, LC = 1    b) Degree=8, LC= $-200$
3. a) $\searrow, \nearrow$    b) $\nearrow, \searrow$    c) $\searrow, \searrow$    d) $\nearrow, \nearrow$
4. $y = -x^2(x+6)^2(x+2)(x-3)^3(x-7)$
5. a)    $3x^3 - 2x^2 + 3x + 10$    $R = 11$    b) $2x^2 + 7x - 1$

**Chapter 9**     1. Is each table an example of Direct Variation, Inverse Variation, or neither. If the table represents Inverse or Direct Variaton write a variation equation and find the value of $x$ when $y = 200$.

a)

| $x$ | $y$ |
|-----|-----|
| 2.5 | 25.6 |
| 8 | 8 |
| 40 | 1.6 |
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b)

| $x$ | $y$ |
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| 4 | 20 |
| 8 | 30 |
| 12 | 40 |
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c)

| $x$ | $y$ |
|-----|-----|
| −6 | −45 |
| 8 | 60 |
| 12 | 90 |
| 18 | 135 |

2. W varies directly with the product of M and the cube of T and inversely with the square of C. $W = 4.8$ when $M = 12$, $T = 2$, and $C = 5$. Write the equation of this relationship with the correct value of $k$. Round the variation constant to the nearest hundredth as necessary.

3. Simplify this rational expression. State the restrictions on the variable. $\dfrac{12x^3 - 108x}{8x^5 - 16x^4 - 120x^3}$

4. Simplify each product or quotient

a) $\dfrac{2x^3 - 50x}{x^2 - 8x + 15} \cdot \dfrac{x - 2}{4x^2 + 12x - 40}$

b) $\dfrac{x^2 - 2x - 3}{6x^2 + 18x} \div \dfrac{x^2 - 6x + 9}{2x^3 - 18x}$

5. Find the sum or difference.     a) $\dfrac{2}{x^2 - x - 6} + \dfrac{5}{x^2 - 4}$     b) $\dfrac{3}{2x^2 + 10x} - \dfrac{4x}{x^2 + 10x + 25}$

6. Simplify each.     a) $\dfrac{\frac{2}{xy} + \frac{8}{3x^2}}{\frac{7}{y^3} + 3}$     b) $\dfrac{\frac{1}{x+4}}{\frac{3}{x-2} - \frac{5}{x^2 + 2x - 8}}$

**Chapter 9**     ANSWERS

1.   a) Inverse Variation, $xy = 64$ or $y = \dfrac{64}{x}$, $x = 0.32$ when $y = 200$

     b) Neither

     c) Direct Variation, $y = 7.5x$ or $\dfrac{y}{x} = 7.5$, $x = 26.67$ when $y = 200$

2. $W = \dfrac{1.25MT^3}{C^2}$     3. $\dfrac{3(x - 3)}{2x^2(x - 5)}$     $x \neq -3, 0, 5$

4. a) $\dfrac{x}{x(x - 3)}$     b) $\dfrac{x + 1}{3}$

5. a) $\dfrac{7x - 19}{(x - 3)(x - 2)(x + 2)}$     b) $\dfrac{-8x^2 + 3x + 15}{2x(x + 5)^2}$

6. a) $\dfrac{6xy^2 + 8y^3}{21x^2 + 9x^2y^3}$     b) $\dfrac{x - 2}{3x + 7}$