Name: ___KEY___

Scientific calculators are allowed. Graphing calculators are NOT allowed.
No reference materials (cell phones, notes, book, notecards, or formulas) are allowed during the test.
You must show all your work to receive full credit. Write your answer on the given line.

Chapter 5
(A.REI.6 DOK 2) *3 points*
1. Solve the system of linear equations using the substitution method. Write your answer as an ordered pair.
$$\begin{cases} x = -4 - 2y \\ 3x - 4y = 18 \end{cases}$$

Substitution ~ 1 pt
Solving for x and y ~ 1 pt each
-1/2 point if answer isn't written as an ordered pair

$3(-4-2y)-4y=18$

$-12-6y-4y=18$

$-12-10y=18$
$+12 \qquad +12$

$-10y=30$
$y=-3$

$x=-4-2(-3)$
$-4+6$
$x=2$

___(2,-3)___

(A.REI.6 DOK 3) *4 points*
2. Solve the system of linear equations using the substitution method. Write your answer as an ordered pair.
$$\begin{cases} 3x - y = 11 \\ 5y - 7x = 1 \end{cases}$$

Solve for a variable ~ 1 pt
Substitution ~ 1 pt
Solving for x and y ~ 1 pt each
-1/2 point if answer isn't written as an ordered pair

$3x-y=11$
$-3x \qquad -3x$

$\dfrac{-y}{-1}=\dfrac{-3x+11}{-1}$

$y=3x-11$

$5(3x-11)-7x=1$

$15x-55-7x=1$

$8x-55=1$
$+55 \ +55$

$\dfrac{8x}{8}=\dfrac{56}{8}$

$x=7$

$y=3(7)-11$
$y=21-11$
$y=10$

___(7,10)___

(A.REI.6 DOK 2) *3 points*
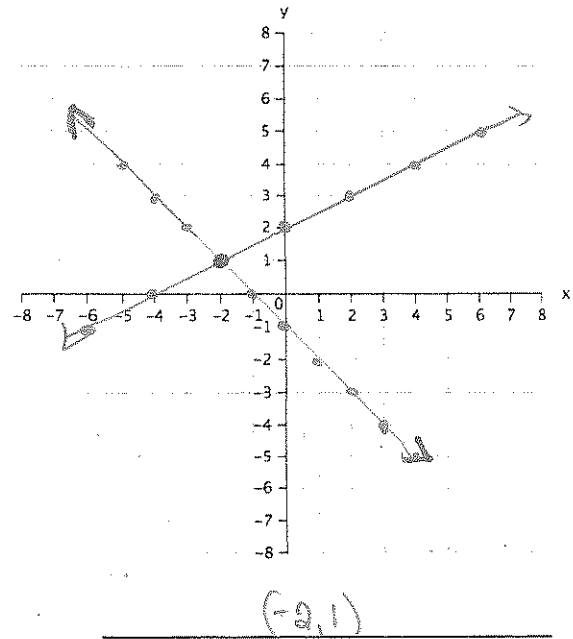
3. Graph the system by graphing.
Write your answer as an ordered pair.

$$\begin{cases} y = \dfrac{1}{2}x + 2 \\ y = -x - 1 \end{cases}$$

Graphing a line ~ 1 pt each
Solution ~ 1 pt
-1/2 pt if not listed as an ordered pair

$(-2, 1)$

(A.REI.6 DOK 3) *4 points*

4. Graph the system by graphing.
Write your answer as an ordered pair.

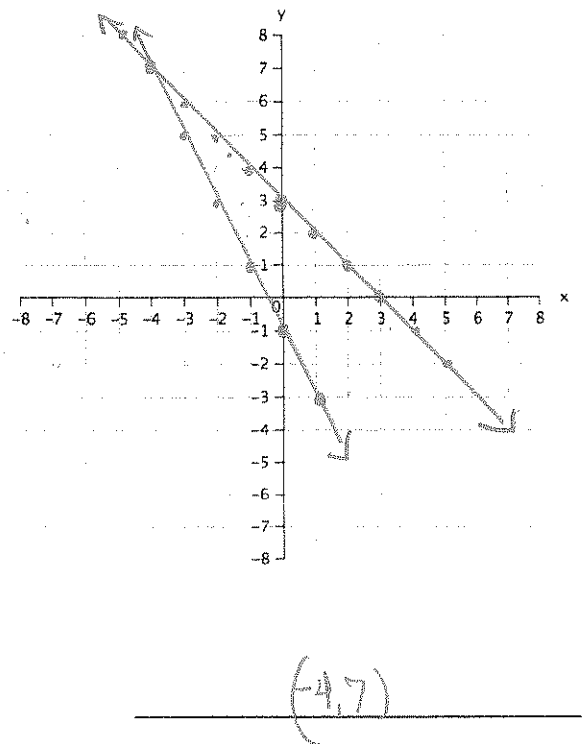$$\begin{cases} x + y = 3 \\ y = -2x - 1 \end{cases}$$

$x + y = 3$
$-x \quad -x$
$y = -x + 3$

Solve for y ~ 1 pt
Graphing a line ~ 1 pt each
Solution ~ 1 pt
-1/2 pt if not listed as an ordered pair

$(-4, 7)$

(A.REI.5 DOK 1) *3 points*

5. Solve the system of linear equation using the elimination method. Write your answer as an ordered pair.

$$\begin{cases} x + y = 12 \\ x - y = 2 \end{cases}$$

$2x = 14 \quad x = 7 \qquad 7 + y = 12$
$\qquad\qquad\qquad\qquad\qquad -7 \qquad -7$

Add equations ~ 1 pt

Solve for x and y ~ 2 pts $\qquad\qquad y = 5$

-1/2 pt for not listing as an ordered pair

$\underline{\qquad\quad (7,5) \qquad\quad}$

(A.REI.5 DOK 2) *4 points*

6. Solve the system of linear equation using the elimination method. Write your answer as an ordered pair.

$$\begin{cases} -1(5x + y = 0) \\ 5x + 2y = 30 \end{cases}$$

$-5x - y = 0 \qquad 5x + 30 = 0$
$5x + 2y = 30 \qquad 5x = -30$
$\qquad\qquad y = 30 \qquad\qquad x = -6$

Multiply an equation by a constant ~ 1 pt

Add equations ~ 1 pt

Solve for x and y ~ 2 pts

-1/2 pt for not listing as an ordered pair

$\underline{\qquad\quad (-6, 30) \qquad\quad}$

(A.REI.5 DOK 3) *4 points*

7. Solve the system of linear equation using the elimination method. Write your answer as an ordered pair.

$$\begin{cases} 2x + 4y = 10 \\ -2(3x + 2y = 17) \end{cases}$$

$2x + 4y = 10 \qquad 2(6) + 4y = 10$
$-6x - 4y = -34 \qquad 12 + 4y = 10$
$\qquad\qquad\qquad\qquad\qquad\qquad -12 \qquad -12$
$\dfrac{-4x}{-4} = \dfrac{-24}{-4} \quad x = 6 \qquad \dfrac{4y}{4} = \dfrac{-2}{4}$

Multiply an equation by a constant ~ 1 pt $\qquad y = -\frac{1}{2}$

Add equations ~ 1 pt

Solve for x and y ~ 2 pts

-1/2 pt for not listing as an ordered pair

$\underline{\qquad\quad (6, -\frac{1}{2}) \qquad\quad}$
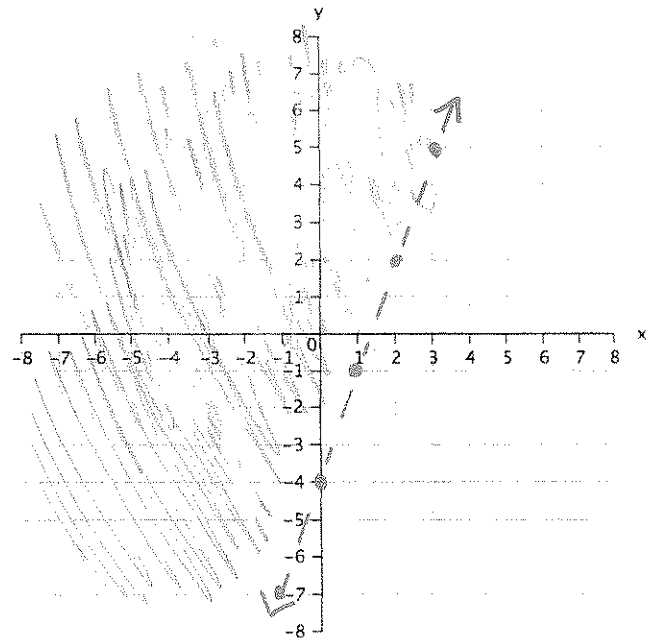
(A.REI.12 DOK 2) *3 points*

8. Graph the inequality.

$$y > 3x - 4$$

Graphing the line ~ 1 pt
Dotted line ~ 1 pt
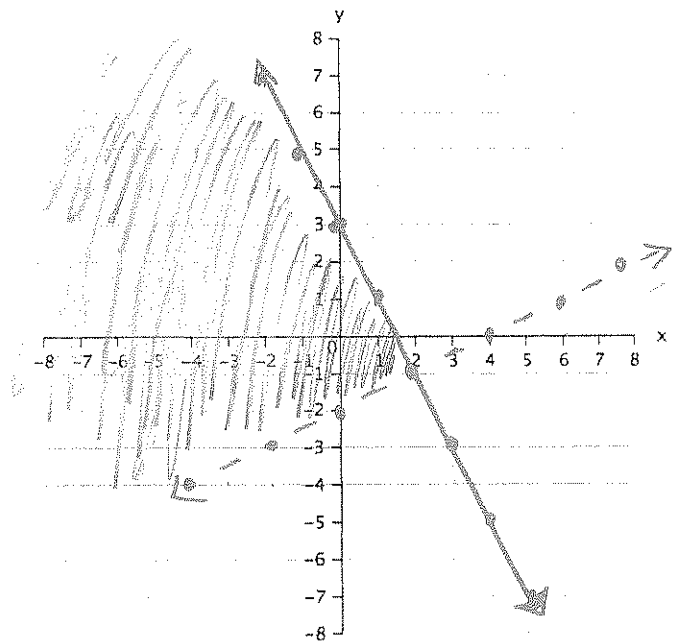Shading ~ 1 pt

(A.REI.12 DOK 2) *6 points*

9. Graph the system of inequalities.

$$\begin{cases} y > \frac{1}{2}x - 2 \\ y \le -2x + 3 \end{cases}$$

Graphing the lines ~ 2 pts
Correct line type ~ 2 pts
Correct shading ~ 2 pts

(A.REI.12 DOK 3) *8 points*

10. Graph the system of inequalities.
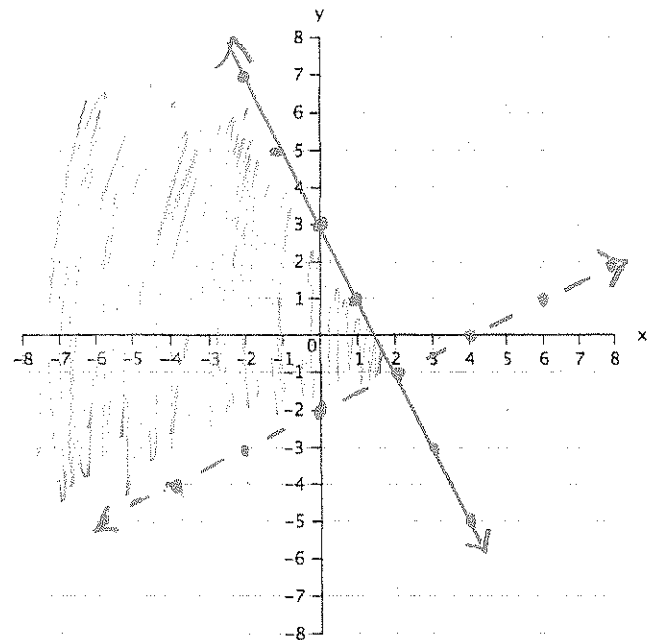
$$\begin{cases} 2x + y \le 3 \\ x - 2y < 4 \end{cases}$$

$y \le -2x + 3$

$-x \qquad -x$

$-2y < -x + 4$

Solve for y ~ 2 pts $\quad y > \frac{1}{2}x - 2$

Graphing the lines ~ 2 pts

Correct line type ~ 2 pts

Correct shading ~ 2 pts

Chapter 6

(A.APR.1 DOK 2) *3 points*

11. Simplify.

$$(3b^2 - 2b + 1) - (b^2 - 5b + 4)$$

$$3b^2 - 2b + 1 - b^2 + 5b - 4$$

Distribute the negative ~ 1.5 pts

Combine like terms ~ 1.5 pts

$$2b^2 + 3b - 3$$

(A.APR.1 DOK 3) *4 points*

12. Simplify.

$$7(2m^2 - 8m) + m(8m + 2) - (3m - 5)$$

$$14m^2 - 56m + 8m^2 + 2m - 3m + 5$$

Distributive ~ 3 pts

Combine like terms ~ 1 pt

$$22m^2 - 57m + 5$$

(A.APR.1 DOK 2) *3 points*

13. Simplify.

$$5x(7x^2 - x + 4)$$

Distributive ~ 3 pts

$$35x^3 - 5x^2 + 20x$$

(A.APR.1 DOK 3) *7 points*

14. Simplify.

$$(3x - 2)(4x^2 + 3x - 8)$$

$$12x^3 + 9x^2 - 24x$$
$$-8x^2 - 6x + 16$$

Distributive 6 times ~ 6 pt

Combine like terms ~ 1 pt

$$12x^3 + x^2 - 30x + 16$$

(N.RN.2 DOK 1) *2 points*

15. Rewrite the expression with a rational exponent:

$$\sqrt[3]{x^2}$$

Numerator must be 2 ~ 1 pt
Denominator must be 3 ~ 1 pt

$(x^2)^{\frac{1}{3}} = x^{\frac{2}{3}}$

$$x^{\frac{2}{3}}$$

(N.RN.2 DOK 1) *2 points*

16. Rewrite the expression in radical form:

$$y^{\frac{4}{5}}$$

Index must be 5 ~ 1 pt
Exponent must be 4 ~ 1 pt

$\sqrt[5]{y^4}$

$$\sqrt[5]{y^4}$$

(N.RN.2 DOK 2) *3 points*

17. Rewrite the expression in radical form:

$$(2x^2)^{\frac{2}{5}}$$

Index must be 5 ~ 1 pt
Correct exponent(s) ~ 2 pts

$\sqrt[5]{(2x^2)^2} = \sqrt[5]{4x^4}$

$$\sqrt[5]{4x^4}$$

(N.RN.2 DOK 3) *4 points*

18. Simplify and write the answer with rational exponents:

$$\sqrt[4]{x^2y} \cdot \sqrt[4]{xy}$$

Multiplication ~ 2 pts
Converting to rational exponents ~ 2 pts

$\sqrt[4]{x^3y^2} = (x^3y^2)^{\frac{1}{4}} = x^{\frac{3}{4}}y^{\frac{1}{2}}$

$$x^{\frac{3}{4}}y^{\frac{1}{2}}$$

(N.RN.2 DOK 3) *4 points*

19. Simplify and write the answer in radical form:

$$(2x)^{\frac{1}{4}} \cdot (2x)^{\frac{1 \cdot 2}{2 \cdot 2}}$$

Multiplication ~ 2 pts
Converting to radical form ~ 2 pts

$(2x)^{\frac{3}{4}} \quad \sqrt[4]{(2x)^3} = \sqrt[4]{8x^3}$

$$\sqrt[4]{8x^3}$$

Chapter 7

(A.SSE.2 DOK 1) *2 points*

20. Factor:

$$6r^2 - 4r$$

Each factor ~ 1 pt

$$\underline{2r(3r - 2)}$$

(A.SSE.2 DOK 2) *3 points*

21. Factor:

$$x^2 + 4x - 12$$

Correct signs ~ 1 pt
Correct factors ~ 2 pts

$$\underline{(x + 6)(x - 2)}$$

(A.SSE.2 DOK 2) *3 points*

22. Factor:

$$x^2 - 16$$

Correct signs ~ 1 pt
Correct factors ~ 2 pts

$$\underline{(x - 4)(x + 4)}$$

(A.SSE.2 DOK 3) *4 points*

23. Factor:

$$5x^2 - 14x + 8$$

Each binomial ~ 2 pts each

$$40 \cdot 1$$
$$20 \cdot 2$$
$$-10 \cdot 4$$

$$5x^2 - 10x - 4x + 8$$
$$5x(x - 2) - 4(x - 2)$$

$$\underline{(x - 2)(5x - 4)}$$

(A.SSE.2 DOK 3) *5 points*

24. Factor:

$$3x^3 + 6x^2 - 4x - 8$$

Factor each group ~ 2 pt each
Rewrite as 2 binomials ~ 1 pt

$$3x^2(x + 2) - 4(x + 2)$$
$$(3x^2 - 4)(x + 2)$$

$$\underline{(3x^2 - 4)(x + 2)}$$

Chapter 8

(A.REI.4b DOK 2) *3 points*

25. Solve by taking square roots:

$$2x^2 = 72$$

Divide ~ 1 pt

Square root ~ 1 pt

+/- sign ~ 1 pt

$$\frac{2x^2}{2} = \frac{72}{2}$$

$$x^2 = 36$$

$$x = \pm 6$$

$$x = \pm 6$$

(A.REI.4b DOK 2) *4 points*

26. Solve by factoring:

$$x^2 - 14x + 45 = 0$$

Factor ~ 2 pts

Answers ~ 1 pt each

$$(x-9)(x-5) = 0$$

$$x-9=0 \quad x-5=0$$

$$x=9 \quad x=5$$

$$x = 5, 9$$

(A.REI.4b DOK 3) *5 points*

27. Solve using the quadratic formula:

$$2x^2 - 7x + 3 = 0$$

Substitution into formula ~ 2 pts

Discriminant ~ 1 pt

Answers ~ 1 pt each

$$2x^2 - 6x - 1x + 3 = 0$$

$$2x(x-3) - 1(x-3) = 0$$

$$(2x-1)(x-3) = 0$$

$$2x-1=0 \quad x-3=0$$

$$+1 \;+1 \quad\quad +3\;+3$$

$$x = 3$$

$$\frac{2x}{2} = \frac{1}{2}$$

$$x = \frac{1}{2}, 3$$

(A.REI.4b DOK 3) *6 points*

28. Solve by completing the square:

$$2x^2 - 20x + 18 = 0$$

Factor out a 2 ~ 1 pt

Subtract the constant ~ 1 pt

Add 25 to both sides ~ 1 pt

Factor ~ 1 pt

Answer ~ 1 pt each

$$\frac{2x^2 - 20}{2} = \frac{-18}{2}$$

$$x^2 - 10 + 25 = -9 + 25$$

$$\left(\frac{-10}{2}\right)^2 = (-5)^2 = 25$$

$$(x-5)^2 = 16$$

$$x - 5 = \pm 4$$

$$x = 1, 9$$

$$x-5=4 \quad x-5=-4$$

$$+5 \;+5 \quad\quad +5\;+5$$

$$x = 9 \quad x = 1$$

Chapter 10

Use the data to answer the following questions 30 – 32.

The finishing times of runners in a 5K race, to the nearest minute, are given.

Finishing Times of Runners in a 5K Race (in minutes)				
18	30	17	17	31
32	19	24	28	22

(S-ID.3 DOK 1) *4 points*

29. Find the mean, median, mode and the range.

1 pt each

17, 17, 18, 19, 22, 24, 28, 30, 31, 32

23

Mean: _____23.8_____

Median: _____23_____

Mode: _____17_____

Range: _____17 - 32_____

(S-ID.3 DOK 2) *3 points*

30. A reporter asks you, "What is the typical finishing time for this race?" Which measure of central tendency would you answer: mean or mode? Explain.

Mean ~ 1 pt

Mean, answers will vary.

Explanation ~ 2 pt

(S-ID.3 DOK 3) *4 points*

31. Grandma's unofficial time was 68 minutes in the 5K race. If her time was included in the data above, how would this effect the mean, median, mode and range?
Choose one of the following for each: *greatly decreases, slightly decreases, no change, slightly increases, greatly increases*

1 pt each

Mean: slight/great Increase ≈ (increase 4 mi

Median: Slight Increase ≈ (0.2 min)

Mode: No Change

Range: Greatly increases