

Name: \_\_\_\_\_

KEY

## Algebra 1 Final Exam Summary

The date of the Algebra 1 Final Exam is: \_\_\_\_\_ at: \_\_\_\_\_



You MAY use a calculator on the exam although you will not NEED one.

You will need to know the following:

### Chapter 6

### Inequalities

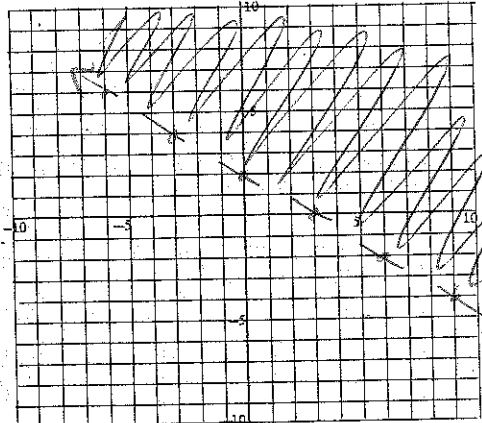

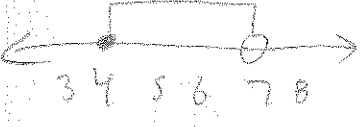
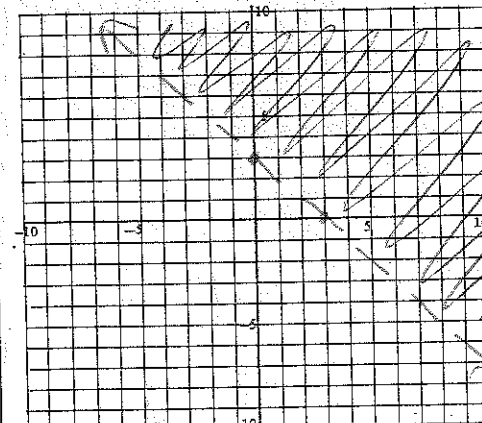
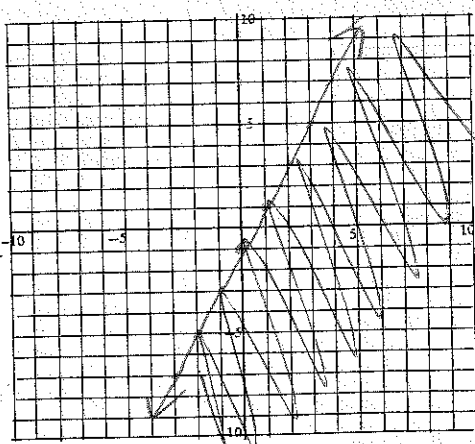
Examples: Solve the following equations/inequalities.

<p>1. <math>2x+4 &gt; 3x-1</math> <math>-3x \quad -3x</math> <math>-x+4 &gt; -1</math> <math>-4 \quad -4</math> <math>-x &gt; -5</math> <math>-1 \quad -1</math> <math>x &lt; 5</math> FLIP SIGN!</p>	<p>2. <math>7-3x \leq 16</math> <math>-7 \quad -7</math> <math>-3x \leq 9</math> <math>-3 \quad -3</math> <math>x \geq -3</math> FLIP SIGN!</p>	<p>3. <math>x+3 \leq 2(x-4)</math> <math>x+3 \leq 2x-8</math> <math>-2x \quad -2x</math> <math>-x+3 \leq -8</math> <math>-3 \quad -3</math> <math>-x \leq -11</math> <math>-1 \quad -1</math> <math>x \geq 11</math> FLIP SIGN!</p>
<p>4. <math> x+3  &gt; 7</math> <math>-7 &gt; x+3 &gt; 7</math> <math>-3 \quad -3 \quad -3</math> <math>-10 &gt; x &gt; 4</math>  <math>x &lt; -10</math> OR <math>x &gt; 4</math></p>	<p>5. <math> 3+x +7 &lt; 10</math> <math>-7 \quad -7</math> <math> 3+x  &lt; 3</math> <math>-3 &lt; 3+x &lt; 3</math> <math>-3 \quad -3 \quad -3</math> <math>-6 &lt; x &lt; 0</math> </p>	<p>6. <math> 3x-4 -2 = 21</math> <math>+2 \quad +2</math> <math> 3x-4  = 23</math> <math>-23 = 3x-4 = 23</math> <math>+4 \quad +4 \quad +4</math> <math>-19 = 3x = 27</math> <math>-3 \quad -3 \quad -3</math> <math>-\frac{19}{3} = x = 9</math> <math>x = 9</math> OR <math>-\frac{19}{3}</math></p>

Examples: Write the expression in words.

<p>7. <math>5 &lt; x \leq 7</math></p> <p>X IS GREATER THAN 5 AND LESS THAN OR EQUAL TO 7</p>	<p>8. <math>2 &lt; x &lt; 10</math></p> <p>X IS GREATER THAN 2 AND LESS THAN 10</p>	<p>9. <math>x &lt; -21</math> or <math>x &gt; -5</math></p> <p>X IS LESS THAN -21 OR GREATER THAN -5</p>
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Examples: Graph.

<p>10. <math>2x + 3y &gt; 6</math></p> <p><math>y &gt; -\frac{2}{3}x + 2</math></p>  <p>(DASHED LINE)</p>	<p>11. <math>x &gt; 5</math></p> <p>(on a number line)</p>  <p><math>4 \leq x &lt; 7</math></p> <p>(on a number line)</p> 
<p>12. <math>x + y &gt; 3</math></p> <p><math>y &gt; -x + 3</math></p>  <p>(DASHED LINE)</p>	<p>13. <math>2x - y \geq 1</math></p> <p><math>y \leq 2x - 1</math></p>  <p>(SOLID LINE)</p>

# Chapter 7

## Systems

Examples: Solve the system of equations using linear combination.

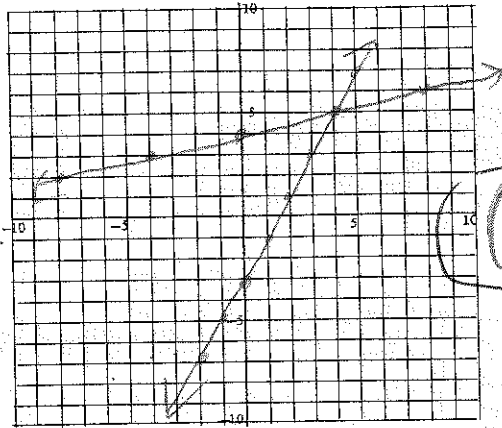
<p>14. <math>3x+4y=6</math>  <math>-3(x+2y=4)</math></p> $\begin{array}{r} 3x+4y=6 \\ -3x-6y=-12 \\ \hline -2y=-6 \\ y=3 \end{array}$ $\begin{array}{r} 3x+4(3)=6 \\ 3x+12=6 \\ 3x=-6 \\ x=-2 \end{array}$ <p><b><math>(-2, 3)</math></b></p>	<p>15. <math>4x+3y=16</math>  <math>2x-3y=8</math></p> $\begin{array}{r} 6x = 24 \\ x = 4 \end{array}$ $\begin{array}{r} 4(4)+3y=16 \\ 16+3y=16 \\ 3y=0 \\ y=0 \end{array}$ <p><b><math>(4, 0)</math></b></p>	<p>16. <math>3x+5y=6</math>  <math>-4x+2y=5</math></p> $\begin{array}{r} 12x+20y=24 \\ -12x+6y=15 \\ \hline 26y=39 \\ y=\frac{39}{26} \\ y=\frac{3}{2} \end{array}$ $\begin{array}{r} -4x+2(\frac{3}{2})=5 \\ -4x+3=5 \\ -4x=2 \\ x=-\frac{1}{2} \end{array}$ <p><b><math>(-\frac{1}{2}, \frac{3}{2})</math></b></p>
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Examples: Solve the system of equations using substitution.

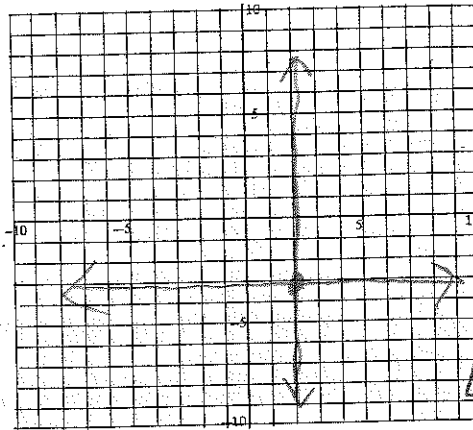
<p>17. <math>3x+4y=6</math>  <math>x+2y=4</math></p> $\begin{array}{r} x = -2y+4 \\ 3(-2y+4)+4y=6 \\ -6y+12+4y=6 \\ -2y+12=6 \\ -2y=-6 \\ y=3 \end{array}$ $\begin{array}{r} x+2(3)=4 \\ x+6=4 \\ x=-2 \end{array}$ <p><b><math>(-2, 3)</math></b></p>	<p>18. <math>x+y=1</math>  <math>x-y=2</math></p> $\begin{array}{r} x = y+2 \\ (y+2)+y=1 \\ 2y+2=1 \\ 2y=-1 \\ y=-\frac{1}{2} \end{array}$ $\begin{array}{r} x+(-\frac{1}{2})=1 \\ x=\frac{1}{2} \end{array}$ <p><b><math>(\frac{1}{2}, -\frac{1}{2})</math></b></p>	<p>19. <math>x+2y=1</math>  <math>5x+3y=-23</math></p> $\begin{array}{r} x = -2y+1 \\ 5(-2y+1)+3y=-23 \\ -10y+5+3y=-23 \\ -7y+5=-23 \\ -7y=-28 \\ y=4 \end{array}$ $\begin{array}{r} x+2(4)=1 \\ x+8=1 \\ x=-7 \end{array}$ <p><b><math>(-7, 4)</math></b></p>
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Solve the System by Graphing

20.  $y = 2x - 3$  and  $y = \frac{1}{4}x + 4$



21.  $y = -3$  and  $x = 2$



## Chapter 8

### Exponent Rules

Examples: Simplify.

22.  $x^2 \cdot x^4$

$x^6$

23.  $2x^2 \cdot 4x^5$

$8x^7$

24.  $(x^3)^4$

$x^{12}$

25.  $(2x^2)^3$

$2^3 x^6$   
 $8x^6$

26.  $x^{-4}$

$\frac{1}{x^4}$

27.  $\left(\frac{2x}{3y}\right)^{-2} \left(\frac{3y}{2x}\right)^2$

$\frac{3^3 y^2}{2^2 x^2}$   
 $\frac{9y^2}{4x^2}$

28.  $\frac{2x^4 y}{3y^{-2}}$

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

29.  $\frac{5x^4 y}{8x^2}$

$\frac{5x^2 y}{8}$

30. $x^1$  <div style="border: 1px solid black; padding: 5px; width: 50px; margin: 10px auto;">X</div>	31. $5^1$  <div style="border: 1px solid black; padding: 5px; width: 50px; margin: 10px auto;">5</div>	32. $x^0$  <div style="border: 1px solid black; padding: 5px; width: 50px; margin: 10px auto;">1</div>	33. $x^2 \cdot x^{-2}$ $x^0$  <div style="border: 1px solid black; padding: 5px; width: 50px; margin: 10px auto;">1</div>
34. $\frac{8x^2 \cdot 2x^{-5}y^2}{4y^5 \cdot 10y^7}$ $\frac{16x^{-3}y^2}{40y^{12}}$ $\frac{1}{4x^3y^{10}}$ <div style="border: 1px solid black; padding: 5px; width: 100px; margin: 10px auto;"><math>\frac{1}{4x^3y^{10}}</math></div>	35. $\left(\frac{2x^{-7}}{6y^5x}\right)^0 \cdot \frac{2^{-5}}{x^4}$ $1 \cdot \frac{2^{-5}}{x^4}$ <div style="border: 1px solid black; padding: 5px; width: 100px; margin: 10px auto;"><math>\frac{1}{32x^4}</math></div>	36. $(-5)^4(-5)^1(-5)^{-2}$ $(625)(-5)\left(\frac{1}{25}\right)$ $(-5)^{4+1+(-2)}$ $(-5)^3$ <div style="border: 1px solid black; padding: 5px; width: 100px; margin: 10px auto;">-125</div>	37. $\frac{x^7y}{x^{-6}y^{12}}$ <div style="border: 1px solid black; padding: 5px; width: 100px; margin: 10px auto;"><math>\frac{x^{13}}{y^{11}}</math></div>

## Scientific Notation

Examples: Write in scientific notation.

38. 2637 <div style="border: 1px solid black; padding: 5px; width: 150px; margin: 10px auto;"><math>2.637 \times 10^3</math></div>	39. .000597 <div style="border: 1px solid black; padding: 5px; width: 150px; margin: 10px auto;"><math>5.97 \times 10^{-4}</math></div>	40. 35209 <div style="border: 1px solid black; padding: 5px; width: 150px; margin: 10px auto;"><math>3.5209 \times 10^4</math></div>	41. .00000209 <div style="border: 1px solid black; padding: 5px; width: 150px; margin: 10px auto;"><math>2.09 \times 10^{-6}</math></div>
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Examples: Write in decimal form.

42. $2.36 \times 10^5$ <div style="border: 1px solid black; padding: 5px; width: 150px; margin: 10px auto;">236,000</div>	43. $1.3273 \times 10^{-4}$ <div style="border: 1px solid black; padding: 5px; width: 150px; margin: 10px auto;">.00013273</div>	44. $9.342 \times 10^{-2}$ <div style="border: 1px solid black; padding: 5px; width: 150px; margin: 10px auto;">.09342</div>	45. $1.46 \times 10^{10}$ <div style="border: 1px solid black; padding: 5px; width: 150px; margin: 10px auto;">14,600,000,000</div>
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# Chapter 9

## Radicals

Examples: Simplify.

46. $\sqrt{40}$ $\frac{\sqrt{4 \cdot 10}}{2\sqrt{10}}$	47. $5\sqrt{20}$ $\frac{5 \cdot 2\sqrt{5}}{10\sqrt{5}}$	48. $\sqrt{\frac{25}{36}} \cdot \sqrt{\frac{25}{36}}$ $\frac{5}{6}$	49. $\sqrt{\frac{100}{64}} \cdot \sqrt{\frac{100}{64}}$ $\frac{10}{8} \cdot \frac{5}{4}$
50. $\sqrt{\frac{73}{25}} \cdot \sqrt{\frac{73}{25}}$ $\frac{\sqrt{73}}{5}$	51. $\sqrt{75}$ $\sqrt{25 \cdot 3}$ $5\sqrt{3}$	52. $\sqrt{\frac{25}{7}} \cdot \sqrt{\frac{25}{7}}$ $\frac{5}{\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}}$ $\frac{5\sqrt{7}}{7}$	53. $\sqrt{\frac{40}{9}} \cdot \sqrt{\frac{40}{9}}$ $\frac{\sqrt{4 \cdot 10}}{\sqrt{9}}$ $\frac{2\sqrt{10}}{3}$

## Quadratic Formula

Examples: Solve the equation using the quadratic formula.

54. $y = 2x^2 + 4x - 6$ $a=2$ $b=4$ $c=-6$ $X = \frac{-4 \pm \sqrt{4^2 - (4)(2)(-6)}}{2(2)}$ $X = \frac{-4 \pm \sqrt{16 + 48}}{4}$ $X = \frac{-4 \pm \sqrt{64}}{4}$ $X = \frac{-4 \pm 8}{4}$ $\frac{-4+8}{4} = \frac{4}{4} = 1$ $\frac{-4-8}{4} = \frac{-12}{4} = -3$	55. $y = x^2 + 11x + 10$ $a=1$ $b=11$ $c=10$ $X = \frac{-11 \pm \sqrt{11^2 - 4(1)(10)}}{2(1)}$ $X = \frac{-11 \pm \sqrt{121 - 40}}{2}$ $X = \frac{-11 \pm \sqrt{81}}{2}$ $X = \frac{-11 \pm 9}{2}$ $\frac{-11+9}{2} = \frac{-2}{2} = -1$ $\frac{-11-9}{2} = \frac{-20}{2} = -10$	56. $y = 15x^2 - 9w - 6$ $a=15$ $b=-9$ $c=-6$ $X = \frac{9 \pm \sqrt{(-9)^2 - 4(15)(-6)}}{2(15)}$ $X = \frac{9 \pm \sqrt{81 + 360}}{30}$ $X = \frac{9 \pm \sqrt{441}}{30}$ $X = \frac{9 \pm 21}{30}$ $\frac{9+21}{30} = \frac{30}{30} = 1$ $\frac{9-21}{30} = \frac{-12}{30} = -\frac{2}{5}$
$X=1$ or $X=-3$	$X=-1$ or $X=-10$	$X=1$ or $X=-\frac{2}{5}$

# Graphing Quadratics

Examples: Graph the quadratic. Identify the vertex, x intercepts, y intercept, and axis of symmetry.

<p>57. <math>y = x^2 + 5x + 4</math></p> <p><math>(x+4)(x+1) = 0</math></p> <p><math>x = -4</math>   <math>x = -1</math></p>	<p>58. <math>y = x^2 - 9</math></p> <p><math>(x+3)(x-3) = 0</math></p> <p><math>x = -3</math>   <math>x = 3</math></p> <p><math>y = 0^2 - 9</math> <math>y = -9</math></p>
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$$y = \left(-\frac{5}{2}\right)^2 + 5\left(-\frac{5}{2}\right) + 4$$

$$\frac{25}{4} - \frac{50}{4} + \frac{16}{4} \quad y = \frac{-9}{4} \text{ or } -2\frac{1}{4}$$

## Chapter 10

### Factoring

Examples: Factor the polynomial.

<p>59. <math>x^2 + 5x - 6</math></p> <p><math>(x+6)(x-1)</math></p>	<p>60. <math>2x^2 + 7x + 6</math></p> <p><math>(2x+3)(x+2)</math></p>	<p>61. <math>16x^2 - 25</math></p> <p><del><math>(4x+5)(4x-5)</math></del></p>	<p>62. <math>3y^3 + 12y^2 + 9y</math></p> <p><math>3y(y^2 + 4y + 3)</math></p> <p><math>3y(y+3)(y+1)</math></p>
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63. $3x^3 + 21x^2 + 30x$ $3x(x^2 + 7x + 10)$ $3x(x+5)(x+2)$	64. $10x^2 + 15x + 5$ $5(2x^2 + 3x + 1)$ $5(2x+1)(x+1)$	65. $25x^2 - 49$ $(5x+7)(5x-7)$	66. $16y^2 - 81$ $(4y+9)(4y-9)$
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## Polynomials

Examples: Perform the indicated operations.

67. $(3x^2 + 2x - 4) - (2x^4 + 5x^2 - 3x + 7)$ $+ (-2x^4 - 5x^2 + 3x - 7)$ $-2x^4 - 2x^2 + 5x - 11$	68. $(2x+4)(x+3)$ $2x^2 + 10x + 12$	69. $x^2 + 4(x+2) - 2x^2 + 11$ $x^2 + 4x + 8 - 2x^2 + 11$ $-x^2 + 4x + 19$
70. $2x^2(3x^2 + 4x - 7)$ $6x^4 + 8x^3 - 14x^2$	71. $(x+4)(x-3)$ $x^2 + x - 12$	72. $(3x^2 + 4x - 1)(x - 2)$ $3x^3 + 4x^2 - x$ $+ -6x^2 - 8x + 2$ $3x^3 - 2x^2 - 9x + 2$
73. $(2x+3)^2$ $(2x+3)(2x+3)$ $4x^2 + 12x + 9$	74. $(x-2)^2$ $(x-2)(x-2)$ $x^2 - 4x + 4$	75. $2x(x-1) - 5x + 6x^2$ $2x^2 - 2x - 5x + 6x^2$ $8x^2 - 7x$



Examples: Solve the equation by factoring.

<p>76. <math>x^2 + 9x + 20 = 0</math></p> <p><math>(x+5)(x+4) = 0</math></p> <p><math>x = -5 \quad x = -4</math></p>	<p>77. <math>x^2 + 8x = 65</math></p> <p><math>x^2 + 8x - 65 = 0</math></p> <p><math>(x-5)(x+13) = 0</math></p> <p><math>x = 5 \quad x = -13</math></p>	<p>78. <math>x^2 - 5x = 84</math></p> <p><math>x^2 - 5x - 84 = 0</math></p> <p><math>(x-12)(x+7) = 0</math></p> <p><math>x = 12 \quad x = -7</math></p>
<p>79. <math>x^2 + 7x + 10 = 0</math></p> <p><math>(x+5)(x+2) = 0</math></p> <p><math>x = -5 \quad x = -2</math></p>	<p>80. <math>y^2 - 3y - 18 = 0</math></p> <p><math>(y-6)(y+3) = 0</math></p> <p><math>y = 6 \quad y = -3</math></p>	<p>81. <math>y^2 - 10y = -16</math></p> <p><math>y^2 - 10y + 16 = 0</math></p> <p><math>(y-8)(y-2) = 0</math></p> <p><math>y = 8 \quad y = 2</math></p>

## Chapter 11

### Solving Proportions

Examples: Solve the proportion. Check for extraneous solutions (check your answer!).

<p>82. <math>\frac{x-3}{5} = \frac{x}{10}</math></p> <p><math>10x - 30 = 5x</math></p> <p><math>5x = 30</math></p> <p><math>x = 6</math></p>	<p>83. <math>\frac{3}{x} = \frac{5}{8}</math></p> <p><math>5x = 24</math></p> <p><math>x = \frac{24}{5}</math></p>	<p>84. <math>\frac{x-2}{4} = \frac{x+10}{10}</math></p> <p><math>10x - 20 = 4x + 40</math></p> <p><math>6x = 60</math></p> <p><math>x = 10</math></p>	<p>85. <math>\frac{-2}{a-7} = \frac{a}{5}</math></p> <p><math>a^2 - 7a = -10</math></p> <p><math>a^2 - 7a + 10 = 0</math></p> <p><math>(a-5)(a-2) = 0</math></p> <p><math>a = 5 \quad a = 2</math></p>
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