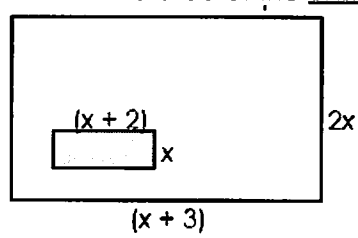
Key

Final Exam Review for Unit 1

What you need to know & be able to do	Things to remember		
Unit Conversions		1. Convert 1500g to kg. 1.5 kg	2. A bowl of cereal weighs 60 oz. How heavy is it in lb? 3.75 lbs.
		3. Convert 12 kilometers to inches. 475,200 inches	4. You are in a car that is traveling at 65 mph. How fast is it traveling in feet per second? $95.\overline{3}$ ft/sec.
		5. Convert 60 liters to milliliters. 60,000 mL	6. Today is Katie's 21st birthday, how old would she be in minutes? 11,037,600 minutes
Identify Vocabulary	• # of terms • Coefficients • Factors • Constants	7. How many terms are in the expression $12x^3 + 7x^2 - 4x - 19$? 4	8. What are the terms, coefficients, and constants in the expression $20x^4 - 11x + 3$? $20x^4, -11x, 3$ 20 & -11 3
Radicals	Pull out the pairs! Paris on outside leftovers on inside Adding and Subtracting: Simplify, Can only add or subtract like terms (Same radicand) Multiplying: Outside times Outside, Inside times Inside, Simplify	9. $4\sqrt{98p^2}$ $28p\sqrt{2}$	10. $3\sqrt{2} \cdot 5\sqrt{7}$ $15\sqrt{14}$
		11. $x\sqrt{72} - x\sqrt{18} + 5x\sqrt{2}$ $8x\sqrt{2}$	12. $\sqrt{30} \cdot \sqrt{12}$ $6\sqrt{10}$

- There are 5280 feet in one mile
- There are 0.034 ounces in one milliliter
- There are 0.454 kg in one pound
- There are 1.6 kilometers in one mile
- There are 73 gallons in 2 barrels
- There are 1.05 quarts in one liter
- There are 4 quarts in one gallon
- There are 16 ounces in a pound.

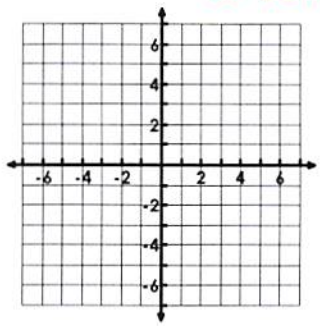
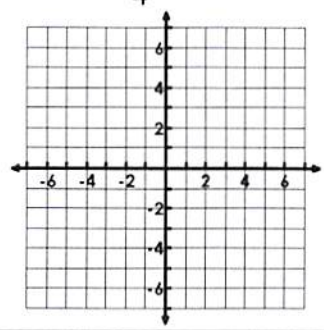
<table>
<tr><td rowspan="3">Polynomials</td><td rowspan="3">• Adding: Combine Like Terms (Only add the coefficients)
• Subtracting: Distribute the negative then combine like terms
• Multiplying: Box Method or FOIL (Multiply the coefficients and add the exponents</td><td>13. $(10x^2 - 4x + 2) + (3x^2 + x)$
$13x^2 - 3x + 2$</td><td>14. $(3x^2 - 6x + 2) - (4x^2 - 2x + 9)$
$-x^2 - 4x - 7$</td></tr>
<tr><td>15. $(x^2 + 2x - 3) - (6x^2 + 7x - 8)$
$-5x^2 - 5x + 5$</td><td>16. $(x + 4)(x - 3)$
$x^2 + x - 12$</td></tr>
<tr><td>17. $2x^2(4x^2 - 5x + 3)$
$8x^4 - 10x^3 + 6x^2$</td><td>18. $(2m - 3)^2$
$4m^2 - 12m + 9$</td></tr>
<tr><td rowspan="3">Rational vs. Irrational</td><td rowspan="3">• Rational #: Anything that can be written as a fraction
• Irrational #: Non-perfect square roots, non-repeating & non-terminating decimals, anything with π</td><td>Decide whether the following is Rational or Irrational.</td><td>19. $4\sqrt{50}$
Irrational</td></tr>
<tr><td>20. $\frac{2}{3}$ Rational</td><td>21. $0.\overline{66}$
Rational</td></tr>
<tr><td>22. $5\pi - 3$
Irrational</td><td>23. 2.35497...
Irrational</td></tr>
<tr><td>Sum of Rational and Irrationals</td><td>• Determine if the following are always true, sometimes true, never true.</td><td>24. The sum of two rational numbers is irrational
Never True</td><td>25. The product of two irrational numbers is rational.
Sometimes True</td></tr>
<tr><td rowspan="2">Radicals and Polynomials Applied</td><td rowspan="2"></td><td>26. Rachel is building a rectangular garden that is (3x – 8) units long and (2x+3) units wide. What algebraic expression would represent the AREA of the garden?
$6x^2 - 7x - 24$ units^2</td><td>27. Using the same information from #26. What expression would represent the PERIMETER of the garden?
$10x - 10$ units</td></tr>
<tr><td colspan="2">28. Find the area of the <u>unshaded</u> region.
 

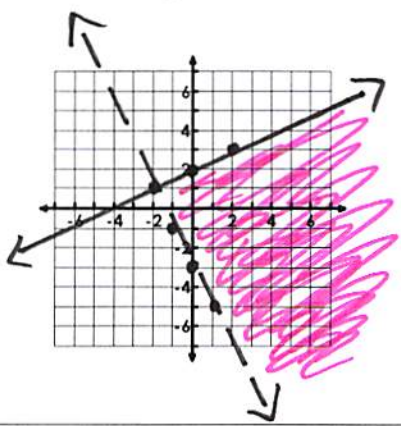
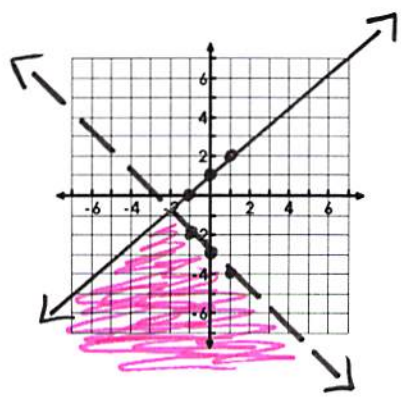
$x^2 + 4x$ units^2</td></tr>
</table>

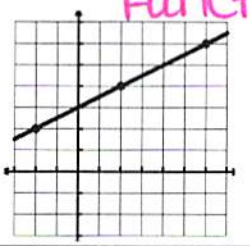
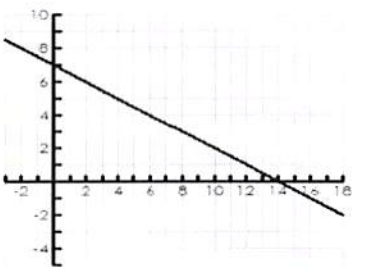
Key

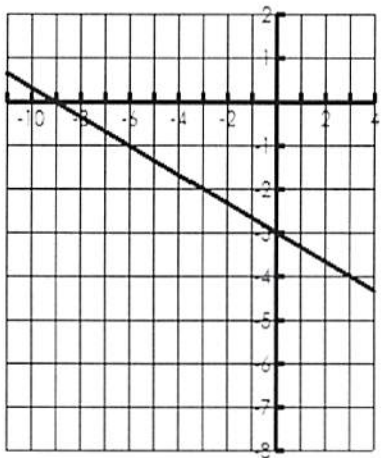
Final Exam Review for Unit 2

What you need to know & be able to do	Things to remember	Problem	Problem
Properties of Equality & Properties of Operations	Study your property sheet and algebraic proof sheets!	1. Which property is illustrated by the following: $\frac{6}{5}\cdot\frac{5}{6}=1$ Multiplicative Inverse Property	2. What is an example of the distributive property? $3(x-4)=3x-12$
Linear Models	$y = mx + b$ • m – increase or decrease • b – starting point	3. Lucy gets paid $150 a week and $10 for every computer she sells. Write an expression that represents her weekly income. $10x + 150$	4. Andy wants to mail a package. It costs $4.99 plus $0.30 for every ounce the package weighs. Write an equation that represents the total cost of shipping the package. $y=0.30x+4.99$
Consecutive Integers	Start with x. $x + (x+1) + (x+2)+...=$	5. Three consecutive integers add up to 153. Find the three integers. 50, 51, & 52	6. Three ODD integers add up to 381. Find the integers. 125, 127, & 129
Rectangle – Find length and width	• Draw a picture • Define your ℓ and w • Add all 4 sides • Solve for both variables	7. The width of a rectangle is 11 feet longer than the length. The perimeter of the rectangle is 70 feet. Find the length and the width. length = 12 ft. width = 23 ft.	8. The length of a rectangle is nine inches more than the width. The perimeter is 34 inches. Find the length. 13 inches
Solve for 2-variable Equations	$ax + by = c$ • Never move the variable you're solving for.	9. Tony is going to buy fruit for a smoothie. He wants raspberries, r, that are $4 a carton and strawberries, s, that are $2 a carton. Write an equation to represent all the combinations of fruit if Tony has $18 to spend. $4r + 2s = 18$	10. Using your equation from #9, solve for s, in terms of r, the number of raspberries. $s = 9 - 2r$ 11. If he buys 2 cartons of raspberries, how many strawberries can he buy? 5 cartons

Solve for an indicated variable	PEMDAS • Backwards, from the ground up!	12. Solve for x: $y = -4x + 16$ $x = -\frac{1}{4}y + 4$	13. Solve for L: $P = 2(L + W)$ $L = \frac{P}{2} - W$
Find the solution of a system of linear equations by **graphing**.	• Get "y" by itself. • Identify the slope (m) and the y-int (b) • y = mx + b • Check your answer!	14. $y = -x - 2$ $x + y = 3$ No Solution 	15. $y = x + 2$ $y = \frac{1}{4}x - 1$ (-4,-2) 
Find the solution of a system of linear equations by **substitution**.	• Solve one of the equations for a variable (either x or y). • Substitute into the other equation. • Plug back into the ORIGINAL! • Check your answer!	16. $-7x + 8y = 6$ $x = -4y - 6$ (-2,-1)	17. $8x + 2y = 16$ $x - y = 7$ (3,-4)
Find the solution of a system of linear equations by **elimination**.	• Decide which variable you want to get rid of. • Make sure the coefficients are opposite • Add the two equations. • Solve for the variable. • Substitute back into the original. • Check your answer!	18. $-2x - 8y = 6$ $2x + 6y = -6$ (-3,0)	19. $12x - 8y = 12$ $6x - 7y = -12$ (5,6)

Find the solution of a system of linear equations by **the best method**.	• Check if a pair is already opposite for elimination. • Check to see if either equation is already solved for a variable for substitution. • Check to see if the equations are already in slope-intercept form.	20. $-3x+y=17$ $8x+7y=3$ $(-4,5)$	21. $3x-3y=-3$ $-5x+9y=29$ $(5,6)$
Solving a System of Linear Equations Word Problem	• Define x and y. • Set up two equations. • Decide the best method. • Solve. • End with words!	22. Amy's school is selling tickets to a choral performance. A senior citizen's ticket is \$6 and a child's ticket is \$15. If they made \$810 dollars and sold a total of 72 child and senior citizen tickets, how many of each ticket did they sell? 30 senior citizen 42 child	23. The band is selling wrapping paper for a fundraiser. Customers can buy rolls of plain wrapping paper and rolls of shiny wrapping paper. The band sold a total of 55 rolls and made \$950. If a roll of plain costs \$14 and a roll of shiny costs \$20, how many rolls of each did they sell? 25 rolls of plain 30 rolls of shiny
Graphing a system of linear inequalities.	• Make sure both equations are in slope-intercept form. • Decide if the lines will be solid or dashed. • Graph the lines. • Test a point-typically (0,0). • Shade appropriately.	24. $y>-2x-3$ $y\le\frac{1}{2}x+2$ 	25. $y\le x+1$ $y<-x-3$ 

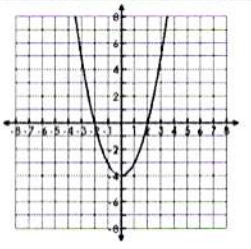
Identify: **Function** or **Not a Funtion** **EXPLAIN!!!!**	Graphs: Must pass the Vertical Line Test! Points: Inputs cannot repeat!	26. Function or Not a Function Function 	27. Function or Not a Function $\{(3,3),(4,3),(4,4),(6,5)\}$ Not a Function
Given functions, **simplify** the expressions.	• Choose the correct functions. • Pay attention to where the number is if there is one. • Combine Like Terms.	$f(x) = x^2 + 3x - 5$ $g(x) = 2x^2 - x + 2$ $h(x) = 3x^3$ 28. $g(x) - f(x)$ $x^2 - 4x + 7$ 29. $f(1) + g(-2)$ 11	30. $f(x) + g(x)$ $3x^2 + 2x - 3$ 31. $3h(x) - 2f(x)$ $9x^3 - 2x^2 - 6x + 10$ 32. $3f(x) + 2g(x)$ $7x^2 + 7x - 11$
Evaluating Functions	• SHOW WORK! • Plug it in. • Use parenthesis when substituting	33. Given, $g(x) = x^2 + x - 4$ a. Find $g(-2) =$ -2 b. Find $g(5) =$ 26	34. a. $g(0) =$ 7 b. $g($ 12 $) = 1$ 

Find the **average rate of change**	• Rate of Change • Average Rate of Change • Slope	35. $(2,-3)$ and $(-2,8)$ $\frac{-11}{4}$	36. When $x_1 = 1$ and $x_2 = 3$ -2
Arithmetic Sequences	• Adding or Subtracting to get to the next term • $a_n = dn + a_0$	37. Write the explicit rule for the following sequence and find the 50th term: 3, 6, 9, 12, 15, 18 $a_n = 3n$ $a_{50} = 150$	38. Write the first 4 terms in the sequence: $a_1 = 9$, $a_n = a_{n-1} - 2$ 9, 7, 5, 3
Characteristics of a Linear Function	• Domain • Range • Y-int • X-int • Inc/Dec • Rate of Change • End Behavior • Slope	39. 	Equation: $y = -\frac{1}{3}x - 3$ Domain: $(-\infty, \infty)$ Range: $(-\infty, \infty)$ X-Int: $(-9,0)$ Y-Int: $(0,-3)$ Increasing or Decreasing End Behavior: As $x \to \infty$, $f(x) \to -\infty$ As $x \to -\infty$, $f(x) \to +\infty$ ROC from $x_1 = -6$ to $x_2 = 3$: $-\frac{1}{3}$

Key

Final Exam Review for Unit 3

You need to know & be able to do	Things to remember	Example Problems	
Factor by GCF	**ALWAYS LOOK FOR A GCF FIRST IN WHATEVER TYPE OF FACTORING YOU ARE DOING** Factor out what all terms have in common Divide the coefficients by the GCF and take away the variables	1. $6x + 24$ $6(x+4)$	2. $16a^2b^2 + 20a^2$ $4a^2(4b^2+5)$
		3. $9x^4 - 15x^3 + 3x^2$ $3x^2(3x^2-5x+1)$	4. $20x + 30y$ $10(2x+3y)$
Factor by Grouping	**USE WITH 4 TERMS** Group the 1st 2 terms and the last 2 terms Factor out the GCF of each group If the "leftovers" match write your factors If the "leftovers" don't match it is prime	5. $18a^3 - 21a^2 + 30a - 35$ $(6a-7)(3a^2+5)$	6. $35uv + 14u - 40v - 16$ $(5v+2)(7u-8)$
		7. $5x^2 + 2x + 5x + 2$ $(x+1)(5x+2)$	8. $4x^2 + 10x - 6x - 15$ $(2x-3)(2x+5)$
Factor when a = 1	**USE WITH 3 TERMS** Play X Game [a·c goes at the top and b at the bottom, find numbers that multiply to give you the top and add to give you the bottom Write your factors	9. $x^2 + 7x + 6$ $(x+6)(x+1)$	10. $x^2 + 11x + 24$ $(x+8)(x+3)$
		11. $x^2 - 7x + 10$ $(x-5)(x-2)$	12. $2x^2 + 2x - 12$ $2(x+3)(x-2)$
Factor when a > 1	**USE WITH 3 TERMS** Play X Game and then use Grouping Grouping- keep 1st term the same and last term the same and break up middle term using the numbers from X	13. $5x^2 + 6x + 1$ $(5x+1)(x+1)$	14. $3x^2 - 10x + 7$ $(3x-7)(x-1)$

	Game, then factor by grouping	15. $5x^2 + 12x + 4$ $(5x+2)(x+2)$	16. $18x^2 + 24x - 10$ $2(3x+5)(3x-1)$
Difference of Squares	**USE WITH 2 TERMS** **Must be a Binomial, Must be Subtraction, Both terms must be Perfect Squares** $a^2 - b^2 = (a+b)(a-b)$; where a is the square root of the 1st term and b is the square root of the 2nd term Watch out for double difference of squares	17. $x^2 - 25$ $(x+5)(x-5)$	18. $x^2 - 49$ $(x+7)(x-7)$
		19. $2x^2 - 32$ $2(x+4)(x-4)$	20. $x^4 - 81$ $(x^2+9)(x+3)(x-3)$
Discriminant	Find the number and type of solutions. $b^2 - 4ac$ Positive: 2 real solutions Negative: No real solutions or 2 Imaginary Solutions Zero: 1 Real solution	21.  2 Real Roots	22. $x^2 + 8x + 4 = 0$ 2 Real Roots
Solve a Quadratic by Factoring	Get in standard form. Factor. Set each factor equal to zero and solve.	23. $4x^2 - 9 = 0$ $x = -\frac{3}{2}, \frac{3}{2}$	24 $2x^2 + x = 6$ $x = \frac{3}{2}, -2$
		25. $4x^2 - 4x - 15 = 0$ $x = \frac{5}{2}, -\frac{3}{2}$	26. $5x^2 + x = 4$ $x = \frac{4}{5}, -1$

Solve a Quadratic by Taking Square Roots	Isolate the square. Take the square root of both sides. Don't forget the ±. Get the variable by itself.	27. $x^2 - 13 = 0$ $X = \pm\sqrt{13}$	28. $x^2 - 81 = 0$ $X = \pm 9$
		29. $(x-1)^2 + 4 = 20$ $X = 5, -3$	30. $(x+4)^2 = 121$ $X = 7, -15$
Solve a Quadratic by Completing the Square	Put terms with an x on the left. Make sure a = 1. Find the number that completes the square. Add it to both sides. Factor the left. Simplify the right. Take the square root of each side. Solve for x.	31. $x^2 + 2x - 4 = 0$ $X = -1 \pm \sqrt{5}$	32. $x^2 + 8x + 4 = 0$ $X = -4 \pm 2\sqrt{3}$
		33. $x^2 - 8x - 36 = 0$ $X = 4 \pm 2\sqrt{13}$	34. $x^2 + 4x - 2 = 0$ $X = -2 \pm \sqrt{6}$
Solve a Quadratic by Quadratic Formula	Put it in standard form. Identify a, b, and c. Use the formula. $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	35. $x^2 + 4x - 2 = 0$ $X = -2 \pm \sqrt{6}$	36. $x^2 + 4x - 1 = 0$ $X = -2 \pm \sqrt{5}$
		37. $x^2 - 3x = -2$ $X = 2, 1$	38. $2x^2 + 2x = 12x - 1$ $X = \frac{5 \pm \sqrt{23}}{2}$