Entering Algebra 2 Math Packet

Parents and Students,

This summer you are encouraged to continue to practice your math at home. This can be accomplished through regular math practice. This math packet is intended to be completed over the summer break and turned in the first day of school. In order for this to be a successful review packet please follow the following rules:

- Show all required work
- If worksheets are printed, you may write your work on the printed sheet
- If worksheets are not printed, head each paper with the name of the worksheet
- Please keep all work neat and legible, circle or box final answers
- If you need help, view Khan Academy
- It is okay to ask parents or older siblings for help
- If all else fails, send a message to the math teacher through Remind Code @sumhelptcm

There are select answers provided at the end of the packet. This is meant to check your answers and not to be a substitute for working through the problems. Each problem that requires work shown should show all the steps. Any problems that require work that do not show the steps will not be graded.

Part One: Order of Operations

Directions: Simplify each problem in the space provided, circling your final answer. Final answer should have all positive exponents and be in simplest form. No decimal approximations allowed.

Properties

1. Grouping symbols
2. Exponents
3. Multiplication or Division
   In order from left to right
4. Addition or Subtraction
   In order from left to right

Example: $2^3-(4+3*5)$ $=(2*2*2)-(4+3*5)$ $=(8)-(4+15)$ $=8-(19)$ $=-11$	1. $(15-8)\times 3+5+48-6$	2. $18\div 9\times(5-2)+7$
3. $4^3+2+8-60\div 3\times 6-3$	4. $(a^2-b)\div 6$, using $a=6, b=12$	5. $(x+2)^2$ when $x=-5$
6. $2x^2-2x+24$ when $x=2$	7. $\frac{3x^2+5}{12x-4}$, when $x=-1$	8. $\left(a+\sqrt{16}\right)\left(\frac{1}{a^2}-\frac{a}{3}\right)$ when $a=2$

Part Two: Linear Equations

Directions: Solve each problem in the space provided, circling your final answer. Recall: to find x-intercept set y=0 and to find y-intercept set x=0. To find equation of a line find slope and then use slope and point to solve for y-intercept.

Equations of a Line

- Slope-intercept form: $y = mx + b$
- Point-slope form: $y - y_1 = m(x = x_1)$
- Standard form: $Ax + By = C$
- Slope: $m = \frac{y_2 - y_1}{x_2 - x_1}$

Example: Write the equation of a line that has slope $m = -\frac{4}{9}$ and y-intercept $b = -3$. Use $y = mx + b$ then substitute values for ma and b and simplify $y = \frac{-4}{9}x + -3$ $y = -\frac{4}{9}x - 3$	9. Find the slope of the line containing the points (4,–3) and (–6, 4).	10. Write the equation of a line that has slope $m = -\frac{4}{9}$ and passes through the point (18, - 2) .
11. Write the equation of the line containing the points (1,3) and (5, 11).	12. Write the equation of the line containing the point (–4, 6) and parallel to $3x - 2y = 8$.	13. Write the equation of the line containing the point (3,56) and perpendicular to $3x - 2y = 8$.

Part Three: Rules of Exponents

Directions: Simplify each problem in the space provided, circling your final answer. Final answer should have all positive exponents.

Properties

$a^m \bullet a^n = a^{m+n}$ $\qquad (a^m)^n = a^{mn}$

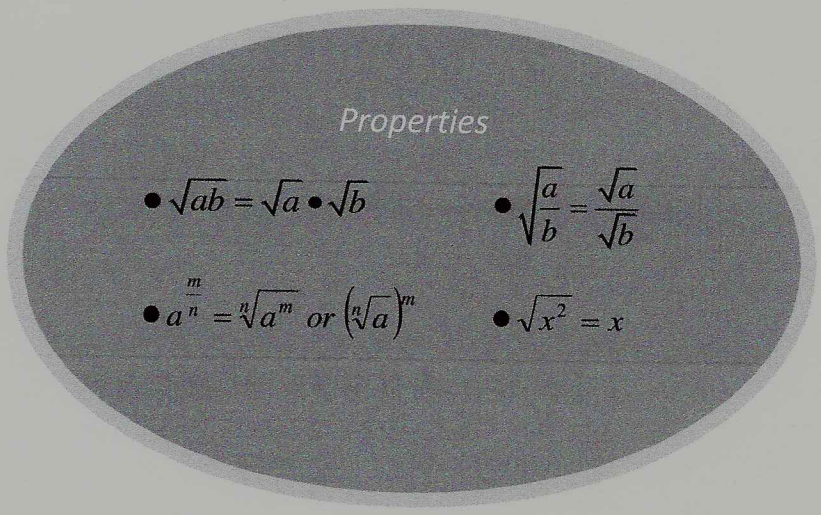
$(ab)^m = a^m b^m$ $\qquad a^{-m} = \frac{1}{a^m}, a \neq 0$

$\frac{a^m}{a^n} = a^{m-n}, a \neq 0$ $\qquad \left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}, b \neq 0$

Example: $(2a)^{-3}$ $= \frac{1}{(2a)^3}$ $= \frac{1}{(2a)} * \frac{1}{(2a)} * \frac{1}{(2a)}$ $= \frac{1}{2^3 a^3} = \frac{1}{8a^3}$	14. $(7x)^{-2}$	15. $(2x^2y)^0(3xy)^3$
16. $\frac{a^3}{a} - \frac{4a^6}{a^4}$	17. $(4x^3)^3$	18. $\left(\frac{5u^2}{2v^2}\right)^2$
19. $(3^{-1} + 2^{-1})^2$	20. $\left(\left(\frac{3}{4}\right)^2 + 1\right)^2$	21. $\left(\frac{x^2y^8z^2}{xy^2z^6}\right)^2$

Part Four: Simplifying Radicals

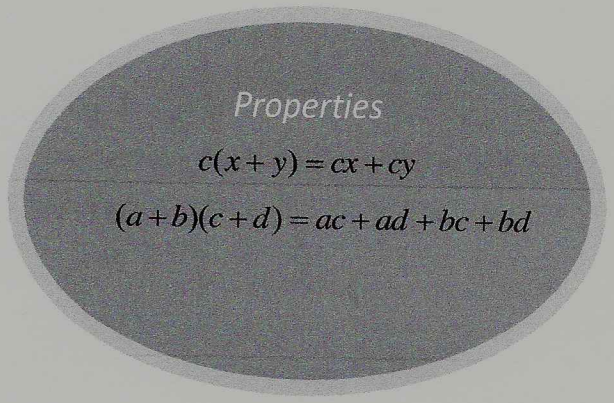
Directions: Simplify each problem in the space provided, circling your final answer. Final answer should have all positive exponents and be rationalized. No decimal approximations allowed.



Example: $\sqrt{24}$ $= \sqrt{4*6}$ $= \sqrt{4} * \sqrt{6}$ $= 2\sqrt{6}$	22. $3\sqrt{700}$	23. $\sqrt{\frac{100}{49}}$
24. $3\sqrt{700} + 2\sqrt{7}$	25. $\left(2\sqrt{6}\right) \cdot \left(3\sqrt{15}\right)$	26. $\sqrt{12} - \sqrt{48}$
27. $\sqrt{75x^3} \cdot \sqrt{3x^3}$	28. $\frac{50a}{2\sqrt{25a^2}}$	**BE CAREFUL:** $\sqrt[n]{a+b} \neq \sqrt[n]{a} + \sqrt[n]{b}$ $\sqrt[n]{a-b} \neq \sqrt[n]{a} - \sqrt[n]{b}$ $\sqrt[n]{a^n + b^n} \neq a+b$

Part Five: Simplifying Polynomials

Directions: Simplify each problem in the space provided, circling your final answer. Final answer should have all positive exponents and be in simplest form. No decimal approximations allowed.



Example: $(4x^2+7x-12)-(3x^2+5x+2)$ $=4x^2+7x-12-3x^2-5x-2)$ $=4x^2-3x^2+7x-5x-12-2)$ $=x^2-2x-14$	29. $(7x-2y)-(3x+5y)$	30. $-7x(2x-9)$
31. $(-3x+y)+(2x-y)$	32. $(3x+4)(2x-9)$	33. $7(3x^2+10x)-4x$
34. $3x^2+10x-4(x-7)$	35. $(3x^2+5)(2x-3)$	36. $(-3x+y)(2x-y)$

Part Six: Factoring

Directions: Factor each problem completely in the space provided, circling your final answer. Recall: if not factorable, it is "prime".

Strategies

1. *GCF*
2. Difference of Squares $(a+b)(a-b)=a^2-b^2$
3. Trinomials: factors of *ac* that add up to *b*
4. Sum and Difference

   $a^2+2ab+b^2=(a+b)^2$

   $a^2-2ab+b^2=(a-b)^2$
5. Grouping

Example: $3b^2+15b+18$ $=3(b^2+5b+6)$ $=3(b+3)(b+2)$	37. x^2+6x+5	38. x^2+x-6
39. $3x^3+18x^2+24x$	40. $4n^2-24n$	41. $144x^2-36$
42. $2x^2+7x-4$	43. $2x^5+10x^4+12x^3$	44. $2x^3+3x^2-8x-12$

Part Six: Solving

Directions: Solve each problem completely in the space provided, circling your final answer. Recall: For quadratics you may need the zero-product property… if $ab = 0$, then $a = 0$ or $b = 0$.

Strategies

1. Factor out a GCF (if one exists).
2. Quadratic – factor, completing the square or quadratic formula. $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
3. Cubic – try to factor by grouping.
4. Absolute value equations : $|a+b| = c$
   $a+b=c$ or $a+b=-c$
5. Radical equations – raise each side to the root.

45. $3(x-7)+5=-2x-8$	46. $\frac{x+1}{3}=5$	47. $(x+4)(9x-3)=0$
48. $x^2+x-12=0$	49. $x^2+2x-35=0$	50. $x^2+3x=-1$
51. $\lvert 1-4x\rvert=5$	52. $-4x+7\le 5$	53. $2\sqrt{x}-3=5$

Part Seven: Systems of Equations

Directions: Solve each problem completely in the space provided, circling your final answer.

Methods

1. Graphing.
2. Substitution
3. Elimination.

54. $\begin{cases} 3x+2y=2 \\ 9x-8y=-4 \end{cases}$	55. $\begin{cases} y=-3x+1 \\ 6x+2y=10 \end{cases}$	56. $\begin{cases} y=2x-2 \\ 7.5y=15x-15 \end{cases}$

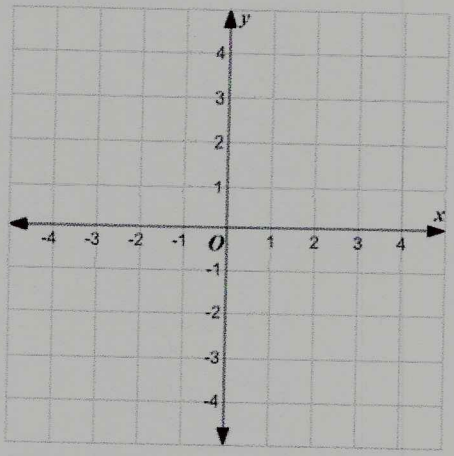
Part Eight: Systems of Inequalities

Directions: Solve each system of inequalities by graphing.

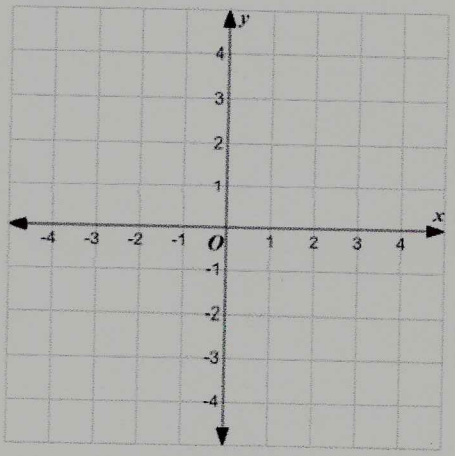
Methods

Graph both inequalities on the same coordinate plane and their intersection (overlapping region) is the solution. $<$ and $>$ are dotted lines, $\leq$ and $\geq$ are solid line.

57. $\begin{cases} y<3x+2 \\ y\leq -2x+1 \end{cases}$



58. $\begin{cases} y>-3x-2 \\ 2x-3y<6 \end{cases}$



Select Answers

Order of Operations

1) 68 3) -49 7) -1/2

Linear Equations

9) -7/10 11) $y= 2x + 1$

Rules of Exponents

14) $1/ 49x^2$ 16) $-3a^2$ 20) 625/256

Simplifying Radicals

22) $30\sqrt{7}$ 24) $32\sqrt{7}$ 27) $15x^3$

Simplifying Polynomials

29) $4x - 7y$ 31) $-x$ 36) $-6x^2+5xy-y^2$

Factoring

37) $(x+5)(x+1)$ 40) $4n(n-6)$ 43) $2x^3(x+3)(x+2)$

Solving

45) 8/5 48) -4, 3 52) $x \geq 1/2$

Systems of Equations

54) (4/21, 5/7)