Algebra II CP

Summer Packet

Due August 28, 2018

**Please complete neatly and show all work!*

Math Help Websites:

The internet has a vast amount of resources. To utilize your search in an efficient manner, enter the specific topic skill listed below to narrow your results.

http://www.coolmath.com
http://www.aplusmath.com
http://www.mathplayground.com
http://www.purplemath.com
http://www.ixl.com
http://softschools.com
http://math.com/homeworkhelp
http://kidsmathgamesonline.com
http://learnzillion.com
www.mrmathblog.com

http://www.khanacademy.org (great videos to help you if you get stuck)!

SIMPLIFYING EXPRESSIONS

Objective: To simplify and evaluate expressions using the correct order of operations.

Example 1

Simplify $9^2 - 6 \div 3 + 4$.

Solution:

$$\begin{aligned} 9^2 - 6 \div 3 + 4 &= 81 - 6 \div 3 + 4 \\ &= 81 - 2 + 4 && \text{Simplify the power } 9^2 = 9 \times 9 \\ &= 79 + 4 && \text{Divide and then subtract.} \\ &= 83 && \text{Add.} \end{aligned}$$

Example 2

Simplify $11 + 5[8 - 3(6 - 4)]$

Solution:

$$\begin{aligned} 11 + 5[8 - 3(6 - 4)] &= 11 + 5 \cdot [8 - 3(2)] && \text{Subtract inside parentheses.} \\ &= 11 + 5 \cdot [8 - 6] && \text{Multiply inside brackets.} \\ &= 11 + 5(2) && \text{Subtract inside brackets.} \\ &= 11 + 10 && \text{Multiply.} \\ &= 21 && \text{Add.} \end{aligned}$$

Example 3

Evaluate the expression $3r^2 + s - 6$ if $r = 2$ and $s = 5$.

Solution: Substitute the given values for the variables. Then simplify.

$$3r^2 + s - 6 = 3(2)^2 + 5 - 6 = 3(4) + 5 - 6 = 12 + 5 - 6 = 11$$

Simplify. Show ALL steps.

1. $3 \cdot 2^3 - (7^2 - 5^2)$

2. $16 - 3[9 - 2(5 - 3)]$

3. $[4(5 - 2) + 2^3] \div 2$

Evaluate each expression if $x = 2$ and $y = -3$. Show ALL steps.

4. $y^2 - y + 1$

5. $3x^2 + x - 8$

6. $(xy - x)^3$

EVALUATE VARIABLE EXPRESSIONS

Objective: To evaluate variable expressions.

Example:

Evaluate $a(b+c)$ if $a=5, b=3, c=2$

$5(3+2)$

$5(5)$

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Remember to substitute the values in for the variables and then follow the order of operations to simplify.

Show all work for full credit. A calculator is not permitted for these selected problems.

Evaluate each expression if x = 7, y = 10, r = 15, p = 3, and w = 8.

1. $x+y-r$

2. $w+w+y+y$

3. $(r+p)+w$

4. $x+p+w-r+y$

5. $y+15-w+12-x$

6. $85-17+p-x+w$

Evaluate each expression if x = 3, y = 4, and z = 5.

7. $6x-3y$

8. $6(x+y)$

9. $(y-x)\div(z-y)$

10. $2x+3z+y$

SOLVING ONE STEP EQUATIONS WITH ADDITION AND SUBTRACTION

Objective: To solve one step equations using addition and subtraction.

Example:

Solve for x.

$$x + 7 = 10$$
$$-7 \quad -7$$
$$x = 3$$

Show all work for full credit. A calculator is not permitted for these selected problems.

Solve the equation.

1. $x + 12 = 37$

2. $x + 3 = 21$

3. $25 = x + 17$

4. $x - 7 = 21$

5. $13 = m - 13$

6. $w + 18 = 18$

7. $x + 7 = 7.9$

8. $x - 5 = 2.5$

9. $7.8 = m - 2$

SOLVING ONE STEP EQUATIONS WITH MULTIPLICATION AND DIVISION

Objective: To solve one step equations using multiplication and division.

Example 1:

Solve for n.

$$\frac{4n}{4} = \frac{28}{4}$$

$$n = 7$$

Example 2:

Solve for x.

$$(3)\frac{x}{3} = 9(3)$$

$$x = 27$$

Show all work for full credit. A calculator is not permitted for these selected problems.

Solve the equation.

1. $5x = 60$

2. $\frac{x}{4} = 2$

3. $\frac{x}{6} = 12$

4. $9x = 81$

5. $48 = 12x$

6. $45 = 5x$

7. $\frac{x}{3} = 11$

8. $4x = 48$

SOLVING PROPORTIONS

Objective: To solve a proportion using cross-multiplication.

Example
Solve for x.

a. $\frac{x}{4}=\frac{21}{7}$

$\frac{x}{4}\times\frac{21}{7}$ (Cross Multiply)

$x\cdot 7=4\cdot 21$

$\frac{7x}{7}=\frac{84}{7}$ (Simplify)

$x=12$

The solution set is $\{12\}$.

b. $\frac{3}{8}=\frac{-6}{4a}$

$\frac{3}{8}\times\frac{-6}{4a}$

$3\cdot 4a=8\cdot(-6)$

$\frac{12a}{12}=\frac{-48}{12}$

$a=-4$

The solution set is $\{-4\}$.

Solve each proportion using cross multiplication. Leave answers in fraction form. Show ALL work.

1. $\frac{-8}{1}=\frac{4b}{5}$

2. $\frac{4r}{3}=-12$

3. $\frac{9}{1}=\frac{2n-1}{5}$

4. $\frac{6}{4x+3}=\frac{4}{2-5x}$

5. $\frac{x+6}{8}=\frac{x-6}{9}$

6. $\frac{x-6}{4}=\frac{x-9}{2}$

FRACTIONS

Objective: To add, subtract, multiply and divide fractions.

Example 1

a. Add $\frac{4}{5}+\frac{3}{5}$

$\frac{4}{5}+\frac{3}{5}=\frac{4+3}{5}=\frac{7}{5}=1\frac{2}{5}$

b. Subtract $\frac{5}{9}-\frac{2}{9}$

$\frac{5}{9}-\frac{2}{9}=\frac{5-2}{9}=\frac{3}{9}=\frac{1}{3}$

Example 2

Add $\frac{3}{4}+\frac{5}{6}$

$\frac{3}{4}+\frac{5}{6}=\frac{9}{12}+\frac{10}{12}$

$\frac{9+10}{12}=\frac{19}{12}$ or $1\frac{7}{12}$

Example 3

Multiply $\frac{3}{4}\bullet\frac{8}{13}$

$\frac{3}{4}\bullet\frac{8}{13}$

$\frac{6}{13}$

Example 4

Divide $\frac{2}{3}\div\frac{1}{9}$

Change to a multiplication problem

$\frac{2}{3}\bullet\frac{9}{1}$

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Hints for adding and subtracting fractions:

- Find a common denominator
- Do not write as improper fractions
- Add/subtract numerators only
- Check your answer for an improper fraction
- Reduce the answer if necessary

Hints for multiply fractions:

- Write mixed numbers as improper fractions
- Multiply the numerators across
- Multiply the denominators across
- Write product as a mixed number
- Reduce if necessary

Hints for dividing fractions:

- Write mixed numbers as improper fractions
- Dividing by a number is the same as multiplying by the reciprocal
- Follow the last four steps from the hints for multiplying as stated above

Perform the indicated operation. Show ALL work.

$3\frac{1}{2} + 6\frac{2}{3}$

$2\frac{3}{5} + 10\frac{1}{7}$

$9\frac{2}{9} + 5\frac{3}{8}$

$5\frac{2}{3} - 2\frac{1}{4}$

$6\frac{4}{5} - 2\frac{9}{10}$

$8 - 5\frac{4}{7}$

$4 \bullet \frac{6}{11}$

$\frac{2}{3} \bullet \frac{5}{9}$

Perform the indicated operation. Show ALL work.

$3\frac{1}{5} \cdot \frac{3}{8}$

$\frac{4}{9} \cdot 2\frac{1}{7}$

$8\frac{1}{3} \div 5$

$\frac{9}{14} \div \frac{2}{3}$

$6\frac{1}{4} \div 2\frac{1}{8}$

SLOPE-INTERCEPT FORM

Objective:

a. To identify slope and y-intercept.
b. To graph using the slope and the y-intercept.

Example

a. Given the equation $-6x+3y=-3$, identify the slope (m) and y-intercept (b).

Solution:

Begin by putting the original equation into slope-intercept form, or $y=mx+b$.

You can do this by isolating y.

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

$$+6x \qquad +6x$$

Add $6x$ to both sides

$$\frac{3y}{3}=\frac{6x}{3}-\frac{3}{3}$$

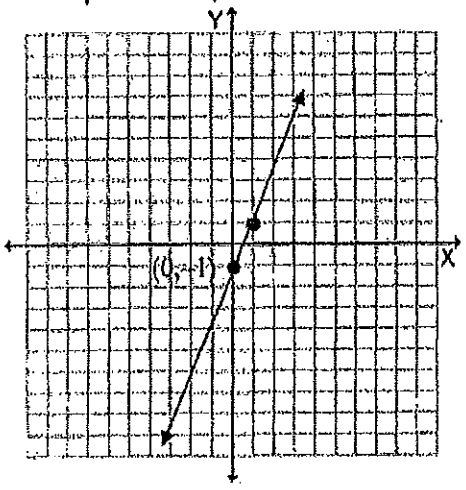
Divide both sides by 3

$$y=2x-1$$

$$y=mx+b$$

Therefore, the slope or $m=2$ and the y-intercept or $b=-1$.

b. Graph $-6x+3y=-3$.



From part a, we know $m=2$ and $b=-1$.

First, plot a point on $(0,-1)$ on the y-axis since $b=-1$ is the y-intercept.

From $(0,-1)$ use the slope $m=\frac{2}{1}$ to "rise" up 2 units and "run" right 1 unit to the locate the next point on the line.

Identify the slope and y-intercept in each equation. Show ALL work.

1. $2x+y=1$

$m=$_____

$b=$_____

2. $-x-2y=-2$

$m=$_____

$b=$_____

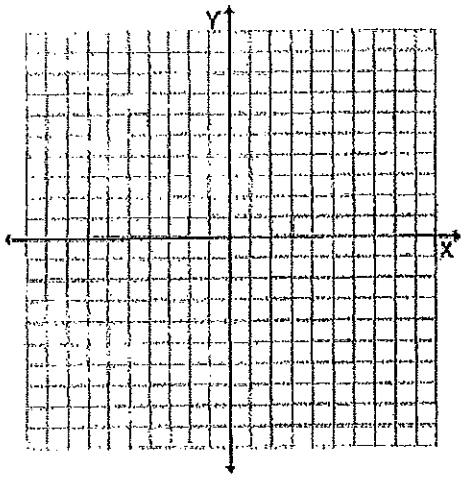
3. $-4x+4y=-5$

$m=$_____

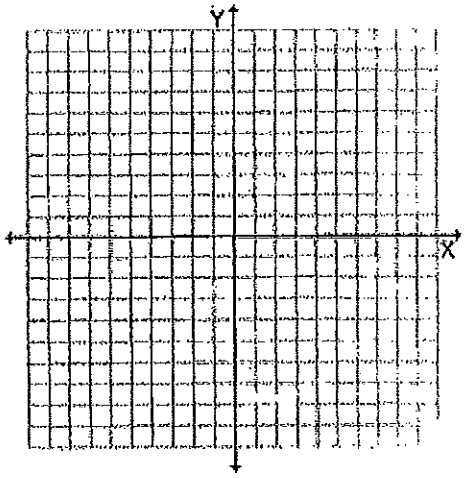
$b=$_____

Graph each equation using the slope and the y-intercept. Show ALL work.

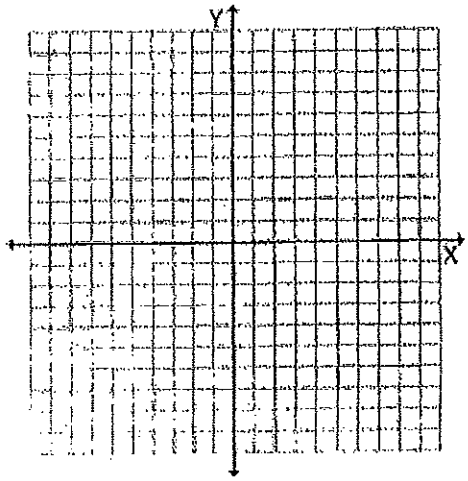
4. $2x - y = 5$



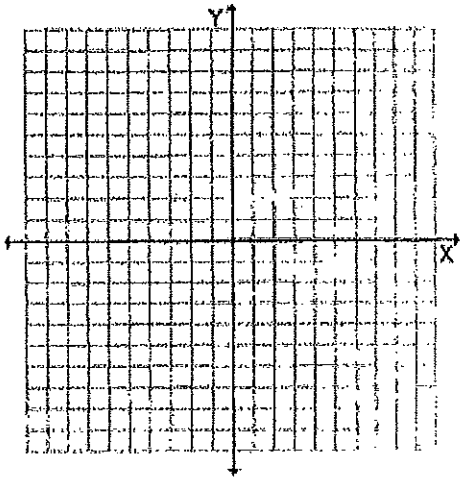
5. $-2x + 5y = -15$



6. $2x - 3y = 6$



7. $x + 3y = 3$



FACTORING POLYNOMIALS

Objective: To factor a trinomial.

Factoring Patterns for $x^2+bx+c=0$ when c is negative: $(x+\_\_)(x-\_\_)$

Example 1

Factor.

$x^2+12x-45$

1. Since the coefficient of the x^2 term is one, just think of factors of your last term: -45 that add up to the middle term: +12.
2. The factors of -45 that add up to +12 are +15 and -3 .
3. Therefore:

$x^2+12x-45=(x+15)(x-3)$

So, the solution is: $(x+15)(x-3)$

**Hint: To check your answer, simply use the foil method. If you come up with the trinomial that you started with, you are correct!

Factoring Patterns for $x^2+bx+c=0$ when c is positive:

When b is positive: $(x+\_\_)(x+\_\_)$

When b is negative: $(x-\_\_)(x-\_\_)$

Example 2

Factor.

$x^2-10x+16$

1. Since the coefficient of the x^2 term is one, just think of factors of your last term: +16 that add up to the middle term: -10.
2. The factors of +16 that add up to -10 are -8 and -2.
3. Therefore:

$x^2-10x+16=(x-2)(x-8)$

So, the solution is: $(x-2)(x-8)$

**Hint: To check your answer, simply use the foil method. If you come up with the trinomial that you started with, you are correct!

Factor Completely. Show ALL work.

1. x^2-2x-3
2. $x^2-11x+24$
3. $x^2+17x+30$
4. $x^2+5x-14$
5. $x^2+19x+60$
6. $x^2-10x+16$
7. $x^2-2x-35$
8. $2x^2+15x+7$
9. $3x^2+16x-44$

OPERATIONS WITH RADICALS

Objective: To incorporate operations with radicals.

Example 1

Add

$3\sqrt{5} + 7\sqrt{5} = 10\sqrt{5}$ Add the outside terms and keep the same radical (the same process is used with subtraction)

Example 2

Multiply

$3\sqrt{5} \bullet 4\sqrt{15}$

$= 3 \bullet 4\sqrt{5 \bullet 15}$

$= 12\sqrt{75}$ ← Simplify the radical

$= 12\sqrt{25 \bullet 3}$

$= 12\sqrt{25} \bullet \sqrt{3}$

$= 12 \bullet 5 \bullet \sqrt{3}$

$= 60\sqrt{3}$

Example 3

Divide

$\frac{10\sqrt{2}}{5}$

$= 2\sqrt{2}$

Perform the indicated operation.

$6\sqrt{7} + 4\sqrt{7}$

$8\sqrt{11} - 7\sqrt{11}$

$5\sqrt{6} - \sqrt{6}$

$\frac{12\sqrt{5}}{3}$

$\frac{22\sqrt{7}}{2}$

$2\sqrt{3} \bullet \sqrt{5}$

$7\sqrt{5} \bullet 8\sqrt{20}$

$\sqrt{10} \bullet 6\sqrt{5}$

$\sqrt{11} \bullet \sqrt{99}$

$6\sqrt{2} \bullet 3\sqrt{2}$