DeSoto
COUNTY SCHOOLS

Foundations to Algebra

Week 4

Kuta Software - Infinite Algebra 1 Name____________________

Adding and Subtracting Polynomials

Date________________ Period____

Simplify each expression.

1) $(5p^2 - 3) + (2p^2 - 3p^3)$

2) $(a^3 - 2a^2) - (3a^2 - 4a^3)$

3) $(4 + 2n^3) + (5n^3 + 2)$

4) $(4n - 3n^3) - (3n^3 + 4n)$

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

6) $(4r^3 + 3r^4) - (r^4 - 5r^3)$

7) $(5a + 4) - (5a + 3)$

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

9) $(-4k^4 + 14 + 3k^2) + (-3k^4 - 14k^2 - 8)$

10) $(3 - 6n^5 - 8n^4) - (-6n^4 - 3n - 8n^5)$

11) $(12a^5 - 6a - 10a^3) - (10a - 2a^5 - 14a^4)$

12) $(8n - 3n^4 + 10n^2) - (3n^2 + 11n^4 - 7)$

13) $(-x^4 + 13x^5 + 6x^3) + (6x^3 + 5x^5 + 7x^4)$

14) $(9r^3 + 5r^2 + 11r) + (-2r^3 + 9r - 8r^2)$

15) $(13n^2 + 11n - 2n^4) + (-13n^2 - 3n - 6n^4)$

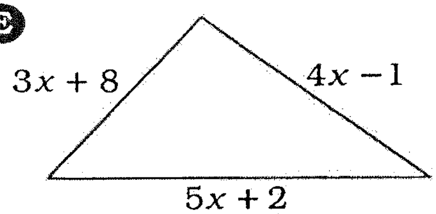
16) $(-7x^5 + 14 - 2x) + (10x^4 + 7x + 5x^5)$

Mystery Message

Do each exercise and find your answer at the bottom of the page. Write the letter of the exercise in the box above the answer. (Assume that figures that appear to be rectangular are rectangles.)

Part 1. Find the perimeter.

E



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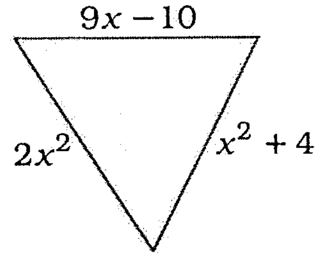

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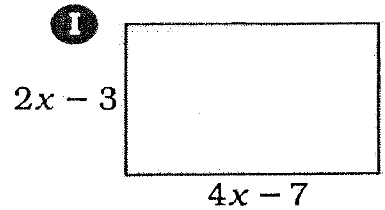
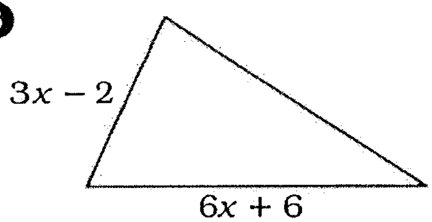


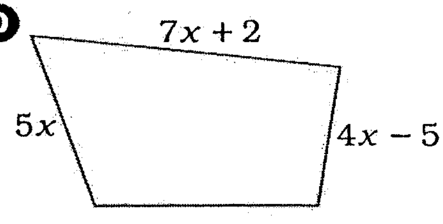
Part 2. Find the missing side length. The perimeter, *P*, is given.

S



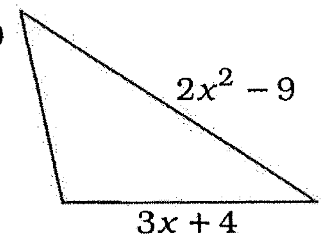
$P = 13x + 11$

D



$P = 21x + 2$

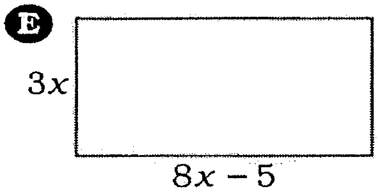
A



$P = 3x^2 - 2x - 5$

Part 3. Find the area.

E



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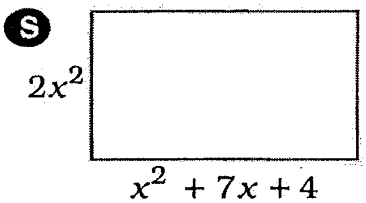

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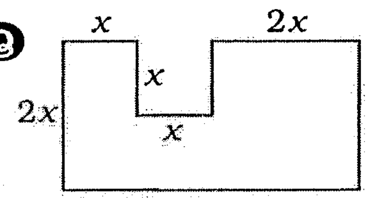
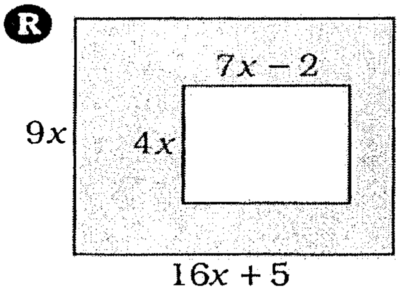


Part 4. Find the area of the shaded region.

R



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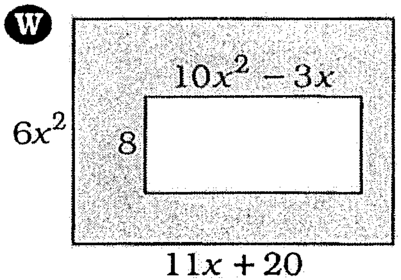

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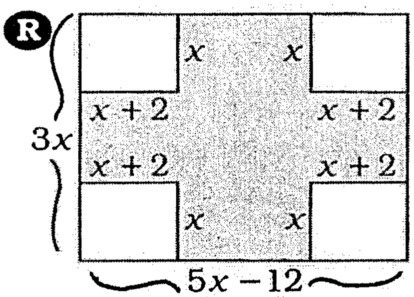
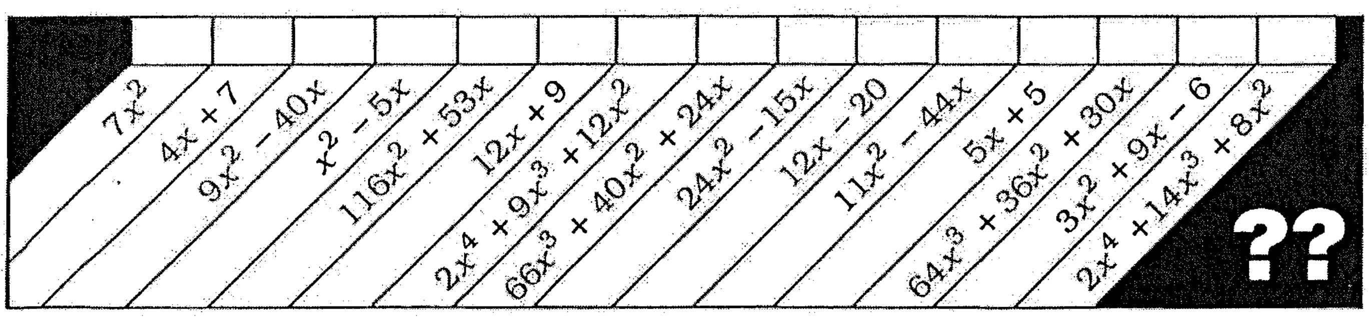




2pgs
Area Models 2

DISTRIBUTIVE PROPERTY #10

The **DISTRIBUTIVE PROPERTY** shows how to express sums and products in two ways: $a(b + c) = ab + ac$. This can also be written $(b + c)a = ab + ac$.

Factored form	Distributed form	Simplified form
$\mathbf{a(b + c)}$	$\mathbf{a(b) + a(c)}$	$\mathbf{ab + ac}$

To simplify: Multiply each term on the inside of the parentheses by the term on the outside. Combine terms if possible.

Example 1

$$2(47) = 2(40 + 7)$$
$$= (2 \cdot 40) + (2 \cdot 7)$$
$$= 80 + 14$$
$$= 94$$

Example 2

$$3(x + 4) = (3 \cdot x) + (3 \cdot 4)$$
$$= 3x + 12$$

Example 3

$$4(x + 3y + 1) = (4 \cdot x) + (4 \cdot 3y) + 4(1)$$
$$= 4x + 12y + 4$$

Problems

Simplify each expression below by applying the Distributive Property.

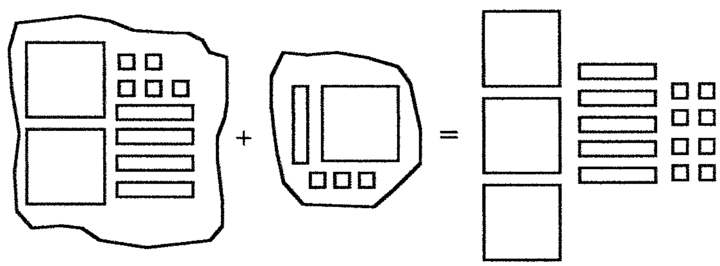
1. $6(9 + 4)$
2. $4(9 + 8)$
3. $7(8 + 6)$
4. $5(7 + 4)$
5. $3(27) = 3(20 + 7)$
6. $6(46) = 6(40 + 6)$
7. $8(43)$
8. $6(78)$
9. $3(x + 6)$
10. $5(x + 7)$
11. $8(x - 4)$
12. $6(x - 10)$
13. $(8 + x)4$
14. $(2 + x)5$
15. $-7(x + 1)$
16. $-4(y + 3)$
17. $-3(y - 5)$
18. $-5(b - 4)$
19. $-(x + 6)$
20. $-(x + 7)$
21. $-(x - 4)$
22. $-(-x - 3)$
23. $x(x + 3)$
24. $4x(x + 2)$
25. $-x(5x - 7)$
26. $-x(2x - 6)$

COMBINING LIKE TERMS #11

LIKE TERMS are terms that are exactly the same except for their coefficients. Like terms can be combined into one quantity by adding and/or subtracting the coefficients of the terms. Terms are usually listed in the order of decreasing powers of the variable. Combining like terms using algebra tiles is shown in the first two examples.

Example 1

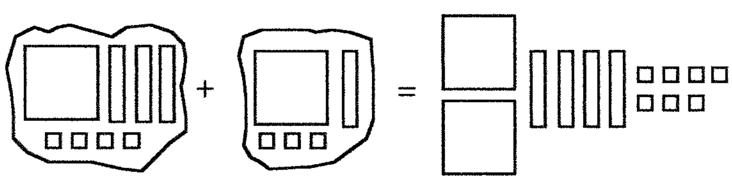
Simplify $(2x^2 + 4x + 5) + (x^2 + x + 3)$ means combine $2x^2 + 4x + 5$ with $x^2 + x + 3$.



$$(2x^2 + 4x + 5) + (x^2 + x + 3) = 3x^2 + 5x + 8.$$

Example 2

Simplify $(x^2 + 3x + 4) + (x^2 + x + 3)$.



$$(x^2 + 3x + 4) + (x^2 + x + 3) = 2x^2 + 4x + 7$$

Example 3

$(4x^2 + 3x - 7) + (-2x^2 - 2x - 3) = 4x^2 + (-2x^2) + 3x + (-2x) - 7 + (-3) = 2x^2 + x - 10$

Example 4

$(-3x^2 - 2x + 5) - (-4x^2 + 7x - 6) = -3x^2 - (-4x^2) - 2x - (7x) + 5 - (-6)$

$= -3x^2 + 4x^2 - 2x - 7x + 5 + 6 = x^2 - 9x + 11$

Problems

Combine like terms for each expression below.

1. $(x^2 + 3x + 4) + (x^2 + 3x + 2)$
2. $(x^2 + 4x + 3) + (x^2 + 2x + 5)$
3. $(2x^2 + 2x + 1) + (x^2 + 4x + 5)$
4. $(3x^2 + x + 7) + (3x^2 + 2x + 4)$
5. $(2x^2 + 4x + 3) + (x^2 + 3x + 5)$
6. $(4x^2 + 2x + 8) + (2x^2 + 5x + 1)$
7. $(4x^2 + 2x + 8) + (3x^2 + 5x + 3)$
8. $(3x^2 + 4x + 1) + (2x^2 + 4x + 5)$
9. $(5x^2 + 4x - 7) + (3x^2 + 2x + 3)$
10. $(3x^2 - 4x + 2) + (2x^2 + 2x + 4)$
11. $(3x^2 - x + 2) + (4x^2 + 3x - 1)$
12. $(2x^2 - 2x + 7) + (5x^2 + 4x - 3)$
13. $(2x^2 - 3x - 3) + (5x^2 - 4x + 4)$
14. $(3x^2 - 3x + 6) + (2x^2 - x - 4)$
15. $(-4x^2 + x + 2) + (6x^2 - 3x + 2)$
16. $(-3x^2 + 4x + 2) + (5x^2 - 6x - 1)$
17. $(x^2 - 4) + (-x^2 + x - 3)$
18. $(3x^2 + x) + (-2x^2 + 4)$
19. $(3x^2 + 4) + (x^2 - 2x + 3)$
20. $(-2x^2 - x) + (4x^2 - 3)$
21. $(7x^2 - 2x + 3) - (3x^2 - 4x + 7)$
22. $(x^2 - 3x - 2) - (4x^2 + 3x - 3)$
23. $(8x^2 + 4x - 7) - (-4x^2 + 3x - 4)$
24. $(-2x^2 + 14) - (3x^2 + 4x - 7)$

WRITING AND GRAPHING LINEAR EQUATIONS #42

SLOPE (rate of change) is a number that indicates the steepness (or flatness) of a line, that is, its rate of change, as well as its direction (up or down) left to right.

SLOPE (rate of change) is determined by the ratio: $\frac{\text{vertical change}}{\text{horizontal change}} = \frac{\text{change in y}}{\text{change in x}}$

between <u>any</u> two points on a line. Some books and teachers refer to this ratio as the rise (y) over the run (x).

For lines that go **up** (from left to right), the sign of the slope is **positive**. For lines that go **down** (left to right), the sign of the slope is **negative**.

Any linear equation written as **y = mx + b**, where m and b are any real numbers, is said to be in **SLOPE-INTERCEPT FORM**. **m** is the **SLOPE** of the line. **b** is the **Y-INTERCEPT**, that is, the point (0, b) where the line intersects (crosses) the y-axis.

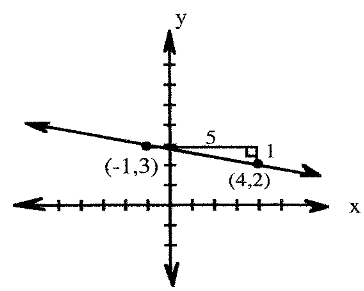
Example 1

Write the slope of the line containing the points (-1, 3) and (4, 2).

First graph the two points and draw the line through them.

Look for and draw a slope triangle using the two given points.

Write the ratio $\frac{\text{vertical change in y}}{\text{horizontal change in x}}$ using the legs of the right triangle: $\frac{1}{5}$.



Assign a positive or negative value to the slope depending on whether the line goes up (+) or down (–) from left to right. The slope is $-\frac{1}{5}$.

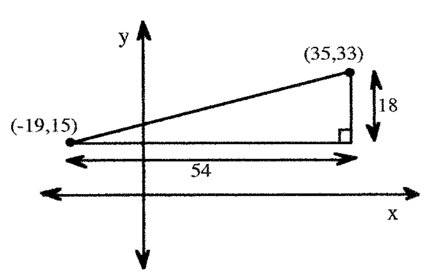
Example 2

Write the slope of the line containing the points (-19, 15) and (35, 33).

Since the points are inconvenient to graph, use a "Generic Slope Triangle," visualizing where the points lie with respect to each other and the axes.

Make a sketch of the points.

Draw a slope triangle and determine the length of each leg. Write the ratio of y to x: $\frac{18}{54} = \frac{1}{3}$. The slope is $\frac{1}{3}$.



Example 3

Given a table, determine the rate of change (slope) and the equation of the line.

		+2		+2		+2	
x	-2		0		2		4
y	1		4		7		9
		+3		+3		+3	

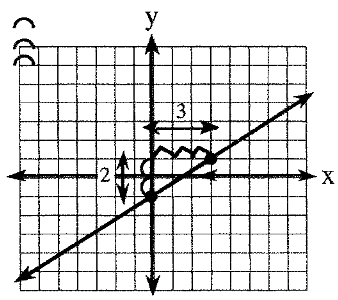
rate of change = $\frac{3}{2}$

y - intercept = (0, 4)

so the equation of the line is $y = \frac{3}{2}x + 4$.

Example 4

Graph the linear equation $y = \frac{2}{3}x - 1$

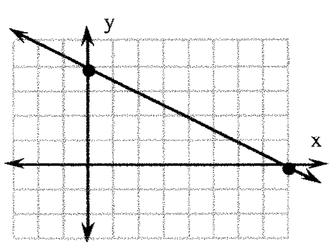


Using $y = mx + b$, the slope in $y = \frac{2}{3}x - 1$ is $\frac{2}{3}$ and the y-intercept is the point (0, -1). To graph, begin at the y-intercept (0, -1). Remember that slope is $\frac{\text{vertical change}}{\text{horizontal change}}$ so go up 2 units (since 2 is positive) from (0, -1) and then move right 3 units. This gives a second point on the graph. To create the graph, draw a straight line through the two points.

Problems

Determine the slope of each line using the highlighted points.

1.



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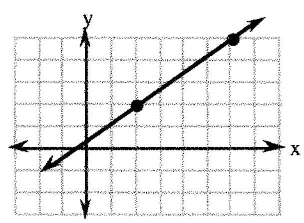

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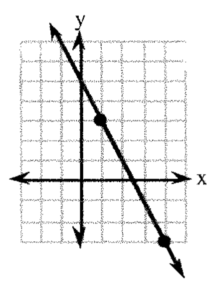


Write the slope of the line containing each pair of points. Sketch a slope triangle to visualize the vertical and horizontal change.

4. (2, 3) and (5, 7)
5. (2, 5) and (9, 4)
6. (1, -3) and (7, -4)
7. (-2, 1) and (3, -3)
8. (-2, 5) and (4, 5)
9. (5, 8) and (3, 5)

Use a Generic Slope Triangle to write the slope of the line containing each pair of points:

10. (50, 40) and (30, 75)
11. (10, 39) and (44, 80)
12. (5, -13) and (-51, 10)

Identify the slope and y-intercept in each equation.

13. $y = \frac{1}{2}x - 2$

14. $y = -3x + 5$

15. $y = 4x$

16. $y = -\frac{2}{3}x + 1$

17. $y = x - 7$

18. $y = 5$

Draw a graph to find the equation of the line with:

19. slope $= \frac{1}{2}$ and passing through (2, 3).

20. slope $= \frac{2}{3}$ and passing through (3, -2).

21. slope $= -\frac{1}{3}$ and passing through (3, -1).

22. slope = -4 and passing through (-3, 8).

For each table, determine the rate of change and the equation. Be sure to record whether the rate is positive or negative for both x and y.

23.

x	-2	-1	0	1	2
y	-5	-2	1	4	7

24.

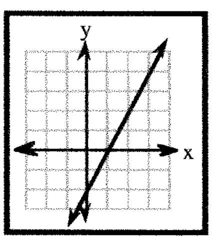
x	-2	0	2	4	6
y	7	3	-1	-5	-9

25.

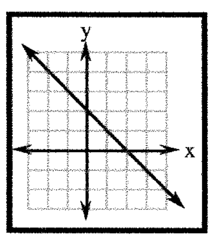
x	-6	-3	0	3	6
y	-3	-1	1	3	5

Using the slope and y-intercept, determine the equation of the line.

26.



27.



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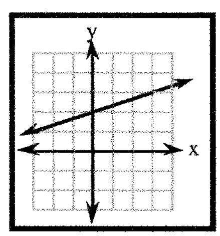

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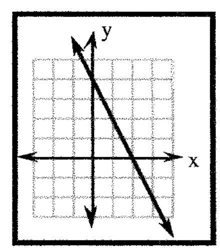

Graph the following linear equations on graph paper.

30. $y = \frac{1}{2}x + 2$

31. $y = -\frac{3}{5}x + 1$

32. $y = -4x$

33. $y = -2x + \frac{1}{2}$

34. $3x + 2y = 12$