Summer Assignment - Geometry Classes

The purpose of the Summer Assignment is to review key topics in Algebra that you will use in Geometry. Topics include:

1. **Simplifying Radicals**
2. **Rules of Exponents**
3. **Solving Systems of Equations**

Instructions and examples are included on pages 2-4.

Print the worksheets on pages 5-9 and solve the problems as noted.

All work must be shown (use additional paper if needed). BOX all answers.

Hand in your work on the first day of class.

Simplifying Radicals

To simplify a radical, factor the expression under the radical sign to its prime factors. For every pair of like factors, bring one of the factors out from under the radical sign and eliminate the other. When all factors have been addressed, multiply whatever is outside the radical sign together, then multiply whatever is inside the radical sign together.

Perfect Squares: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144

Examples:

$\sqrt{24}$	$\sqrt{98}$	$\sqrt{180}$
$\sqrt{4 \times 6}$	$\sqrt{2 \times 49}$	$\sqrt{18 \times 10}$
$\sqrt{2 \times 2 \times 2 \times 3}$	$\sqrt{2 \times 7 \times 7}$	$\sqrt{2 \times 3 \times 3 \times 2 \times 5}$
$2\sqrt{6}$	$7\sqrt{2}$	$6\sqrt{5}$

Rules of Exponents

$(ab)^m = a^m b^m$ $\quad a^m a^n = a^{m+n}$ $\quad (a^m)^n = a^{mn}$

$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$ $\quad \frac{a^m}{a^n} = a^{m-n}$

$a^0 = 1$ $\quad a^{-m} = \frac{1}{a^m}$

Examples:

$(2x)^2 = 2^2x^2 = 4x^2$ $\quad 4^3 4^2 = 4^{3+2} = 4^5$ $\quad (3^2)^3 = 3^{2\times3} = 3^6$

$\left(\frac{2}{3}\right)^2 = \frac{2^2}{3^2} = \frac{4}{9}$ $\quad \frac{6x^5}{4x^2} = \left(\frac{3\times2}{2\times2}\right)(x^{5-2}) = \frac{3x^3}{2}$

$1000^0 = 1$ $\quad 5^{-2} = \frac{1}{5^2} = \frac{1}{25}$

Systems of Equations

The **substitution method** is most useful for systems of 2 equations in 2 unknowns. The main idea is that we solve one of the equations for one of the unknowns, and then substitute the result into the other equation.

Example 1: Solve the following system of equations by SUBSTITUTION.

$$2x + 3y = 5$$
$$x + y = 5$$

Step 1: Solve one of the equations for either **x =** or **y =** .

$$x + y = 5$$
$$y = 5 - x$$

Step 2: Substitute the solution from step 1 into the second equation.

$$2x + 3y = 5$$
$$2x + 3(5 - x) = 5$$

Step 3: Solve this new equation.

$$2x + 3(5 - x) = 5$$
$$2x + 15 - 3x = 5$$
$$-x + 15 = 5$$
$$-x = 5 - 15$$
$$x = 10$$

Step 4: Solve for the second variable

$$y = 5 - x$$
$$y = 5 - 10$$
$$y = -5$$

The solution is: (x, y) = (10, -5)

The **elimination method** of solving systems of equations is also called the addition method. To solve a system of equations by elimination we transform the system such that one variable "cancels out".

Example 1: Solve the following system of equations by ELIMINATION.

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

In this example we will "cancel out" the y term by adding the equations together.

$$\left.\begin{array}{l} 3x - y = 5 \\ \underline{x + y = 3} \end{array}\right\} \text{add equations}$$

$$4x = 8$$

Now we can find: **x = 2**

In order to solve for y, take the value for **x** and substitute it back into either one of the original equations.

$$x + y = 3$$

$$2 + y = 3$$

$$y = 1$$

The solution is (x, y) = (2, 1).

Example 2: Solve the following system of equations by ELIMINATION.

$$x + 3y = -5$$

$$4x - y = 6$$

Look at the x - coefficients. Multiply the first equation by -4, to set up the x-coefficients to cancel.

$$x + 3y = -5 \quad \text{Multiply by} - 4$$

$$\underline{4x - y = 6}$$

$$\left.\begin{array}{l} -4x - 12y = 20 \\ \underline{4x - y = 6} \end{array}\right\} \text{Add equations}$$

$$-13y = 26$$

Now we can find: **y = -2**

Take the value for **y** and substitute it back into either one of the original equations.

$$x + 3y = -5$$

$$x + 3 \cdot (-2) = -5$$

$$x - 6 = -5$$

$$x = 1$$

The solution is (x, y) = (1, -2).

Name________________________________

Simplifying Radicals

Simplify.

1) $\sqrt{75}$

2) $\sqrt{16}$

3) $\sqrt{36}$

4) $\sqrt{64}$

5) $\sqrt{80}$

6) $\sqrt{30}$

7) $\sqrt{8}$

8) $\sqrt{18}$

9) $\sqrt{32}$

10) $\sqrt{12}$

11) $\sqrt{8}$

12) $\sqrt{108}$

13) $\sqrt{125}$

14) $\sqrt{50}$

15) $\sqrt{175}$

16) $\sqrt{28}$

17) $\sqrt{45}$

18) $\sqrt{72}$

19) $\sqrt{20}$

20) $\sqrt{150}$

Name________________________________

Exponents and Multiplication

Simplify. Your answer should contain only positive exponents.

1) $4^2 \cdot 4^2$

2) $4 \cdot 4^2$

3) $3^2 \cdot 3^2$

4) $2 \cdot 2^2 \cdot 2^2$

5) $2n^4 \cdot 5n^4$

6) $6r \cdot 5r^2$

7) $2n^4 \cdot 6n^4$

8) $6k^2 \cdot k$

9) $5b^2 \cdot 8b$

10) $4x^2 \cdot 3x$

11) $6x \cdot 2x^2$

12) $6x \cdot 6x^3$

13) $7v^3 \cdot 10u^3v^5 \cdot 8uv^3$

14) $9xy^2 \cdot 9x^5y^2$

15) $6m^3n^3 \cdot 8m^2n^3$

16) $6x^2 \cdot 6x^3y^4$

17) $7u^2v^5 \cdot 9uv^3$

18) $uv \cdot 4uv^5$

19) $10xy^3 \cdot 8x^5y^3$

20) $3u^4v^5 \cdot 7u^2v^3$

21) $(2x^2)^2$

22) $(p^4)^4$

23) $(k^3)^4$

24) $(7k)^2$

25) $(x^2)^3$

26) $(2b^2)^4$

Name______________________________

Exponents and Division

Simplify. Your answer should contain only positive exponents.

1) $\frac{5^4}{5}$

2) $\frac{3}{3^3}$

3) $\frac{2^2}{2^3}$

4) $\frac{2^4}{2^2}$

5) $\frac{3r^3}{2r}$

6) $\frac{7k^2}{4k^3}$

7) $\frac{10p^4}{6p}$

8) $\frac{3b}{10b^3}$

9) $\frac{8m^3}{10m^3}$

10) $\frac{7n^3}{2n^5}$

11) $\frac{2n^2}{n}$

12) $\frac{8x^3}{10x^5}$

13) $\frac{12x^3}{9y^8}$

14) $\frac{14x^4y^7}{6x^5y^4}$

15) $\frac{11u^4}{17u^7v^9}$

16) $\frac{4y^4}{14yx^8}$

17) $\frac{12yx^4}{10yx^8}$

18) $\frac{18x^8y^8}{10x^3}$

19) $\frac{5n^8}{20n^8}$

20) $\frac{16yx^4}{9x^8y^2}$

SYSTEMS OF EQUATIONS Name ________________________

Answers should be in the form (x , y). Show all work.

Problems 1-4: Solve the system of equations using the Substitution Method.

1) $2x + y = 4$

$y = 1 - x$

2) $3x - 2y = 5$

$x + 2y = 15$

3) $4x - 3y = 9$

$2x - y = 5$

4) $x - 3y = 2$

$x + 4y = 16$

Problems 5-8: Solve the system of equations using the Elimination Method.

5) $6x + 5y = -8$

$2x - 5y = -16$

6) $4x - 3y = 8$

$2x + y = 14$

7) $5x + 2y = 16$

$3x + 4y = 4$

8) $4x + 15y = 10$

$3x + 10y = 5$