Rosary School \ Marj Elhamam

Name : _____ Date : / 11 / 2025

Subject: study sheet 3 Unit (3) Grade : 6 ( )

- An **algebraic term** is made up of numbers (called coefficients), letters (called variables) and multiplication operation sign.

  Examples : $\mathbf{3x}$, $\mathbf{2y^2z}$, $\mathbf{-4ab}$, **10**

  Note: **10** is a **constant** algebraic expression.

- An **algebraic expression** is made up of one term or more and an addition operation signs.

  Examples: $(\mathbf{3x + 2})$, $(\mathbf{4a - 7})$, $(\mathbf{2x + 3x + 5})$

  Note: every algebraic term is an algebraic expression but not every algebraic expression is an algebraic term.

- **Like Terms**

Like terms are terms that have the same variable raised to the same power.

Examples of like terms: $\mathbf{3x}$ and $\mathbf{5x}$

$\mathbf{7a}$ and $\mathbf{-2a}$

$\mathbf{-2y^3}$ **and** $\mathbf{5y^3}$

Examples of unlike terms: $\mathbf{4x}$ and $\mathbf{4y}$ (different variables)

$\boldsymbol{x}^2$ and $\boldsymbol{x}$ (different powers).

- **Simplifying Like Terms When Adding and Subtracting**

To simplify an algebraic expression, combine the numbers of the like terms.

Examples:

$2x + 5x = 7x$

$8y - 3y = 5y$

$4a + 7b - 2a + 3b =$

$(4a - 2a) + (7b + 3b) =$

$2a + 10b$

Be careful with positive and negative signs when simplifying.

Examples:

$6x - 9x = -3x$

$-5a + 3a = -2a$

- **Tips to Remember**

✓ Group like terms together before simplifying.

✓ Add or subtract the coefficient of each variable.

✓ Keep the sign (+ or –) between the terms.

Examples:

Expression Form	**Steps**	**Simplified Form**
1. $2x + 5x$	$2x + 5x = (2 + 5)x$	$7x$
2. $8y - 3y$	$8y - 3y = (8 - 3)y$	$5y$
3. $3x + 5 + 2x - 7$	$(3x + 2x) + (5 - 7)$	$5x - 2$
4. $4a + 7b - 2a + 3b$	$(4a - 2a) + (7b + 3b)$	$2a + 10b$

- **Simplifying When Multiplying Variables**

  When we multiply variables, we multiply their coefficients and add the powers of the variables.

  Example 1:

$$2x \times 3x = (2 \times 3) \times (x \times x) = 6x^2$$

  Example 2:

$$4a \times 5a \times 2a = (4 \times 5 \times 2) \times (a \times a \times a) = 40a^3$$

  Example 3:

$$3x \times 2y = 6xy$$

  (different variables — just write them together)

  Example 4:

$$-2a \times 3a^2 = (-2 \times 3) \times (a \times a^2) = -6a^3$$

  Writing Algebraic Expressions

Words / Phrases	Operation	Example	Expression
Sum, total, more than, increased by	Addition (+)	5 more than x	$x + 5$
Difference, less than, decreased by	Subtraction (–)	7 less than x	$x - 7$
Times, product of, multiplied by	Multiplication (×)	4 times x	$4x$
Divided by, quotient of	Division (÷)	x divided by 3	$x \div 3$ *or* $x/3$
Double	Multiplying by 2	double x	$2x$

Example 1:

"A number increased by 9" → $x + 9$

"Twice a number" → $2x$

"A number decreased by 4" → $x - 4$

"The product of 3 and a number" → $3x$

"Half of a number" → $x \div 2$ *or* $\frac{1}{2}x$

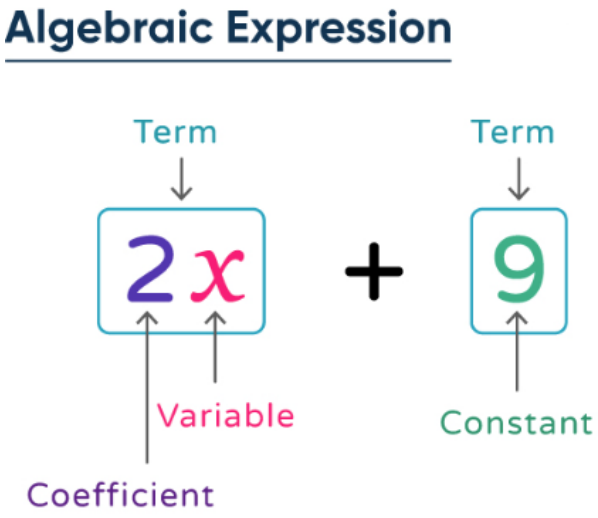
Example 2:

"A number doubled, then increased by 6" → $2x + 6$

"Three less than five times a number" → $5x - 3$

"A number divided by 2, then decreased by 7" → $(x \div 2) - 7$

"Four more than twice a number" → $2x + 4$



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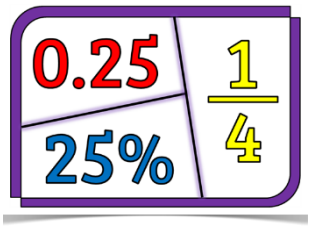
Subject: Study sheet (4) Grade : 6 ( )

To write a **decimal** as a **fraction**, follow these steps:

1) Look at the place value of the last digit (tenths, hundredths or thousandths).
2) Write the denominator of your fraction as 10 for the tenths place, 100 for the hundredths place or 1000 for the thousandths place.
3) Write all the digits without the decimal point as the numerator.
4) Cancel the fraction to its simplest form (if possible).

Example: Write these decimals as fractions in the simplest form if possible.

a) $1.07 = \frac{107}{100}$ **b)** $0.8 = \frac{8 \div 2}{10 \div 2} = \frac{4}{5}$



To write a **fraction** as a **decimal**, follow these steps:

Method 1: Long division

Example: Write these fractions as decimals.

a) $\frac{3}{5} = 0.6$

$$
\begin{array}{r|l}
5 & 3.0 \\
- & 0 \\
\hline
 & 30 \\
- & 30 \\
\hline
 & 00
\end{array}
$$

b) $\frac{21}{20} = 1.05$

$$
\begin{array}{r|l}
20 & 21.00 \\
- & 20 \\
\hline
 & 010 \\
- & 00 \\
\hline
 & 100 \\
- & 100 \\
\hline
 & 000
\end{array}
$$

c) $\frac{2}{25} = 0.08$

$$
\begin{array}{r|l}
25 & 2.00 \\
- & 0 \\
\hline
 & 20 \\
- & 00 \\
\hline
 & 200 \\
- & 200 \\
\hline
 & 000
\end{array}
$$

Method 2:

Step 1: Find a number you can multiply by the denominator to make it 10,100, or 1000 ……
Step 2: Multiply both denominator and numerator by that number.
Step 3: Write down just the numerator, putting the decimal point in the correct spot (one space from the right-hand side for every zero in the denominator)

Example: Write these fractions as decimals.

a) $\frac{3}{5} = \frac{3\times2}{5\times2} = \frac{6}{10} = 0.6$ 

b) $\frac{21}{20} = \frac{21\times5}{20\times5} = \frac{105}{100} = 1.05$ 

c) $\frac{2}{25} = \frac{2\times4}{25\times4} = \frac{8}{100} = 0.08$ 

To write a **fraction** as a **percentage:**

Step 1: Write the fraction as an equivalent fraction having 100 in the denominator.
Step 2: Write down just the **numerator** with the " % " sign.

Example: Write $\frac{4}{50}$ as a percentage.

$\frac{4\times2}{50\times2} = \frac{8}{100} = 8\ \%$

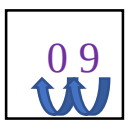
To write a **percentage** as a **decimal:**

Step 1: Write the percentage as a fraction.

Step 2: Divide the numerator by 100 by moving the decimal point two places to the left.

Example: Write these percentages as decimals.

a) $67\% = \frac{67}{100} = 0.67$ 

b) $9\% = \frac{9}{100} = 0.09$ 

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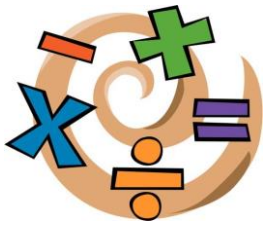
Subject: study sheet (2) Grade : 6 ( )

Squares and Cubes

Squares, Cubes, Square Roots & Cube Roots

❖ Squares

A square number is the result of multiplying a number by itself.



Examples:

$3 \times 3 = 9 \rightarrow 9$ is a square number.

$6 \times 6 = 36 \rightarrow 36$ is a square number.

Common Squares:

$1^2=1$, $2^2=4$, $3^2=9$, $4^2=16$, $5^2=25$, $6^2=36$, $7^2=49$, $8^2=64$, $9^2=81$, $10^2=100$

❖ Cubes

A cube number is the result of multiplying a number by itself three times.

Examples:

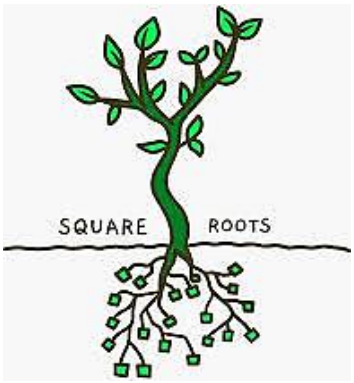
$2 \times 2 \times 2 = 8 \rightarrow 8$ is a cube number.

$3 \times 3 \times 3 = 27 \rightarrow 27$ is a cube number.

Common Cubes:

$1^3=1$, $2^3=8$, $3^3=27$, $4^3=64$, $5^3=125$, $6^3=216$, $7^3=343$, $8^3=512$

❖ Square Roots (√)



The square root of a number is a value that, when multiplied by itself, gives the number.

Examples:

$\sqrt{9} = 3$ because $3 \times 3 = 9$

$\sqrt{25} = 5$ because $5 \times 5 = 25$

Common Square Roots:

$\sqrt{1}=1$ $\sqrt{4}=2$ $\sqrt{9}=3$ $\sqrt{16}=4$

$\sqrt{25}=5$ $\sqrt{36}=6$ $\sqrt{49}=7$ $\sqrt{64}=8$

$\sqrt{81}=9$ $\sqrt{100}=10$

❖ Cube Roots ($\sqrt[3]{}$)

The cube root of a number is a value that, when multiplied by itself three times, gives that number.

Examples:

$\sqrt[3]{8} = 2$ because $2 \times 2 \times 2 = 8$

$\sqrt[3]{27} = 3$ because $3 \times 3 \times 3 = 27$

Common Cube Roots:

$\sqrt[3]{1}=1$ $\sqrt[3]{8}=2$ $\sqrt[3]{27}=3$ $\sqrt[3]{64}=4$

$\sqrt[3]{125}=5$ $\sqrt[3]{216}=6$ $\sqrt[3]{343}=7$

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