

Worksheet (3) | Lower Secondary Stage (6-8)

1st Semester | 2023-2024

Subject: Math

Class: Grade 7

Name:.....

Objectives:

- Evaluating algebraic expressions.
- Simplify linear expressions with integer coefficients.

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How to evaluate algebraic expressions??

1 Identify the variable and its value. This information should be given to you. Usually you will be told to evaluate the expression "when" or "where" the variable is equal to a certain value. If you are not given the variable's value, you cannot evaluate the expression.^[4]

Exercise 1 :

Complete this table .

– Evaluate a Variable Expression – write the expression, substitute a number for each variable, and simplify the result.

The expressions	$x = 2$	$x = -2$
$3x - 10$	$3(2) - 10$ $6 - 10 = -4$	$3(-2) - 10$ $-6 - 10 = -16$
$x^3 + 7x^2 - x$	$(2)^3 + 7(2)^2 - 2 =$ $8 + 28 - 2 = 34$	$(-2)^3 + 7(-2)^2 - 2$ $-8 + 28 - 2 = 18$
$\frac{3x^3 - 5x}{7}$	$\frac{3(2)^3 - 5(2)}{7}$ $\frac{24 - 10}{7} = \frac{14}{7} = 2$	$\frac{3(-2)^3 - 5(-2)}{7}$ $\frac{-24 + 10}{7} = \frac{-14}{7} = -2$

Exercise 2 :

Tick (✓) which expressions have the same value when : $x = 3$, $y = -2$

$6 + 4 = 10$
 $2x + y^2$
✓

$4(3)(-2) = -24$
 $4xy$

$-2 + 9 = 7$
 $y + x^2$

$4(-2)^2 - (3)^2 + 3$
 $4y^2 - x^2 + x$
 $16 - 9 + 3 = 10$
✓

Simplifying algebraic expressions is when we use a variety of techniques to make algebraic expressions more efficient and compact – in their simplest form.

Example Simplify $8x + 4 + 3(2x - 3)$

1 Expand the brackets $8x + 4 + 3(2x - 3) = 8x + 4 + 6x - 9$

2 Collect like terms $8x + 4 + 6x - 9 = 14x - 5$

The simplified expression is $14x - 5$

Example 1 : Simplify the following:
 $x^2 + x + y^2 + 2x$

(a) $5x + y^2$ (b) $4x^2 + y^2$

(c) $x^2 + 3x + y^2$ (d) $4xy^2$

Commutative Properties

Addition: $a + b = b + a$

Multiplication: $a \cdot b = b \cdot a$

Exercise 3 :

Simplify :

1) $1x + 3x$
 $= 4x$

2) $3t + 7 + 8t$
 $11t + 7$

$$3) \quad 9y + 6 - 7y - 3$$

$$= 2y + 3$$

$$4) \quad 2x + 3y - 4x + 1$$

$$= -2x + 3y + 1$$

Distributive Property of Multiplication

$$a(b + c) = ab + ac$$

$$a(b - c) = ab - ac$$

$$5) \quad 2(3x + 5) + 3(2x + 6)$$

$$6x + 10 + 6x + 18$$

$$= 12x + 28$$

$$6) \quad 2(x+4) + 3(x-5) - 2y$$

$$2x + 8 + 3x - 15 - 2y$$

$$= 5x - 7 - 2y$$

$$= 5x - 2y - 7$$

$$7) \quad -(y+1) + 3y - 12$$

$$-y - 1 + 3y - 12$$

$$= 2y - 13$$

$$8) \quad -7(x-1) + 5(2x+3)$$

$$-7x + 7 + 10x + 15$$

$$= 3x + 22$$

$$9) \quad 3(4x + 1) - (5x + 7)$$

$$12x + 3 - 5x - 7$$

$$= 7x - 4$$

$$10) \quad (10x)(8) - 6(x-3)$$

$$80x - 6x + 18$$

$$= 74x + 18$$

Exercise 4:

Solve each problem and circle your answer.

#	Question	Answer 1	Answer 2	Answer 3
1	$4(x + 3)$	$x + 12$ Purple	$4x + 7$ Yellow	$4x + 12$ Red
2	$8(2x - 5)$	$16x - 40$ Yellow	$10x - 13$ Green	$16x - 13$ Dark Blue
3	$7x + 2 + 3 + 4x$	$11x + 5$ Purple	$11x + 6$ Orange	$10x + 5$ Red
4	$9 - 5x + 2x - 8$	$-3x + 17$ Pink	$-3x + 1$ Green	$7x - 1$ Light Blue
5	$2(3x - 1) + x$	$7x - 2$ Light Blue	$7x + 2$ Yellow	$6x - 2$ Pink
6	$8 + 3(x - 5)$	$3x + 7$ Green	$3x + 22$ Red	$3x - 7$ Dark Blue
7	$7(4x - 2) + 8x + 9$	$19x - 5$ Red	$36x - 5$ Pink	$36x + 23$ Yellow
8	$4 + 5(3x + 2) - 2x$	$13x + 10$ Purple	$13x + 14$ Red	$17x + 10$ Dark Blue
9	$-4(x - 9) - 3 + 7x$	$3x + 33$ Light Blue	$3x - 39$ Red	$3x - 36$ Pink
10	$9(2x + 3) + 4(x - 10)$	$22x + 13$ Yellow	$22x + 67$ Purple	$22x - 13$ Red
11	$6(x - 7) - 2(x + 5)$	$4x - 52$ Green	$8x - 32$ Dark Blue	$4x - 32$ Purple