



2024-2025

**EIGHTH GRADE MATH
SUMMER PACKET**

This packet will be due the first week of school and it will be graded.
Please use pencil only and remember: **NO WORK, NO CREDIT!**

Name: _____

Teacher: _____

Skill #1: Operations with Integers

Addition	Subtraction
<p>same signs? KEEP THEM!</p> $(+) + (+) = +$ $(-) + (-) = -$ <p>Different signs? Subtract the smaller # from the larger #</p> $(+) + (-) = +$ Keep the larger sign $(-) + (+) = -$	<p>keep the first number</p> <p>change the subtraction to addition</p> <p>change the sign of the second number</p> <p>then use the addition rules!</p>
MULTIPLICATION and DIVISION	
<p>① Multiply or divide like normal</p> <p>② same signs? Answer is POSITIVE!</p> <p>③ Different signs? Answer is NEGATIVE!</p>	<p>If you love to love, you're a lover. $(+) \cdot (+) = +$</p> <p>If you love to hate, you're a hater. $(+) \cdot (-) = -$</p> <p>If you hate to love, you're a hater. $(-) \cdot (+) = -$</p> <p>If you hate to hate, you're a lover. $(-) \cdot (-) = +$</p>

**** Note: Try to do these WITHOUT a calculator first. Then use it to verify your answers.****

Now try these problems

1. $46 + (-13)$

2. $-16 + (-2)$

3. $-13 - (-16)$

4. $13 - (-13)$

5. $-12 (-5)$

6. $\frac{30}{-15} =$

Operations with FRACTIONS

Addition

$$\frac{1}{4} + \frac{3}{8} =$$

$$\left[\frac{1}{4} \times \frac{2}{2}\right] + \frac{3}{8} =$$

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

If the denominators are different, first find a common denominator.

Then add or subtract the numerators.

The denominators stay the same.

Subtraction

$$\frac{5}{6} - \frac{3}{4} =$$

$$\left[\frac{5}{6} \times \frac{2}{2}\right] - \left[\frac{3}{4} \times \frac{3}{3}\right] =$$

$$\frac{10}{12} - \frac{9}{12} = \frac{1}{12}$$

Multiplication

Multiply the numerators.

$$\frac{3}{4} \times \frac{4}{5} = \frac{12}{20} = \frac{3}{5}$$

Multiply the denominators.

Reduce.

Remember to Reduce!

For all operations, reduce or simplify when possible.

Division

First, invert the divisor.

$$\frac{4}{5} \div \frac{5}{6} =$$

Multiply the numerators.

$$\frac{4}{5} \times \frac{6}{5} = \frac{24}{25}$$

Multiply the denominators.

Now try these problems

1. $\frac{3}{5} + \frac{1}{5}$

2. $\frac{5}{7} - \frac{2}{7}$

3. $\frac{2}{4} \times \frac{1}{9}$

4. $\frac{3}{7} + \frac{4}{5}$

Skill #1: Simplifying Numerical Expressions

To simplify numerical expressions, you must follow order of operations.

ORDER →

always work LEFT → RIGHT

Parentheses $()$

Exponents x^3

PRACTICE:

$$3 + 7 \times 6 \div 3 =$$

$$3 + 42 \div 3 =$$

$$3 + 14 =$$

17

$$(6 \times 4) \div 3 - 6 + 2 =$$

$$24 \div 3 - 6 + 2 =$$

$$8 - 6 + 2 =$$

$$2 + 2 =$$

4

$$2^2 \times 9 \div 3 =$$

$$4 \times 9 \div 3 =$$

$$36 \div 3 =$$

12

Multiply \times

Divide \div



P	Please	Parentheses
E	Excuse	Exponents
M	My	Multiply
D	Dear	Divide
A	Aunt	Addition
S	Sally	Subtraction

Addition $+$

Subtraction $-$

Now try these problems

1. $7 + (6 \times 5^2 + 3)$

2. $3 + 6 \times (5 + 4) + 3 - 7$

3. $(8 - 1) \times (5 - 4)$

4. $9 - (3 - 8 + 4 \div (1 \times 1))$

5. $(8 - 7) \times (2 + 1) + 1$

6. $16 \div 2[8 - 3(4 - 2)] + 1$

Skill #1: Distribution

The Distributive Property**

Definition: For any numbers a, b, and c,

$$a(b + c) = ab + ac \text{ and } (b + c)a = ba + ca;$$

$$a(b - c) = ab - ac \text{ and } (b - c)a = ba - ca;$$

Example:

$$10(x + 2) = 10x + 10(2) = 10x + 20$$

Skill #2: Combining Like Terms

Like Terms

Like terms have the same variables to the same power.

Like terms can be combined.

Like Terms	Unlike Terms
$2x, -5x$	$6x, 5y$
$\frac{1}{2}a, -a$	y, y^2
$-2x^2, 8x^2$	$x, 7$

** Make sure to take a look at the signs!**

$$8(x + 3) = 8x + 24$$

$$2x(5x - 7) = 10x^2 - 14x$$

$$-3(x^2 + 4x - 2) = -3x^2 - 12x + 6$$

Combine like terms.

A. $2x + 5x - 4y + 3$

$$(2x) + (5x) - 4y + (3)$$

$$7x - 4y + 3$$

Identify like terms.

Combine coefficients: $2 + 5 = 7$

B. $9d + 7c - 4d - 2c$

$$(9d) + (7c) - (4d) - (2c)$$

$$5d + 5c$$

Identify like terms.

Combine coefficients: $9 - 4 = 5$
and $7 - 2 = 5$

C. $8g + c - 6$

$$(8g) + (c) - (6)$$

No like terms.

Putting the two concepts together:

$$3(x+2) - 6(x+1) =$$

$$3(x) + 3(2) - 6(x) - 6(1) =$$

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

$$-3x$$

Now try these problems

1. $4(2x + 2) =$

2. $-2x - 3 + 4x + 5x + 6 =$

3. $-3(x - 3) =$

4. $3y - 2y + 5 + y - 2 =$

5. $3(x + 2) + 2(2x + 1) =$

6. $-4(x - 1) + 2(x - 2) =$

Independent Practice:

Simplify each expression.

43) $-6(7n + 5) - 7n$

44) $-10(a + 10) + 2a$

45) $9 - 4(k - 1)$

46) $-9 + 3(7x + 4)$

47) $3 - 3(4x - 3)$

48) $-9(4 - 2m) - 9(1 - 3m)$

49) $10(3 - 7a) + 5(1 - 7a)$

50) $10(7 - 6n) - (2n - 10)$

51) $9(1 + 10n) - 6(n + 8)$

52) $-2(7x + 9) + 6(-4x - 6)$

Skill #1: Solving Two-Step Equations

You can solve equations by *isolating* the variable using inverse operations:

INVERSE OPERATION

Operation	+	-	×	÷
Inverse	-	+	÷	×
Example	$6+4=10$ $10-4=6$	$28-10=18$ $18+10=28$	$7 \times 3=21$ $21 \div 3=7$	$50 \div 10=5$ $5 \times 10=50$

$$2x + 5 = 21$$

$$2x + 5 - 5 = 21 - 5$$

$$2x = 16$$

$$\frac{2x}{2} = \frac{16}{2}$$

$$x = 8$$

Now try these problems

1. $3b+9 = -18$

2. $3z-2 = -26$

3. $2x+8 = 4$

4. $-2y-6 = 6$

5. $2a+9 = 11$

6. $3y-5 = -32$

Independent Practice:

Solve each equation.

$$53) -1 = \frac{-5 + v}{14}$$

$$54) \frac{-9 + x}{7} = -2$$

$$55) \frac{9 + v}{5} = 3$$

$$56) 44 = -2n + 10$$

$$57) 1 + \frac{x}{8} = 3$$

$$58) 4 + \frac{n}{6} = 2$$

$$59) 0 = -1 + \frac{a}{10}$$

$$60) \frac{n}{4} + 2 = 1$$

$$61) -2 + \frac{v}{6} = 1$$

$$62) \frac{x+1}{14} = -1$$

STEPS TO SOLVING MULTI-STEP EQUATIONS

STEP 1: Distribute.

STEP 2: Combine Like Terms on each side.

STEP 3: Move variables to one side.

STEP 4: Move constants to the other side.

STEP 5: Multiply by the denominator/Divide
by coefficient

$$-3x - 32 = -2(5 - 4x)$$

$$-3x - 32 = -10 + 8x$$

$$-3x + 3x - 32 = -10 + 8x + 3x$$

$$-32 = -10 + 11x$$

$$-32 + 10 = -10 + 10 + 11x$$

$$-22 = 11x$$

$$\frac{-22}{11} = \frac{11x}{11}$$

$$-2 = x$$

Now try these problems

1. $7 - 2x = x - 14$

2. $3y + 8 = 2y - 7$

3. $6 - 4x = 16 - 9x$

4. $3.6y = 5.4 + 3.3y$