Writing & Interpreting Expressions

Expression

a mathematical statement involving numbers, variables, & operators

$9a + 4b - 18$

Terms: 9a, 4b, -18

Variables: a, b

Coefficients: 9, 4

Constants: -18

Expressions :
verbal (words)
& algebraic (math)

Operation	Words	Examples
Addition	the sum of, added to, plus, more than, increased by, total, altogether, and	1. A number increased by 2 2. The sum of n and 2 3. $n + 2$
Subtraction	less than, minus, subtracted from, the difference of, take away, taken from, reduced by	1. The difference of a number and 2 2. 2 less than a number 3. $n - 2$
Multiplication	times, multiplied by, the product of, percent of	1. The product of 0.6 and a number 2. 60% of a number 3. $0.6n$
Division	divided by, division of, quotient of, divided into, ratio of,	1. The quotient of a number and 5 2. A number divided by 5 3. $n \div 5$ or $\frac{n}{5}$

Interpret

explain the meaning in context

13. Yolanda is buying supplies for school. She buys n packages of pencils at \$1.40 per package and m pads of paper at \$1.20 each. What does each term in the expression $1.4n + 1.2m$ represent? What does the entire expression represent?

1.4n → "total cost of pencils" "cost of n packages of pencils"

1.2m → "total cost of paper" "cost of m packs of paper"

1.4n + 1.2m → "total cost of school supplies"

Solving Equations

Equation

a mathematical statement that two expressions are equal

To solve:

find the value of the variable by performing inverse operations

SADMEP

- use opposite operations in reverse PEMDAS order

7. $15y + 31 = 61$

$-31 \quad -31$

$\frac{15y}{15} = \frac{30}{15}$

$y = 2$

8. $9 - c = -13$

$-9 \quad -9$

$\frac{-c}{-1} = \frac{-22}{-1}$

$c = 22$

9. $\frac{x}{6} + 4 = 15$

$-4 \quad -4$

$6\left(\frac{x}{6}\right) = (9)6$

$x = 54$

10. $\frac{1}{3}y + \frac{1}{4} = \frac{5}{12}$

ew! fractions! multiply every term by LCD

$3 \times 4 = 12$!

$12\left(\frac{1}{3}\right)y + 12\left(\frac{1}{4}\right) = \frac{5}{12}(12)$

$4y + 3 = 5$

$-3 \quad -3$

$\frac{4y}{4} = \frac{2}{4}$

$y = \frac{1}{2}$

Literal Equations

Same steps! Just weirder answers.

7. $d = rt$ for t $\quad \frac{d}{r} = \frac{rt}{r} \quad t = \frac{d}{r}$

9. $A = \frac{FV - OV}{T}$ for OV

$T(A) = \left(\frac{FV - OV}{T}\right)T$

$AT = FV - OV$

$-FV \quad -FV$

$\frac{AT - FV}{-1} = \frac{-OV}{-1}$

$-AT + FV = OV$

20. Which is a possible way to rewrite the equation $y = 3x + 3b$ to solve for b?

A. $b = \frac{y - 3x}{3}$

B. $b = 3(y - 3x)$

C. $b = \frac{y - 3}{3x}$

D. $b = x(y - 3)$

$-3x \quad -3x$

$\frac{y - 3x}{3} = \frac{3b}{3}$

Solving Word Problems

WISER!

W → what is the question? What is my variable?

I → information → what do I know/need to know?

S → set up (equation, inequality, etc)

E → evaluate → do the math!

R → Review! → plug back in to check

& → make sure you answered the Q

24. Maggie's brother is 3 years younger than twice her age. The sum of their ages is 24. How old is Maggie?

2x → = 3

W → How old is maggie? maggie's age = x

I → maggie = x

brother = 2x − 3

sum = 24

S → x + (2x − 3) = 24

E → x + 2x − 3 = 24

+3 +3

$\frac{3x}{3} = \frac{27}{3}$

x = 9

→ check:

9 + (2(9) − 3)

18 − 3

9 + 15 = 24 ✓

R → Maggie is 9!

Solving Inequalities

greater $>$ less

Explore **Creating Inequalities from Verbal Descriptions**

An **inequality** is a statement that compares two expressions that are not strictly equal by using one of the following inequality signs.

Symbol	Meaning
$<$	is less than
$\leq$	is less than or equal to
$>$	is greater than
$\geq$	is greater than or equal to
$\neq$	is not equal to

You have probably seen a sign at an amusement park saying something like, "You must be at least 48 inches tall to ride this ride." This statement could be written as $h \geq 48$ in., where h represents the height of a person allowed to ride.

To solve:

SADMEP → when mult/divid. by a ⊖, the symbol flips

Solve each inequality.

5. $\frac{4}{3}(6x + 9) < 4$

$\frac{4}{3}(6x) + \frac{4}{3}(9) < 4$

$8x + 12 < 4$

$-12 \quad -12$

$\frac{8x}{8} < \frac{-8}{8}$

$x < -1$

6. $-2\left(\frac{1}{4}x + 2\right) \geq 5$

$-2\left(\frac{1}{4}x\right) - 2(2) \geq 5$

$-\frac{1}{2}x - 4 \geq 5$

$+4 \quad +4$

$\left(-\frac{1}{2}x\right)(-2) \leq (9)(-2)$

$x \leq -18$

Compound Inequalities

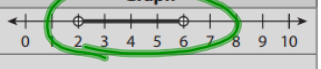
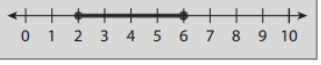
Compand Inequalities "Combined"

OPEN CIRCLE = <, > CLOSED = ≤, ≥

Explain 1 Solving Compound Inequalities Involving AND

Combining two or more simple inequalities forms a **compound inequality**. The graph of a compound inequality involving **AND** is the **intersection**, or the overlapping region, of the simple inequality graphs.

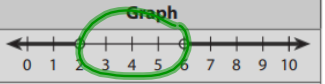
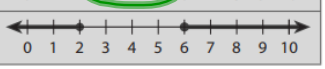
Compound Inequalities: AND

Words	Algebra	Graph
All real numbers greater than 2 **AND** less than 6	$x > 2$ **AND** $x < 6$ $2 < x < 6$	
All real numbers greater than or equal to 2 **AND** less than or equal to 6	$x \geq 2$ **AND** $x \leq 6$ $2 \leq x \leq 6$	

Explain 2 Solving Compound Inequalities Involving OR

The graph of a compound inequality involving **OR** is the **union**, or the combined region, of the simple inequality graphs.

Compound Inequalities: OR

Words	Algebra	Graph
All real numbers less than 2 **OR** greater than 6	$x < 2$ **OR** $x > 6$	
All real numbers less than or equal to 2 **OR** greater than or equal to 6	$x \leq 2$ **OR** $x \geq 6$	

YourTurn

Solve each compound inequality and graph the solutions.

3. $-2 < x - 3 < 5$

$+3 \quad +3 \quad +3$

$1 < x < 8$

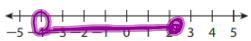
$1 < x < 8$

4. $-10 < 3x + 2 \leq 8$

$-2 \quad -2 \quad -2$

$\frac{-12}{3} < \frac{3x}{3} \leq \frac{6}{3}$

$-4 < x \leq 2$

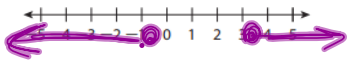


$-4 < x \leq 2$

6. $x - 5 \geq -2$ **OR** $-5 \leq -6$

$+5 \quad +5$

$x \geq 3 \quad x \leq 1$



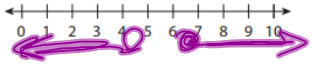
$x \leq 1$ OR $x \geq 3$

7. $4x - 1 < 15$ **OR** $8x \geq 48$

$+1 \quad +1 \quad \frac{+}{8}$

$\frac{4x}{4} < \frac{16}{4} \quad x \geq 6$

$x < 4$



$x < 4$ OR $x \geq 6$