1.0

OPERATIONS WITH POSTIVE AND NEGATIVE NUMBERS

Adding Integers without a number line

-3 + -5 =

-1 + -3 =

-6 + -2 =

-9+ -14 =

-12 + -8 =

SAME SIGN
- Ignore the signs
- Add numbers
- Put sign back

Adding Integers without a number line

-3 + 5 =

-1 + 6 =

-5 + 9=

5 + -7 =

8 + -6 =

14 + -18 =

DIFFERENT SIGNS
- Ignore the signs
- Subtract
- Put sign back of number that "looks" the biggest

Example 1

Find the sum of the following:

$a)\ -5.3+(-4.9)$

$b)\ -12.2+19.3$

Practice

Find the sum of the following:

3) $-9+(-3.4)$

4) $0.25+(-5.9)$

Examples

Find the sum of the following:

5) $3\frac{3}{8}+\left(-5\frac{2}{3}\right)$

DIFFERENT SIGNS
- Ignore the signs
- Subtract
- Put sign back of number that "looks" the biggest

Subtraction is the same as adding the opposite

1. Change the minus sign to addition
2. Change the second number into the opposite
3. Do the problem like a regular addition problem

5 – 7

3 – (-7)

-3 – 6

-5 – (-9)

Examples

Simplify the following:

a) $-7-(-5)$

b) $-2-6$

c) $64-(-13)$

d) $17-29$

Examples

Simplify the following:

$e) -3.59-(-50) =$

$f) 18.2-56.7 =$

Examples

Simplify the following:

$g) \frac{7}{3}-\frac{11}{3}$

$h) -\frac{4}{9}-\frac{5}{12}$

RULES FOR MULTIPLYING INTEGERS

Multiply numbers like regular multiplication… however…

POSITIVE X POSITIVE = POSITIVE
POSITIVE X NEGATIVE = NEGATIVE
NEGATIVE X POSITIVE = NEGATIVE
NEGATIVE x NEGATIVE = POSITIVE

1) 2×-3

2) -5×4

3) -3×-7

4) -8×3

5) -6×-5

6) 12×-4

7) -1×-15

8) $3\times-2\times-4$

9) $-5\times-8\times-2$

PRACTICE

10) $-2(3.5)(-4)$

11) $\frac{1}{4}(-12)(3)$

Reciprocals

WHERE DOES THE NEGATIVE GO?

$$-\frac{1}{6}$$

$$= \frac{-1}{6} \qquad = \frac{1}{-6}$$

Reciprocals

ANOTHER NAME IS THE MULTIPLICATIVE INVERSE

FIND THE RECIPROCALS OF THE FOLLOWING:

1) $\frac{3}{5}$

2) 6

3) $2\frac{3}{4}$

4) $-1\frac{2}{3}$

RULES FOR DIVIDING INTEGERS

Divide numbers like regular division… however…

POSITIVE ÷ POSITIVE = POSITIVE
POSITIVE ÷ NEGATIVE = NEGATIVE
NEGATIVE ÷ POSITIVE = NEGATIVE
NEGATIVE ÷ NEGATIVE = POSITIVE

1) $8 \div -4$

2) $-20 \div 4$

3) $-21 \div -7$

4) $-36 \div 3$

EXAMPLES

a) $-16 \div 4$

b) $18 \div (-3)$

EXAMPLES

c) $-20 \div \left(-\frac{5}{3}\right)$

d) $-16 \div \frac{8}{3}$

1.1

SOLVING SIMPLE EQUATIONS

$x + 9 = 14$

$x - 12 = 51$

3) $-5 = x + 13$

4) $-57 + j = 72$

5) $6x = 222$

6) $-x = 27$

7) $\frac{c}{6} = -7$

8) $a + 4.7 = 10.3$

9) $0.5 = b - 1.25$

10) $-10 = c + 4.2$

11) $\frac{d}{3} = -2.1$

12) $-0.05e = 6.5$

13) $-34 = \dfrac{f}{-6}$

14) $h + 2\pi = 3\pi$

On Your Own

Solve.

1. $b + 2 = -5$

2. $g - 1.7 = -0.9$

On Your Own

Solve.

3. $-3 = k + 3$

4. $r - \pi = \pi$

On Your Own

Solve.

5. $t - \frac{1}{4} = -\frac{3}{4}$

6. $5.6 + z = -8$

Solving

Examples

16) $\pi x = 3\pi$

17) $\frac{2}{5}x = -4$

Solving

Examples

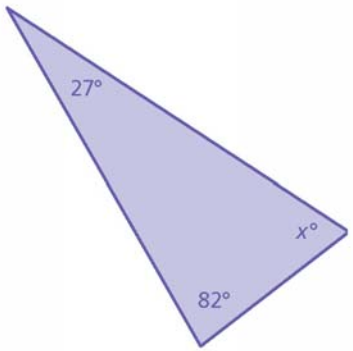
18) **What value of k makes the equation $k + 4 \div 0.2 = 5$ true?**

Ⓐ 15 Ⓑ 5 Ⓒ 3 Ⓓ 1.5

Application

Find the value of the missing variable

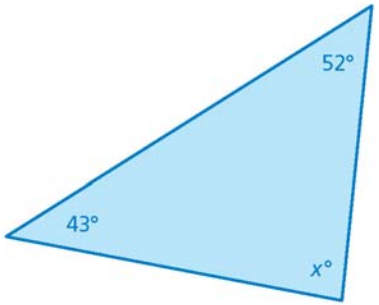
a.



Application

Find the value of the missing variable

b.



1.2

SOLVE MULTI-STEP EQUATIONS

Solving Two-Step Equations

- Solve by using the INVERSE operation to undo operations
- Undo two-step equations by doing PEMDAS backwards!!

$a)\ 2x-35=15$

$b)\ 837=\frac{p}{2}+37$

Examples

$c)\ -3x+1=7$

$d)\ \frac{1}{2}x-9=-25$

Practice

$1)\ -3x+(-x)=48$

$2)\ \frac{1}{4}y+5=3$

Solving Multi-Step Equations

- **Simplify (combine like terms) if you can**
- **Solve**

$$a)\quad 5a - a - 7 = 13$$

Solving Multi-Step Equations

- **Simplify (combine like terms) if you can**
- **Solve**

$$b)\quad 8x - 6x - 25 = -35$$

Practice

$$1)\quad -4n - 8n + 17 = 23$$

Solving Multi-Step Equations

- **Simplify (combine like terms) if you can**
- **Solve**

$$b)\quad 8x - 6x - 25 = -35$$

Solving Multi-Step Equations

- **Distribute if possible**
- **Simplify**
- **Solve**

$$c)\ \ 4z+7(z-2)=41$$

Solving Multi-Step Equations

- **Distribute if possible**
- **Simplify**
- **Solve**

$$d)\ \ -3(x+2)+5x=-9$$

1.2

SOLVE MULTI-STEP EQUATIONS (PART 2)

Solving Multi-Step Equations

- **Distribute if possible**
- **Simplify**
- **Solve**

Examples

$a)\ \ 4x+6+3=17$

Solving Multi-Step Equations

- **Distribute if possible**
- **Simplify**
- **Solve**

Examples

$b)\ \ r+11+8r=29$

Solving Multi-Step Equations

- **Distribute if possible**
- **Simplify**
- **Solve**

Examples

$c)\ \ 10(1+3b)=-20$

Solving Multi-Step Equations

- **Distribute if possible**
- **Simplify**
- **Solve**

Examples

$d)\ \ 8 = 8v - 4(v + 8)$

1.3

SOLVING EQUATIONS WITH VARIABLES ON BOTH SIDES

DO NOW

Solve the equation. Check your solution.

1) $\frac{g}{5} - 7 = 12$

DO NOW

Solve the equation. Check your solution.

2) $2x + 3x - 5 = 25$

DO NOW

Solve the equation. Check your solution.

3) $3(x - 6) + 10 = 16$

DO NOW

Solve the equation. Check your solution.

4) $2(1-5x)+4=-8$

Examples

1) Cancel the "smallest variable term"
2) Collect constant terms on the other side

a) $13+5x=2x-8$

b) $2m-6=12-4m$

c) $34-3x=14x$

Practice

1) $7-8x=4x-17$

2) $9-3k=17-2k$

Multi-step with variables on each side of the equation

1) Simplify each side of the equation
2) Collect variable terms on one side
3) Collect constant terms on the other side

$a)\ 3-4y=5(y-3)$ $b)\ 3z-10+4z=5z-7$

Classwork

1) $y=24-3y$

Classwork

2) $-7a=-12a-65$

Classwork

3) $7(a-2)=3a+14$

Classwork

4) $4(r-9)+2=12r+14$

1.3

SOLVING EQUATIONS WITH VARIABLES ON BOTH SIDES (DAY 2)

No Solution vs Identity

An equation has **NO SOLUTION**:
if once you solve, one side can NOT be equal to the other side...

An equation is an **ALL REAL SOLUTIONS**:
if once you solve, one side is ALWAYS equal to the other side...

Examples

a) $13 + x = 2x - 8$

b) $2m - 6 = -6 + 2m$

c) $3x = 3(x + 4)$

1.4

REWRITING EQUATIONS AND FORMULAS

DO NOW

Solve the equation. Check your solution.

1) $5h - 7 = 2(h + 1)$

DO NOW

Solve the equation. Check your solution.

2) $2 - 15n = 5(-3n + 2)$

DO NOW

Solve the equation. Check your solution.

3) $6(2y + 1) = 12y + 6$

Something you should know...

$0 \div 3$ $\qquad$ $\frac{0}{3}$

$3 \div 0$ $\qquad$ $\frac{3}{0}$

What's a Formula?

An equation made up mostly of variables

$$A = lw$$

$$A = \pi r^2$$

$$d = \frac{r}{t}$$

Example 1

Solve the formula for *m*. (Get the variable by itself)

$$F = ma$$

Example 2

Solve the formula for *x*. (Get the variable by itself)

$$y = mx + b$$

Example 3

Solve the formula for *b*. (Get the variable by itself)

$$A = \frac{1}{2}h(a+b)$$

Groupwork

Solve the formula for *y*. (Get the variable by itself)

1) $y - 5x = 10$

2) $15 = 6x + 3y$

Groupwork

Solve for h

3) $A = bh$

Solve for L

4) $S = V - L$

Groupwork

Solve for W

5) $P = 2W + 2L$

Solve for R

6) $C = \frac{1}{4}(R+12)$

CHAPTER 1 REVIEW

1.1 – Solving Simple Equations

a) $8 = m - 13$

b) $\frac{y}{-3} = 8$

1.1 – Solving Simple Equations

c) $\frac{1}{6}x = -3$

1.2 - Solving Multi-Step Equations

a) $\frac{t}{4} - 3 = 9$

b) $6p - 2p = 28$

1.2 - Solving Multi-Step Equations

a) $7m + 3(m + 2) = -24$

b) $\frac{3}{4}(2y - 8) = 6$

1.3 - Solving Equations with Variables on Both Sides

a) $10 - 2x = 3x - 20$

b) $3(2y - 5) = 4y - 7$

1.3 - Solving Equations with Variables on Both Sides

c) $2(8m - 7) = 16m - 14$

1.4 - Rewriting Equations and Formulas

Solve for W

a) $P = 2W + 2L$

Solve for c

b) $g = \frac{1}{6}(K + c)$