Wheeler Middle School
Summer Math Packet
Grade 7 into 8

- This packet is designed to help you retain the information you learned in 7th grade and help you transition into 8th grade.
- This packet is available on the school website for download.
- If you need help, you may use the following websites:

  www.khanacademcy.com

  www.IXL.com
- You are expected to know all of your basic facts as you enter 8th grade. Here are some sites to help you:

  www.sheppardsoftware.com

  www.xtramath.org

  https://www.factmonster.com/math/flashcards
- **This is due the first day of school, August 22nd**

Name: _____

"If you do not use it, you lose it."

Material in this packet taken from Bridgewater/Raynham Regional School District

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Show work for every problem on separate sheet of paper!

Solve Proportional Relationships

A **proportion** is an equation that states that two ratios are equivalent. To determine whether a pair of ratios forms a proportion, use cross products. You can also use cross products to solve proportions.

Example 1

Determine whether the pair of ratios $\frac{20}{24}$ and $\frac{12}{18}$ form a proportion.

Find the cross products.

$\frac{20}{24} \stackrel{?}{=} \frac{12}{18}$

$\rightarrow \quad 24 \bullet 12 = 288$

$\rightarrow \quad 20 \bullet 18 = 360$

Since the cross products are not equal, the ratios do not form a proportion.

Example 2

Solve $\frac{12}{30} = \frac{k}{70}$.

$\frac{12}{30} = \frac{k}{70}$	Write the equation.
$12 \bullet 70 = 30 \bullet k$	Find the cross products.
$840 = 30k$	Multiply.
$\frac{840}{30} = \frac{30k}{30}$	Divide each side by 30.
$28 = k$	Simplify.

The solution is 28.

Exercises

Determine whether each pair of ratios forms a proportion.

1. $\frac{17}{10}, \frac{12}{5}$ **2.** $\frac{6}{9}, \frac{12}{18}$ **3.** $\frac{8}{12}, \frac{10}{15}$

4. $\frac{7}{15}, \frac{12}{32}$ **5.** $\frac{7}{9}, \frac{49}{63}$ **6.** $\frac{8}{24}, \frac{12}{28}$

7. $\frac{4}{7}, \frac{12}{71}$ **8.** $\frac{20}{35}, \frac{30}{45}$ **9.** $\frac{18}{24}, \frac{3}{4}$

Solve each proportion.

10. $\frac{x}{5} = \frac{12}{25}$ **11.** $\frac{3}{4} = \frac{12}{c}$ **12.** $\frac{6}{9} = \frac{10}{r}$

13. $\frac{16}{24} = \frac{z}{15}$ **14.** $\frac{5}{8} = \frac{s}{12}$ **15.** $\frac{14}{t} = \frac{10}{11}$

16. $\frac{w}{6} = \frac{2.8}{7}$ **17.** $\frac{5}{y} = \frac{7}{16.8}$ **18.** $\frac{x}{18} = \frac{7}{36}$

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Percent of a Number

To find the percent of a number, you can write the percent as a fraction and then multiply or write the percent as a decimal and then multiply.

Example 1

Find 25% of 80.

$25\% = \frac{25}{100}$ or $\frac{1}{4}$ Write 25% as a fraction, and reduce to lowest terms.

$\frac{1}{4}$ of $80 = \frac{1}{4} \times 80$ or 20 Multiply.

So, 25% of 80 is 20.

Example 2

What number is 15% of 200?

15% of $200 = 15\% \times 200$ Write a multiplication expression.

$= 0.15 \times 200$ Write 15% as a decimal.

$= 30$ Multiply.

So, 15% of 200 is 30.

Exercises

Find each number.

1. Find 20% of 50.

2. What is 55% of $400?

3. 5% of 1,500 is what number?

4. Find 190% of 20.

5. What is 24% of $500?

6. 8% of $300 is how much?

7. What is 12.5% of 60?

8. Find 0.2% of 40.

9. Find 3% of $800.

10. What is 0.5% of 180?

11. 0.25% of 42 is what number?

12. What is 0.02% of 280?

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The Percent Equation

To solve any type of percent problem, you can use the **percent equation**, part = percent • whole, where the percent is written as a decimal.

Example 1

600 is what percent of 750?

600 is the part and 750 is the whole. Let n represent the percent.

$\underbrace{\text{part}} = \underbrace{\text{percent}} \bullet \underbrace{\text{whole}}$

$600 = n \bullet 750$	Write the percent equation.
$\frac{600}{750} = \frac{750n}{750}$	Divide each side by 750.
$0.8 = n$	Simplify.
$80\% = n$	Write 0.8 as a percent. So, 600 is 80% of 750.

Example 2

45 is 90% of what number?

45 is the part and 90% or 0.9 is the percent. Let w represent the whole.

$\underbrace{\text{part}} = \underbrace{\text{percent}} \bullet \underbrace{\text{whole}}$

$45 = 0.9 \bullet w$	Write the percent equation.
$\frac{45}{0.9} = \frac{0.9w}{0.9}$	Divide each side by 0.9.
$50 = w$	Simplify. So, 45 is 90% of 50.

Exercises

Write an equation for each problem. Then solve. Round to the nearest tenth if necessary.

1. What percent of 56 is 14?

2. 36 is what percent of 40?

3. 80 is 40% of what number?

4. 65% of what number is 78?

5. What percent of 2,000 is 8?

6. What is 110% of 80?

7. 85 is what percent of 170?

8. Find 30% of 70.

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Add Integers

To add integers with the same sign, add their absolute values. The sum is:
- positive if both integers are positive.
- negative if both integers are negative.

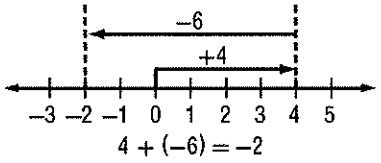
To add integers with different signs, subtract their absolute values. The sum is:
- positive if the positive integer's absolute value is greater.
- negative if the negative integer's absolute value is greater.

To add integers, it is helpful to use a number line.

Example 1

Find 4 + (–6).

Use a number line.
- Start at 0.
- Move 4 units right.
- Then move 6 units left.

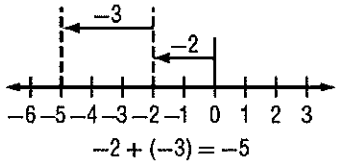


4 + (–6) = –2

Example 2

Find –2 + (–3).

Use a number line.
- Start at 0.
- Move 2 units left.
- Move another 3 units left.



–2 + (–3) = –5

Exercises

Add.

1. –5 + (–2)

2. 8 + 1

3. –7 + 10

4. 16 + (–11)

5. –22 + (–7)

6. –50 + 50

7. –10 + (–10)

8. 100 + (–25)

9. –35 + (–20)

10. –7 + (–3) + 10

11. –42 + 36 + (–36)

12. –17 + 17 + 9

Write an addition expression to describe each situation. Then find each sum.

13. HAWK A hawk is in a tree 100 feet above the ground. It flies down to the ground.

14. RUNNING Leah ran 6 blocks north then back 4 blocks south.

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Subtract Integers

To subtract an integer, add its opposite.

Example 1

Find 6 – 9.

$6 - 9 = 6 + (-9)$ To subtract 9, add –9.
$= -3$ Simplify.

Example 2

Find –10 – (–12).

$-10 - (-12) = -10 + 12$ To subtract –12, add 12.
$= 2$ Simplify.

Example 3

Evaluate $a - b$ if $a = -3$ and $b = 7$.

$a - b = -3 - 7$ Replace a with –3 and b with 7.
$= -3 + (-7)$ To subtract 7, add –7.
$= -10$ Simplify.

Exercises

Subtract.

1. $7 - 9$

2. $20 - (-6)$

3. $-10 - 4$

4. $0 - 12$

5. $-7 - 8$

6. $13 - 18$

7. $-20 - (-5)$

8. $-8 - (-6)$

9. $25 - (-14)$

10. $-75 - 50$

11. $15 - 65$

12. $19 - (-10)$

Evaluate each expression if $m = -2$, $n = 10$, and $p = 5$.

13. $m - 6$

14. $9 - n$

15. $p - (-8)$

16. $p - m$

17. $m - n$

18. $-25 - p$

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Multiply Integers

The product of two integers with **different** signs is **negative**.
The product of two integers with the **same** sign is **positive**.

Example 1

Find 5(–2).

$5(-2) = -10$ The integers have different signs. The product is negative.

Example 2

Find –3(7).

$-3(7) = -21$ The integers have different signs. The product is negative.

Example 3

Find –6(–9).

$-6(-9) = 54$ The integers have the same sign. The product is positive.

Example 4

Find $(-7)^2$.

$(-7)^2 = (-7)(-7)$ There are 2 factors of –7.
$= 49$ The product is positive.

Example 5

Find –2(–3)(4).

$-2(-3)(4)$
$= 6(4)$ Multiply –2 and –3.
$= 24$ Multiply 6 and 4.

Exercises

Multiply.

1. $-5(8)$ **2.** $-3(-7)$ **3.** $10(-8)$

4. $-8(3)$ **5.** $-12(-12)$ **6.** $(-8)^2$

7. $-5(7)$ **8.** $3(-2)$ **9.** $-6(-3)$

10. $5(-4)(5)$ **11.** $-4(-4)$ **12.** $2(-3)(5)$

13. $-2(-3)$ **14.** $9(-4)$ **15.** $(-3)(-4)$

16. $-3(-3)(5)$ **17.** $-2(5)^2$ **18.** $(-3)(-4)(5)$

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Divide Integers

The quotient of two integers with different signs is negative.
The quotient of two integers with the same sign is positive.

Example 1

Find 30 ÷ (–5).

30 ÷ (–5)	The integers have different signs.
30 ÷ (–5) = –6	The quotient is negative.

Example 2

Find –100 ÷ (–5).

–100 + (–5)	The integers have the same sign.
–100 + (–5) = 20	The quotient is positive.

Exercises

Divide.

1. $-12 \div 4$

2. $-14 \div (-7)$

3. $\frac{18}{-2}$

4. $-6 \div (-3)$

5. $-10 \div 10$

6. $\frac{-80}{-20}$

7. $350 \div (-25)$

8. $-420 \div (-3)$

9. $\frac{540}{45}$

10. $\frac{-256}{16}$

ALGEBRA Evaluate each expression if $d = -24$, $e = -4$, and $f = 8$.

11. $12 \div e$

12. $40 \div f$

13. $d \div 6$

14. $d \div e$

15. $f \div e$

16. $e^2 \div f$

17. $\frac{-d}{e}$

18. $ef \div 2$

19. $\frac{f+8}{-4}$

20. $\frac{d-e}{5}$

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Terminating and Repeating Decimals

To write a **fraction as a decimal,** divide the numerator by the denominator. Division ends when the remainder is zero.

You can use **bar notation** to indicate that a number pattern repeats indefinitely. A bar is written over the digits that repeat.

Example 1

Write $\frac{3}{20}$ as a decimal.

$$\begin{array}{r} 0.15 \\ 20\overline{)3.00} \\ \underline{20} \\ 100 \\ \underline{100} \\ 0 \end{array}$$

Divide 3 by 20.

The remainder is 0.

So, $\frac{3}{20} = 0.15$.

Example 2

Write $\frac{5}{9}$ as a decimal.

$$\begin{array}{r} 0.555... \\ 9\overline{)5.000} \\ \underline{45} \\ 50 \\ \underline{45} \\ 50 \\ \underline{45} \\ 5 \end{array}$$

The remainder after each step is 5.

You can use bar notation $0.\overline{5}$ to indicate that 5 repeats forever.

So, $\frac{5}{9} = 0.\overline{5}$.

Example 3

Write –0.32 as a fraction in simplest form.

$-0.32 = -\frac{32}{100}$ The 2 is in the hundredths place.

$= -\frac{8}{25}$ Simplify.

Exercises

Write each fraction or mixed number as a decimal. Use bar notation if the decimal is a repeating decimal.

1. $\frac{8}{10}$ **2.** $-\frac{3}{5}$ **3.** $\frac{7}{11}$

4. $4\frac{7}{8}$ **5.** $-\frac{13}{15}$ **6.** $3\frac{47}{99}$

Write each decimal as a fraction in simplest form.

7. –0.14 **8.** 0.3 **9.** 0.94

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Add and Subtract Unlike Fractions

To add or subtract fractions with different denominators,

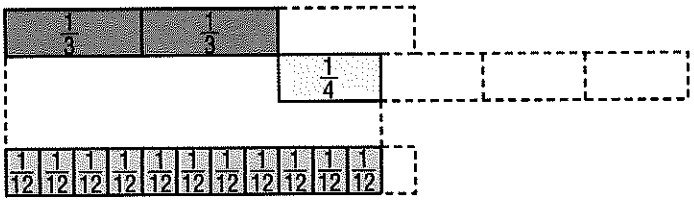
- Rename the fractions using the least common denominator (LCD).
- Add or subtract as with like fractions.
- If necessary, simplify the sum or difference.

Example

Find $\frac{2}{3}+\frac{1}{4}$.

Method 1 Use a model.

$$\begin{array}{r} \frac{2}{3} \\ +\frac{1}{4} \\ \hline \frac{11}{12} \end{array}$$



Method 2 Use the LCD.

$\frac{2}{3}+\frac{1}{4}=\frac{2}{3}\cdot\frac{4}{4}+\frac{1}{4}\cdot\frac{3}{3}$ Rename using the LCD, 12.

$=\frac{8}{12}+\frac{3}{12}$ or $\frac{11}{12}$ Add the fractions.

Exercises

Add or subtract. Write in simplest form.

1. $\frac{1}{2}+\frac{3}{4}$

2. $\frac{3}{8}-\frac{1}{2}$

3. $\frac{7}{15}+\left(-\frac{5}{6}\right)$

4. $\frac{2}{5}-\frac{1}{3}$

5. $\frac{5}{9}+\left(-\frac{5}{12}\right)$

6. $\frac{11}{12}-\frac{3}{4}$

7. $\frac{7}{8}-\left(-\frac{1}{3}\right)$

8. $\frac{7}{9}-\frac{1}{2}$

9. $\frac{3}{10}+\frac{7}{12}$

10. $\frac{3}{5}+\frac{2}{3}$

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Multiply Fractions

To multiply fractions, multiply the numerators and multiply the denominators.

$$\frac{5}{6}\times\frac{3}{5}=\frac{5\times3}{6\times5}=\frac{15}{30}=\frac{1}{2}$$

To multiply mixed numbers, rename each mixed number as an improper fraction. Then multiply the fractions.

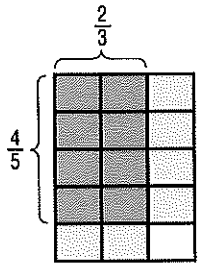
$$2\frac{2}{3}\times1\frac{1}{4}=\frac{8}{3}\times\frac{5}{4}=\frac{40}{12}=3\frac{1}{3}$$

Example 1

Find $\frac{2}{3}\times\frac{4}{5}$. Write in simplest form.

$\frac{2}{3}\times\frac{4}{5}=\frac{2\times4}{3\times5}$ ← Multiply the numerators. ← Multiply the denominators.

$=\frac{8}{15}$ Simplify.



Example 2

Find $\frac{1}{3}\times2\frac{1}{2}$. Write in simplest form.

$\frac{1}{3}\times2\frac{1}{2}=\frac{1}{3}\times\frac{5}{2}$ Rename $2\frac{1}{2}$ as an improper fraction, $\frac{5}{2}$.

$=\frac{1\times5}{3\times2}$ Multiply.

$=\frac{5}{6}$ Simplify.

Exercises

Multiply. Write in simplest form.

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

2. $\frac{1}{2}\times\frac{7}{8}$

3. $-\frac{1}{3}\times\frac{3}{5}$

4. $\frac{5}{9}\times4$

5. $1\frac{2}{3}\times\left(-\frac{3}{5}\right)$

6. $3\frac{3}{4}\times1\frac{1}{6}$

7. $\frac{3}{4}\times1\frac{2}{3}$

8. $-3\frac{1}{3}\times\left(-2\frac{1}{2}\right)$

9. $4\frac{1}{5}\times\frac{1}{7}$

10. $\frac{7}{5}\times8$

11. $-2\frac{1}{3}\times\frac{4}{6}$

12. $\frac{1}{8}\times2\frac{3}{4}$

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Divide Fractions

To divide by a fraction, multiply by its multiplicative inverse or reciprocal. To divide by a mixed number, rename the mixed number as an improper fraction.

Example

Find $3\frac{1}{3} \div \frac{2}{9}$. Write in simplest form.

$3\frac{1}{3} \div \frac{2}{9} = \frac{10}{3} \div \frac{2}{9}$ Rename $3\frac{1}{3}$ as an improper fraction.

$= \frac{10}{3} \cdot \frac{9}{2}$ Multiply by the reciprocal of $\frac{2}{9}$, which is $\frac{9}{2}$.

$= \frac{\overset{5}{\cancel{10}}}{\underset{1}{\cancel{3}}} \cdot \frac{\overset{3}{\cancel{9}}}{\underset{1}{\cancel{2}}}$ Divide out common factors.

$= 15$ Multiply.

Exercises
Divide. Write in simplest form.

1. $\frac{2}{3} \div \frac{1}{4}$

2. $\frac{2}{5} \div \frac{5}{6}$

3. $-\frac{1}{2} \div \frac{1}{5}$

4. $5 \div \left(-\frac{1}{2}\right)$

5. $\frac{5}{8} \div 10$

6. $7\frac{1}{3} \div 2$

7. $\frac{5}{6} \div 3\frac{1}{2}$

8. $36 \div 1\frac{1}{2}$

9. $-2\frac{1}{2} \div (-10)$

10. $5\frac{2}{5} \div 1\frac{4}{5}$

11. $6\frac{2}{3} \div 3\frac{1}{9}$

12. $4\frac{1}{4} \div \frac{2}{8}$

13. $4\frac{6}{7} \div 2\frac{3}{7}$

14. $12 \div \left(-2\frac{1}{2}\right)$

15. $4\frac{1}{6} \div 3\frac{1}{6}$

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Algebraic Expressions

To evaluate an algebraic expression you replace each variable with its numerical value, then use the order of operations to simplify.

Example 1
Evaluate $6x - 7$ if $x = 8$.

$6x - 7 = 6(8) - 7$ Replace x with 8.
$= 48 - 7$ Use the order of operations.
$= 41$ Subtract 7 from 48.

Example 2
Evaluate $5m - 3n$ if $m = 6$ and $n = 5$.

$5m - 3n = 5(6) - 3(5)$ Replace m with 6 and n with 5.
$= 30 - 15$ Use the order of operations.
$= 15$ Subtract 15 from 30.

Example 3
Evaluate $\frac{ab}{3}$ if $a = 7$ and $b = 6$.

$\frac{ab}{3} = \frac{(7)(6)}{3}$ Replace a with 7 and b with 6.
$= \frac{42}{3}$ The fraction bar is like a grouping symbol.
$= 14$ Divide.

Example 4
Evaluate $x^3 + 4$ if $x = 3$.

$x^3 + 4 = 3^3 + 4$ Replace x with 3.
$= 27 + 4$ Use the order of operations.
$= 31$ Add 27 and 4.

Exercises
Evaluate each expression if $a = 4$, $b = 2$, and $c = 7$.

1. $3ac$ **2.** $5b^3$ **3.** abc

4. $5 + 6c$ **5.** $\frac{ab}{8}$ **6.** $2a - 3b$

7. $\frac{b^4}{4}$ **8.** $c - a$ **9.** $20 - bc$

10. $2bc$ **11.** $ac - 3b$ **12.** $6a^2$

13. $7c$ **14.** $6a - b$ **15.** $ab - c$

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Simplify Algebraic Expressions

When a plus or minus sign separates an algebraic expression into parts, each part is called a **term**. The numerical factor of a term that contains a variable is called the coefficient of the variable. A term without a variable is called a **constant**. **Like terms** contain the same variables to the same powers, such as $3x^2$ and $2x^2$.

Example
1 Identify the terms, like terms, coefficients, and constants in the expression $7x - 5 + x - 3x$.

$7x - 5 + x - 3x = 7x + (-5) + x + (-3x)$ Definition of subtraction
$= 7x + (-5) + 1x + (-3x)$ Identity Property; $x = 1x$

The terms are $7x$, -5, x, and $-3x$. The like terms are $7x$, x, and $-3x$. The coefficients are 7, 1, and –3. The constant is –5.

An algebraic expression is in **simplest form** if it has no like terms and no parentheses.

Examples
Write each expression in simplest form.

2 $5x + 3x$

$5x + 3x = (5 + 3)\,x$ or $8x$ Distributive Property; simplify.

3 $-2m + 5 + 6m - 3$

$-2m$ and $6m$ are like terms. 5 and –3 are also like terms.

$-2m + 5 + 6m - 3 = -2m + 5 + 6m + (-3)$ Definition of subtraction
$= -2m + 6m + 5 + (-3)$ Commutative Property
$= (-2 + 6)\,m + 5 + (-3)$ Distributive Property
$= 4m + 2$ Simplify.

Exercises
Identify the terms, like terms, coefficients, and constants in each expression.

1. $-4y - 3 + 2y$ **2.** $-5g + 3 + 2g - g$ **3.** $5 + 3a - 4 - a$

Write each expression in simplest form.

4. $3d + 6d$ **5.** $2 + 5s - 4$ **6.** $2z + 3 - 9z - 8$

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Solve One-Step Addition and Subtraction Equations

Remember, equations must always remain balanced. If you subtract the same number from each side of an equation, the two sides remain equal. Also if you add the same number to each side of an equation, the two sides remain equal.

Example 1
Solve $x + 5 = 11$. Check your solution.

$x + 5 = 11$	Write the equation.
$\underline{-5 = -5}$	Subtract 5 from each side.
$x = 6$	Simplify.

Check	$x + 5 = 11$	Write the original equation.
	$6 + 5 \stackrel{?}{=} 11$	Replace x with 6.
	$11 = 11$ ✓	This sentence is true.

The solution is 6.

Example 2
Solve $15 = t - 12$. Check your solution.

$15 = t - 12$	Write the equation.
$\underline{+12 = +12}$	Add 12 to each side.
$27 = t$	Simplify.

Check	$15 = t - 12$	Write the original equation.
	$15 = 27 - 12$	Replace t with 27.
	$15 = 15$ ✓	This sentence is true.

The solution is 27.

Exercises
Solve each equation. Check your solution.

1. $h + 3 = 14$ **2.** $m + 8 = 22$ **3.** $p + 5 = 15$ **4.** $17 = y + 8$

5. $w + 4 = -1$ **6.** $k + 5 = -3$ **7.** $25 = 14 + r$ **8.** $57 + z = 97$

9. $b - 3 = 6$ **10.** $7 = c - 5$ **11.** $j - 12 = 18$ **12.** $v - 4 = 18$

13. $-9 = w - 12$ **14.** $y - 8 = -12$ **15.** $14 = f - 2$ **16.** $23 = n - 12$

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Multiplication and Division Equations

Use the Division Property of Equality to solve multiplication equations and the Multiplication Property of Equality to solve division equations.

The **Division Property of Equality** states that if you divide each side of an equation by the same nonzero number, the two sides remain equal.

The **Multiplication Property of Equality** states that if you multiply each side of an equation by the same number, the two sides remain equal.

Example 1
Solve $30 = 6x$.

$30 = 6x$ Write the equation.

$\frac{30}{6} = \frac{6x}{6}$ Divide each side of the equation by 6.

$5 = x$ $30 \div 6 = 5$.

The solution is 5.

Example 2
Solve $\frac{x}{-5} = -2$.

$\frac{x}{-5} = -2$ Write the equation.

$\frac{x}{-5}(-5) = -2(-5)$ Multiply each side of the equation by –5.

$x = 10$ $-2(-5) = 10$.

The solution is 10.

Exercises
Solve each equation. Check your solution.

1. $3x = 12$

2. $9k = -360$

3. $-15a = -45$

4. $14 = 2b$

5. $\frac{x}{5} = 12$

6. $16 = \frac{a}{3}$

7. $\frac{c}{-2} = 7$

8. $-7y = 42$

9. $\frac{m}{6} = -4$

10. $-2 = \frac{b}{-9}$

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Solve Two-Step Equations

To solve a two-step equation, undo the addition or subtraction first. Then undo the multiplication or division.

Example 1
Solve $7v - 3 = 25$. Check your solution.

$7v - 3 = 25$	Write the equation.
$+3 = +3$	Undo the subtraction by adding 3 to each side.
$7v = 28$	Simplify.
$\frac{7v}{7} = \frac{28}{7}$	Undo the multiplication by dividing each side by 7.
$v = 4$	Simplify.

Check

$7v - 3 = 25$	Write the original equation.
$7(4) - 3 \stackrel{?}{=} 25$	Replace v with 4.
$28 - 3 = 25$	Multiply.
$25 = 25$ ✓	The solution checks.

The solution is 4.

Example 2
Solve $-10 = 8 + 3x$. Check your solution.

$-10 = 8 + 3x$	Write the equation.
$-8 = -8$	Undo the addition by subtracting 8 from each side.
$-18 = 3x$	Simplify.
$\frac{-18}{3} = \frac{3x}{x}$	Undo the multiplication by dividing each side by 3.
$-6 = x$	Simplify.

Check

$-10 = 8 + 3x$	Write the original equation.
$-10 \stackrel{?}{=} 8 + 3(-6)$	Replace x with –6.
$-10 \stackrel{?}{=} 8 + (-18)$	Multiply.
$-10 = 10$ ✓	The solution checks.

The solution is –6.

Exercises
Solve each equation. Check your solution.

1. $4y + 1 = 13$ **2.** $6x + 2 = 26$ **3.** $-3 = 5k + 7$ **4.** $\frac{2}{3}n + 4 = -26$

5. $7 = -3c - 2$ **6.** $-8p + 3 = -29$ **7.** $-5 = -5t - 5$ **8.** $-9r + 12 = -24$

9. $11 + \frac{7}{9}n = 4$ **10.** $35 = 7 + 4b$ **11.** $-15 + \frac{4}{5}p = 9$ **12.** $49 = 16 + 3y$

13. $2 = 4t - 14$ **14.** $-9x - 10 = 62$ **15.** $30 = 12z - 18$ **16.** $7 + 4g = 7$

NO Calculators! Show work for every problem on separate sheet of paper!

Solve One-Step Inequalities

Addition and Subtraction Properties	
Words	When you add or subtract the same number from each side of an inequality, the inequality remains true.
Symbols	For all numbers a, b, and c, 1. if $a < b$, then $a + c < b + c$ and $a - c < b - c$. 2. if $a > b$, then $a + c > b + c$ and $a - c > b - c$.

Example 1

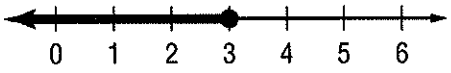
Solve $x + 9 \leq 12$. Graph the solution on a number line.

$x + 9 \leq 12$ — Write the inequality.

$-9 \quad -9$ — Subtract 9 from each side.

$x \leq 3$ — Simplify.

The solution is $x \leq 3$. To graph it, draw a closed dot at 3 and draw an arrow to the left on the number line.



Multiplication and Division Properties	
Words	When you multiply or divide each side of an inequality by the same *positive* number, the inequality remains true.
Symbols	For all numbers a, b, and c, where $c > 0$, 1. if $a < b$, then $ac < bc$ and $\frac{a}{c} < \frac{b}{c}$. 2. if $a > b$, then $ac > bc$ and $\frac{a}{c} > \frac{b}{c}$.

Example 2

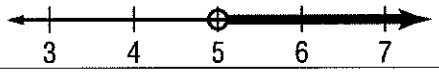
Solve $3x > 15$. Graph the solution on a number line.

$3x > 15$ — Write the inequality.

$\frac{3x}{3} > \frac{15}{3}$ — Divide each side by 3.

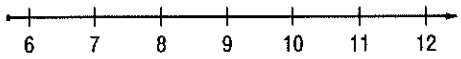
$x > 5$ — Simplify.

The solution is $x > 5$. To graph it, draw an open dot at 5 and draw an arrow to the right on the number line.

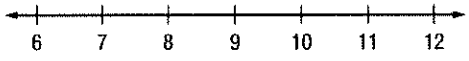


Solve each inequality. Then graph the solution on a number line.

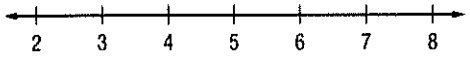
1. $9d > 81$



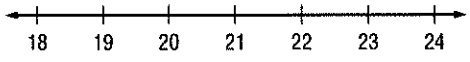
2. $t - 5 < 4$



3. $j + 6 \geq 11$



4. $\frac{n}{3} \leq 7$



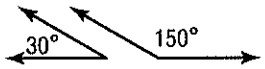
NAME _____

NO Calculator (*except for page 18*)!
Show work for every problem on separate sheet of paper!

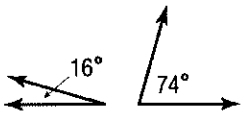
Complementary and Supplementary Angles

- Two angles are **complementary** if the sum of their measures is 90°.
- Two angles are **supplementary** if the sum of their measures is 180°.

Examples
Identify each pair of angles as *complementary*, *supplementary*, or *neither*.

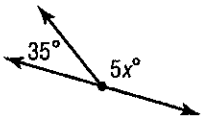
1. 

$30° + 150° = 180°$
The angles are supplementary.

2. 

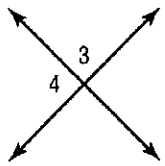
$16° + 74° = 90°$
The angles are complementary.

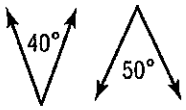
Example 3
ALGEBRA Find the value of x.
Since the two angles form a straight line, they are supplementary. The sum of their measures is 180°.

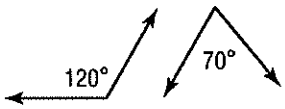


$5x + 35 = 180$	Write the equation.
$-35 = -35$	Subtract 35 from each side.
$5x = 145$	
$\frac{5x}{5} = \frac{145}{5}$	Divide each side by 5
$x = 29$	Simplify.

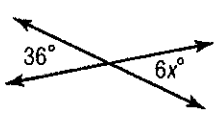
Exercises
Identify each pair of angles as *complementary*, *supplementary*, or *neither*.

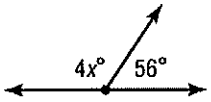
1. 

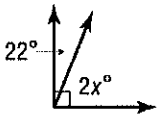
2. 

3. 

ALGEBRA Find the value of x in each figure.

4. 

5. 

6. 

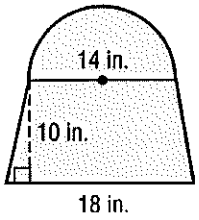
NAME _____ **NO Calculator (*except for page 18*)!**
Show work for every problem on separate sheet of paper!

Area of Composite Figures

To find the area of a composite figure, decompose the figure into shapes whose areas you know how to find. Then find the sum of these areas.

Example
Find the area of the composite figure.

The figure can be separated into a semicircle and trapezoid.

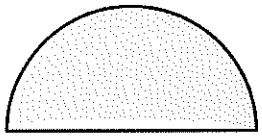


Area of semicircle

$A = \frac{1}{2}\pi r^2$

$A = \frac{1}{2} \cdot \pi \cdot (7)^2$

$A \approx 77.0$

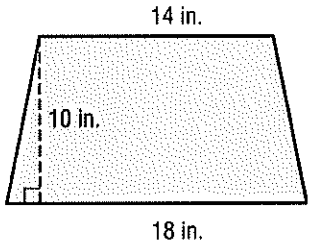


Area of trapezoid

$A = \frac{1}{2}h(b_1 + b_2)$

$A = \frac{1}{2} \cdot 10 \cdot (14 + 18)$

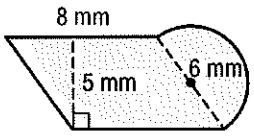
$A = 160$



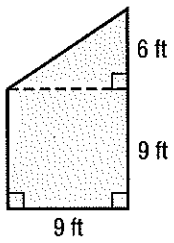
The area of the figure is about 77.0 + 160 or 237 square inches.

Exercises
Find the area of each figure. Round to the nearest tenth if necessary.

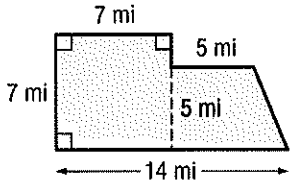
1.



2.



3.



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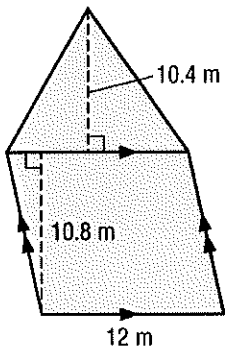

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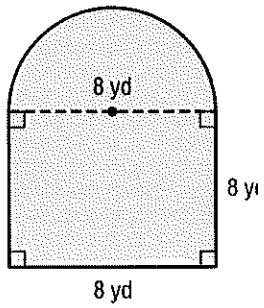

6.