

Summer Math

Grade 8

Name: _____

Date: _____

Parents Signature: _____

Summer Math – Incoming 8th grade

Complete each of the sections to the best of your ability. Show your work.
Worth 2 tests grades – Due 1st day of school.

Multiplying and Dividing Integers

To multiply integers:

- If the signs are alike, the product is positive.

$$2 \cdot 3 = 6$$

$$-2 \cdot -3 = 6$$

- If the signs are different, the product is negative.

$$2 \cdot -3 = -6$$

$$-2 \cdot 3 = -6$$

To divide integers:

- If the signs are alike, the quotient is positive.

$$6 \div 3 = 2$$

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

- If the signs are different, the quotient is negative.

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

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

Study these four examples. Write positive or negative to complete each statement.

$$7 \cdot 3 = 21$$

$$-7 \cdot -3 = 21$$

$$7 \cdot -3 = -21$$

$$-7 \cdot 3 = -21$$

1. When both integers are positive, the product is _____.
2. When one integer is positive and one is negative, the product is _____.
3. When both integers are negative, the product is _____.

$$21 \div 3 = 7$$

$$21 \div -3 = -7$$

$$-21 \div -3 = 7$$

$$-21 \div 3 = -7$$

4. When both integers are positive, the quotient is _____.
5. When both integers are negative, the quotient is _____.
6. When one integer is positive and one is negative, the quotient is _____.

Tell whether each product or quotient will be *positive* or *negative*.

7. $4 \cdot 7$

8. $-4 \cdot 7$

9. $-4 \cdot -7$

10. $4 \cdot -7$

Order of Operations and the Distribution Property

You can remember the order of operations using this phrase:

Please, My Dear Aunt Sally
↓ ↓ ↓ ↓ ↓
Parentheses Multiply Divide Add Subtract

- ① First, do operations within parentheses.

$$7 + 8 \cdot (5 + 3) - 1$$

$$7 + 8 \cdot 8 - 1$$

$$3 \div (5 - 2) + 36$$

$$3 \div 3 + 36$$

- ② Next, multiply and divide from left to right.

$$7 + 8 \cdot 8 - 1$$

$$7 + 64 - 1$$

$$3 \div 3 + 36$$

$$1 + 36$$

- ③ Then, add and subtract from left to right.

$$7 + 64 - 1$$

$$71 - 1$$

$$70$$

$$1 + 36$$

$$37$$

Find the value of each expression.

1. $8 + 5 \cdot 6 + 2$

2. $7 - 4 + 5 \cdot 3$

3. $9 + 3 \cdot 7$

4. $(15 + 9) \div (8 - 2)$

5. $80 - 6 \cdot 7$

Evaluating and Writing Algebraic Expressions

To evaluate an *expression*, substitute a value for the *variable* and compute.

Evaluate $5y - 8$ for $y = 7$.

$$\begin{aligned} &5y - 8 \\ &5 \times 7 - 8 \quad \leftarrow \text{Substitute } y \text{ with } 7. \\ &35 - 8 = 27 \quad \leftarrow \text{Compute.} \end{aligned}$$

You can use key words to write a word phrase for an algebraic expression.

$$\begin{aligned} a + 5 &\rightarrow a \text{ plus } 5 \\ &\text{or } a \text{ increased by } 5 \\ 2n &\rightarrow \text{the product of } 2 \text{ and } n \\ &\text{or } 2 \text{ times } n \end{aligned}$$

Evaluate each expression using the values $m = 3$ and $x = 8$.

1. $4m + 9$

Substitute m : $4 \times \underline{\quad} + 9$

Compute: $\underline{\quad} + 9 = \underline{\quad}$

3. $5x + x$

Substitute x : $5 \times \underline{\quad} + \underline{\quad}$

Compute: $\underline{\quad} + \underline{\quad} = \underline{\quad}$

2. $4x - 7$

Substitute x : $4 \times \underline{\quad} - 7$

Compute: $\underline{\quad} - 7 = \underline{\quad}$

4. $x + 2m$

Substitute x and m : $\underline{\quad} + 2 \times \underline{\quad}$

Compute: $\underline{\quad} + \underline{\quad} = \underline{\quad}$

Evaluate each expression using the values $y = 4$, $z = 8$, and $p = 10$.

5. $3y + 6 = \underline{\quad}$

6. $4z - 2 = \underline{\quad}$

7. $p + 2p = \underline{\quad}$

8. $3z \times z = \underline{\quad}$

9. $5z - y = \underline{\quad}$

10. $2p + y = \underline{\quad}$

11. $8p - p = \underline{\quad}$

12. $3y + 2z = \underline{\quad}$

Simplifying Fractions

A fraction is in **simplest form** when the numerator and denominator have no common factors other than 1.

To write $\frac{18}{24}$ in the simplest form:

① Divide the numerator and denominator by a common factor. $\frac{18 \div 2}{24 \div 2} = \frac{9}{12}$

② Continue dividing by common factors until the only common factor is 1. $\frac{9 \div 3}{12 \div 3} = \frac{3}{4}$ The only factor common to 3 and 4 is 1.

In simplest form $\frac{18}{24}$ is $\frac{3}{4}$.

You can use the greatest common factor (GCF) to write a fraction in simplest form. Divide the numerator and the denominator by the GCF.

The GCF of 18 and 24 is 6.

$$\frac{18}{24} = \frac{18 \div 6}{24 \div 6} = \frac{3}{4}$$

Find the GCF of the numerator and denominator of each fraction. Then write each fraction in simplest form.

1. $\frac{12}{14} =$ _____
GCF = _____

2. $\frac{9}{15} =$ _____
GCF = _____

3. $\frac{35}{42} =$ _____
GCF = _____

4. $\frac{40}{50} =$ _____
GCF = _____

Write each fraction in simplest form.

5. $\frac{42}{60} =$ _____

8. $\frac{20}{36} =$ _____

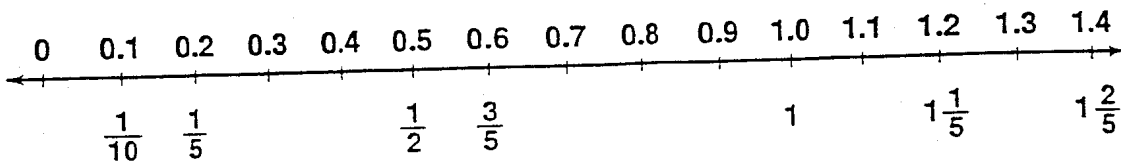
6. $\frac{18}{20} =$ _____

9. $\frac{9}{27} =$ _____

7. $\frac{42}{56} =$ _____

10. $\frac{16}{72} =$ _____

Fractions and Decimals



To change a fraction to a decimal, divide the numerator by the denominator.

$\frac{3}{5}$ Think: $3 \div 5$

$$\begin{array}{r} 0.6 \\ 5 \overline{)3.0} \\ \underline{-30} \\ 0 \end{array}$$

$\frac{3}{5} = 0.6$

To change a decimal to a fraction:

- ① Read the decimal to find the denominator. Write the decimal digits over 10, 100, or 1,000.

0.65 is 65 hundredths $\rightarrow \frac{65}{100}$

- ② Use the GCF to write the fraction in simplest form.

The GCF of 65 and 100 is 5.

$$\frac{65}{100} = \frac{65 \div 5}{100 \div 5} = \frac{13}{20}$$

Write each fraction as a decimal.

1. $\frac{4}{5} =$ _____

2. $\frac{3}{4} =$ _____

3. $\frac{1}{6} =$ _____

4. $\frac{1}{4} =$ _____

5. $\frac{2}{3} =$ _____

Write each decimal as a mixed number or fraction in simplest form.

6. $0.4 =$ _____

8. $0.75 =$ _____

10. $1.5 =$ _____

7. $0.35 =$ _____

9. $2.7 =$ _____

11. $1.8 =$ _____

Scientific Notation

Scientific notation is an efficient way to write very large numbers. A number is written as the product of a number between 1 and 10 and a power of 10.

Write 4,000,000,000 in scientific notation.

- ① Count the number of places that you need to move the decimal point to the left to get a factor between 1 and 10.

$$4, \underbrace{000,000,000}_{9 \text{ places}} \rightarrow \underbrace{4.000 \ 000 \ 000}$$

- ② Use the number of places as the exponent of 10.

$$4,000,000,000 = 4 \times 10^9$$

To change a number from scientific notation to standard form, undo the steps at the left.

Write 3.5×10^8 in standard form.

- ① Note the exponent of 10. (Here it is 8.)
② Move the decimal point to the right the number of places that is equal to the exponent.

$$3.5 \times 10^8 \rightarrow \underbrace{350,000,000}_{8 \text{ places}}$$

$$3.5 \times 10^8 = 350,000,000$$

Write in scientific notation.

1. 93,000,000 _____

2. 17,000 _____

3. 1,200,000 _____

4. 750,000 _____

Write in standard form.

5. 2.58×10^3 _____

6. 4.816×10^5 _____

7. 8×10^6 _____

8. 8.11×10^2 _____

Adding and Subtracting Mixed Numbers

Follow these steps to add or subtract mixed numbers with different denominators.

- ① Write the equivalent fractions with the LCD.
- ② Rename, if necessary.
- ③ Add or subtract the whole numbers.
Add or subtract the fractions.
- ④ Simplify.

Add: $2\frac{2}{5} + 1\frac{3}{4}$

$$2\frac{8}{20} + 1\frac{15}{20}$$

$$2\frac{8}{20} + 1\frac{15}{20} = 3\frac{23}{20}$$

$$3\frac{23}{20} = 4\frac{3}{20}$$

Subtract: $4\frac{1}{3} - 2\frac{5}{6}$

$$4\frac{2}{6} - 2\frac{5}{6}$$

$$4\frac{2}{6} = 3 + 1\frac{2}{6} = 3\frac{8}{6}$$

$$3\frac{8}{6} - 2\frac{5}{6} = 1\frac{3}{6}$$

$$1\frac{3}{6} = 1\frac{1}{2}$$

Find each sum or difference. Write it in simplest form.

1. $2\frac{3}{5} + 1\frac{1}{10}$ _____

2. $3\frac{1}{6} - 2\frac{1}{3}$ _____

Finding a Percent of a Number

- ① Write the percent as a decimal.
- ② Multiply.

Find 12% of 50.

$$0.12$$

$$0.12 \cdot 50 = 6$$

12% of 50 is 6.

Find 150% of 90.

$$1.5$$

$$1.5 \cdot 90 = 135$$

150% of 90 is 135.

Find each answer.

1. 10% of 80 _____

4. 20% of 80 _____

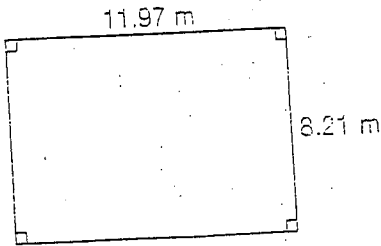
7. 50% of 80 _____

9. 75% of 80 _____

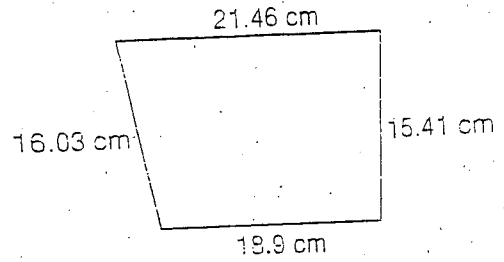
Perimeter

Estimate the perimeter of each figure. Then find the perimeter.

4.

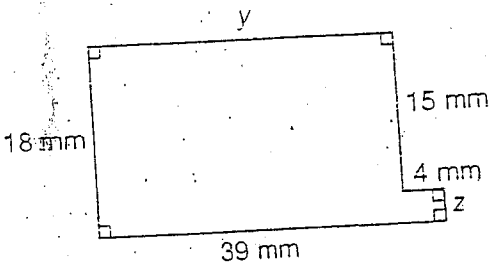


5.

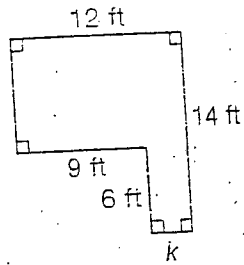


Find the length of each unknown side. Then find the perimeter.

6.



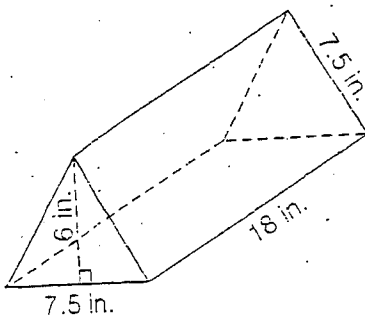
7.



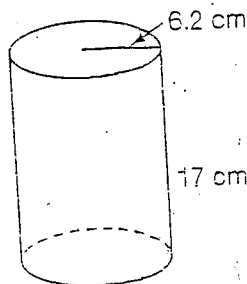
Surface Area

Find the surface area of each figure.

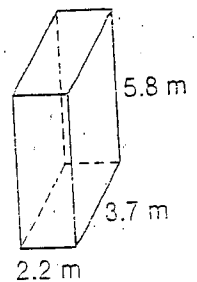
1.



2.



3.



Area of Rectangles and Irregular Figures

Find the area of each figure.

