

DAY 15 Fractions, Decimals, and Percents

A. Fractions, decimals, and percents are all used to represent parts of a whole. They are just different ways of writing the same quantity, as shown below.

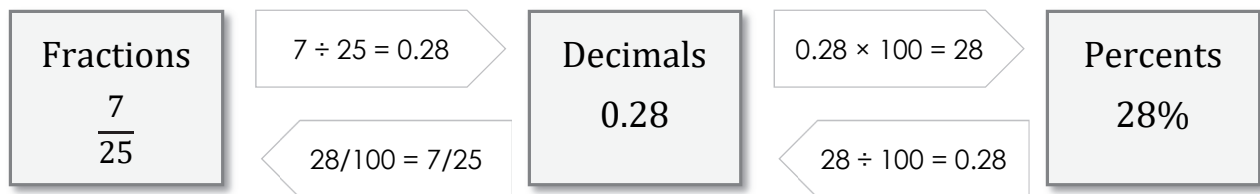
$$7 \text{ out of } 10 = \frac{7}{10} = 0.7 = 70\%$$

$$45 \text{ out of } 100 = \frac{45}{100} = 0.45 = 45\%$$

B. Here are the steps for converting between fractions, decimals, and percents.

1. To convert a fraction to a decimal:
 1. Reduce the fraction to lowest terms.
 2. Divide the numerator by the denominator.

3. To convert a decimal to a percent:
 4. Multiply by 100, or move the decimal point 2 places to the right.
 5. Add a % sign.



8. To convert a decimal to a fraction:
 1. Remove the decimal point.
 2. Place the appropriate denominator (a power of 10) under the number.
 3. Simplify the fraction.

9. To convert a percent to a decimal:
 1. Divide by 100, or move the decimal point 2 places to the left.
 2. Drop the % sign.

C. Convert between fractions, decimals, and percents. Simplify fractions.

Fraction	Decimal	Percent
$\frac{4}{5}$		
		75%
	0.375	
$\frac{22}{40}$		
	0.64	
$\frac{47}{50}$		

DAY 15 Practice

A. Convert between fractions, decimals, and percents. Simplify fractions.

Fraction	Decimal	Percents
	0.625	
		60%
$\frac{6}{16}$		
		35%
$\frac{18}{24}$		
	0.84	
	0.46	
$\frac{9}{75}$		

B. Find the mystery numbers.

I am a decimal. As a fraction, my denominator is twice my numerator. What number am I?

I am a percent. In fraction form, I am equivalent to five eighths times four tenths. What number am I?

I am a decimal between 3 and 4. I have two digits in total and my tenths digit is the square of 3. What number am I?

I am a fraction equivalent to three fourths. My denominator is the sum of all prime factors of 66. What number am I?

I am a fraction. My numerator and denominator are both prime. In percent form, I can be written as 40%. What number am I?

I am a percent. In decimal form, my whole number part is the greatest common factor of 18 and 24. My decimal part is the least common multiple of 21 and 28. What number am I?

DAY 21 Like Terms

A. An algebraic expressions is made up of **terms** separated by plus and minus signs. A term has two parts: the number part, also called the **coefficient**, and the variable part. A term with no variable part is called a **constant**. Let's see an example. Check off each box if you understand it.

$$3x^2 + 4x - 6 + x^2 - 7xy$$

- There are 5 terms: $3x^2$, $4x$, -6 , x^2 , and $-7xy$.
- The coefficient of $-7xy$ is -7 . The variable part is xy .
- The variables are x and y .
- The coefficient of x^2 is 1. The variable part is x^2 .
- The constant is -6 .
- $3x^2$ and x^2 have the same variable part: x^2 .

B. Like terms are terms that have the same variable part. In the expression above, $3x^2$ and x^2 are like terms. Circle the pairs of like terms below. Note that all constants are like terms.

$2x$ and $5x$

x and $8y$

$-x$ and x

9 and -7

$2y$ and $2y^2$

$-4x$ and -4

$5xy$ and $2xy$

x^2 and y^2

$2xy$ and $2y$

y^2 and $-3y^2$

C. You can simplify an expression by combining like terms. To combine like terms, simply combine their coefficients but keep the variable part the same. Here are the steps.

$$\begin{aligned} & (5x) + (x^2) - (x) + (3) + (4x^2) + (2x) + (7) \\ & = (5 - 1 + 2)x + (1 + 4)x^2 + (3 + 7) \\ & = 6x + 5x^2 + 10 \end{aligned}$$

12. To combine like terms:

1. Identify like terms.
2. Combine (add or subtract) the coefficients of like terms.
3. Keep the variable part the same.

D. Simplify each expression by combining like terms.

$3x + 7x$

$4m^2 + 3 + 6m^2 - 3$

$7 + 5k - 2$

$9t + 3 - 4t - 6 + 2t$

$4n - 8 + 5n$

$4s^2 + 2 - 4s - s^2 + 2s$

$2a + 9 - 2a$

$8p - 4q + 5 + 9p + 4q$

$6 - xy + 2xy$

$7u + 4u - 7v - 2u - 5v$

DAY 21 Practice

A. Select all statements that correctly describe the given expression.

$$9x^2 + 4xy + 6 - 2y + y^2 - 7xy + 1$$

- There are 7 terms in the expression.
- The expression evaluates to 5 when $x = y = 0$.
- The coefficient of y^2 is 0.
- $4xy$ and $7xy$ are like terms.
- $9x^2$ and y^2 are like terms.
- There are two variables: x and y .

B. Circle the pairs of like terms.

$4x$ and $4y$

$8x^2$ and x^2

-16 and 12

$5x^2$ and $5x$

9 and $9x$

$-7x$ and $-x$

$2x$ and $2y$

$6y$ and $6xy$

$-3y$ and $3y$

xy and $-xy$

C. Simplify each expression by combining like terms.

$5a + 9a$

$6r + 3 + 2 + 5r + r$

$5 + 7k - 3$

$6m + 2n - 2m + 5n$

$-x + x + 15$

$9p - 3q + 2 + p + 4$

$4m - 9 + 8$

$2s - 5t + 5s - 2s + 6t$

$9n + 3 - 2n$

$4k^2 - 3k - k^2 + 7 + 3k$

$4b^2 + 3b^2 + 2$

$2x^2 + 4xy + 4y^2 - 5xy$

D. Evaluate each expression for the given value of the variable.

$5a - 3; a = 9$

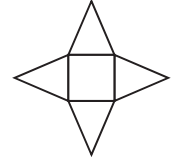
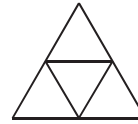
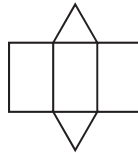
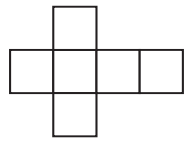
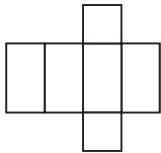
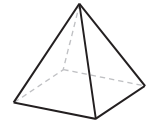
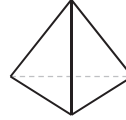
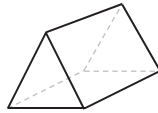
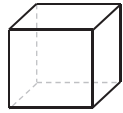
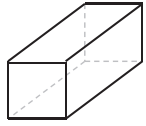
$3 + 6b; b = 4$

$4c \div 5; c = 25$

A math riddle for you! Change 10 10 10 into 9:50 with a single pen stroke.

DAY 36 Surface Area of Prisms

A. A **net** is a 2-dimensional shape that can be folded to form a 3-dimensional object. A net of a polyhedron is made of polygons joined at their edges. Here are some examples. Cover the first row and see if you can visualize the shape formed by each net.



Rectangular prism
(Cuboid)

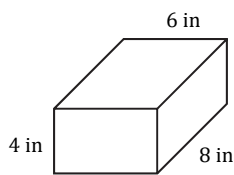
Cube

Triangular prism

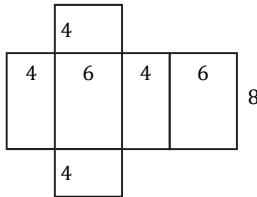
Triangular pyramid

Square pyramid

B. Surface area is the sum of the areas of all surfaces of a 3-dimensional object. The surface area of a prism is the area of its net. Surface area is measured in square units. Here is an example.



Unfold!
⇒



13. The surface area of the cuboid

14. = Front + Top + Left +

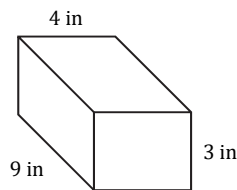
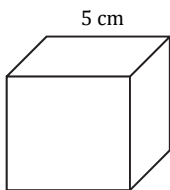
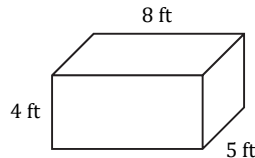
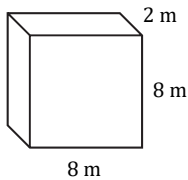
15. Back + Bottom + Right

16. = $(4 \times 6) + (6 \times 8) + (4 \times 8) +$

17. $(4 \times 6) + (6 \times 8) + (4 \times 8)$

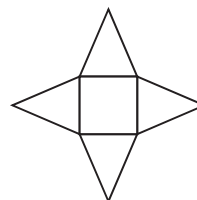
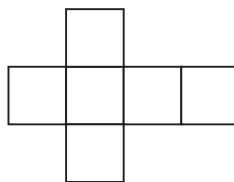
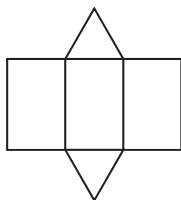
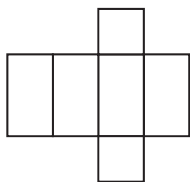
18. = 208 in^2

C. Find the surface area of each solid.

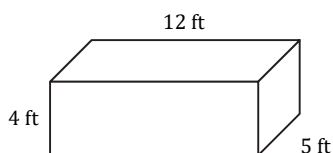


DAY 36 Practice

A. Write the name of the solid formed by each net.



B. Find the area of each face of the prism and then add them all to find its surface area.



Front =

Top =

Left =

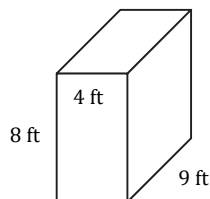
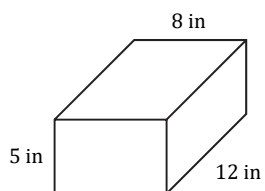
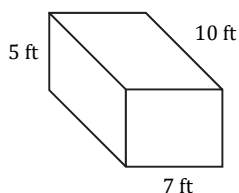
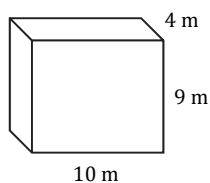
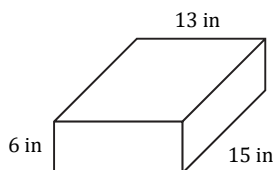
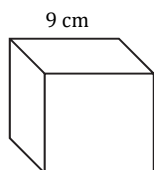
Back =

Bottom =

Right =

Surface area =

C. Find the surface area of each solid.



DAY 92 Catch up and Review!

A. Catch up if you are behind. You can go back and redo a lesson that caused you trouble.

B. Use the review problems below to make sure you're on track. If you get any problem wrong, go back and redo the corresponding day's lesson. Evaluate the expression or solve for x .

Day 63 $\frac{5^2 - 2 \cdot 8}{-3}$

Day 81 $\frac{x}{-7} = -18$

Day 67 $\frac{3.24}{2.7}$

Day 83 $2.96 = -5.2 + x$

Day 69 $6\frac{3}{8} + -3\frac{3}{4}$

Day 84 $x - \frac{5}{6} = \frac{1}{5}$

Day 71 $5\frac{1}{4} \times -3\frac{5}{9}$

Day 85 $7 + \frac{x}{6} = -8$

Day 73 $5\frac{1}{4} \div -2\frac{5}{8}$

Day 86 $-\frac{1}{2}x - \frac{5}{6} = 3\frac{1}{2}$

C. Make sure you know these key terms. Can you explain each term in your own words?

Commutative property

Absolute value

Variable

Associative property

Opposite number

Coefficient

Identity property

Integer

Like terms

Inverse property

Rational number

Inverse operation

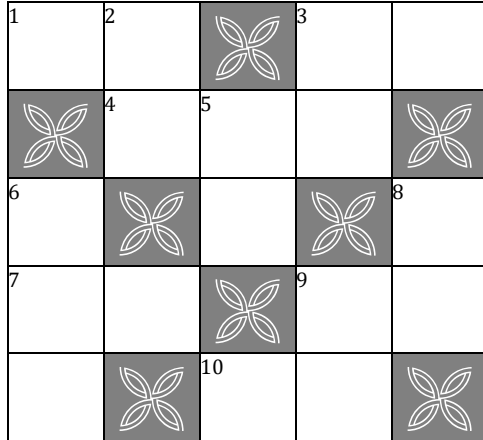
Distributive property

Repeating decimal

Equivalent equation

DAY 92 Practice

A. Solve for x . Use the answers to fill in the crossword puzzle.



Across:

1. $x/5 = 9$

3. $2x - 53 = 95$

4. $x - 216 = -3$

7. $70 = 4x - 82$

9. $35 - 2x = 11$

10. $x + 18 = 64$

Down:

2. $2x - 48 = 56$

3. $15 - x = -58$

5. $8 = 0.4x + 2$

6. $x - 700 = -68$

8. $-17 = 27 - 2x$

9. $x/4 + 3 = 7$

B. Solve each equation. Simplify fractions.

$3.72 - 2.4x = -0.12$

$-2x + 3.74 = 5.54$

$0.4x + 5 = 3.84$

$1\frac{1}{3} + \frac{3}{4}x = 2\frac{1}{4}$

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

$1\frac{3}{8}x - 3\frac{3}{4} = -4\frac{1}{2}$

C. Here is a tricky equation puzzle. Each shape represents a single digit. Can you find the digits?
(Hint: Find the value of the star first.)

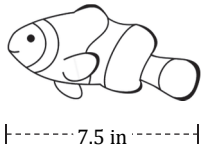
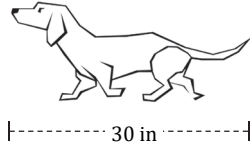
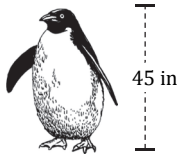
$$\begin{array}{r}
 \bigcirc \quad \text{pentagon} \quad \star \\
 \bigcirc \quad \text{pentagon} \quad \star \\
 + \quad \bigcirc \quad \text{pentagon} \quad \star \\
 \hline
 \star \quad \star \quad \star
 \end{array}$$

$$\begin{array}{l}
 \bigcirc = \underline{\hspace{2cm}} \\
 \text{pentagon} = \underline{\hspace{2cm}} \\
 \star = \underline{\hspace{2cm}}
 \end{array}$$

DAY 113 Scale Drawings

A. A map has a scale of 1 inch = 25 miles and two cities on the map are 3 inches apart. Show how to use a proportion to find the actual distance between the two cities. Review Day 112 if needed.

B. In a scale drawing (or model), the **scale** or **scale factor** is always the ratio of a distance in the drawing to the corresponding distance in the real world. Use an inch ruler to measure the width or height of each model below and find the scale factor as a fraction in simplest form.



C. All models use a scale of 1 to 24. Find the missing dimensions.

Model	Model dimension	Actual dimension
Car	Length: 7 in	Length:
Tree	Height:	Height: 28.8 ft
Desk	Width: 2.5 in	Width:
Whale	Length: 2 ft	Length:
House	Height:	Height: 14.4 ft

D. Solve each problem.

A map has a scale of 0.5 in = 25 miles. What is the actual distance when the distance on the map is 2.2 inches?

Jackson made a scale drawing of a nearby park. In real life, the park is 120 feet wide. In his drawing, it is 8 inches wide. What scale did Jackson use for his drawing?

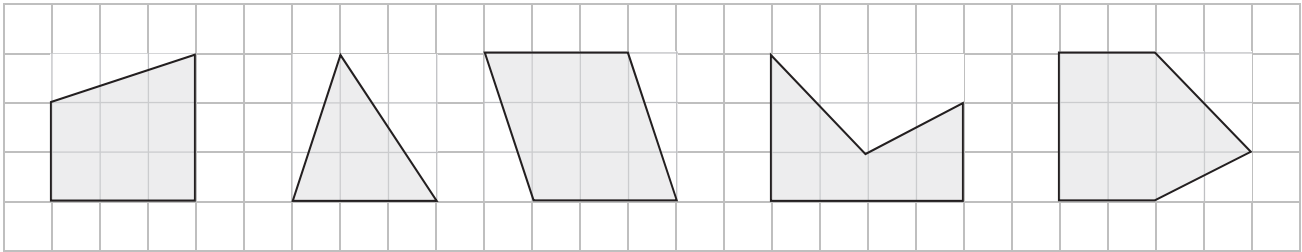
Betty's scale drawing of her house uses a scale of 1 in = 5 feet. The actual dimensions of her house are 55 feet by 80 feet. What are the dimensions of Betty's house on the drawing?

DAY 113 Practice

A. Find the drawing length or actual length for each scale.

Scale	Drawing length	Actual length
1 in = 6 ft	3.5 in	
$\frac{1}{2}$ in : 4 ft	12 in	
1 cm : 5 m		46 m
$\frac{1}{4}$ in : 10 mi		600 mi

B. Below are five polygons scaled down and drawn on 1 cm grid paper. The scale is 1 cm = 4 in. Find the actual area of each shape.



C. Maria is taking a road trip. Her map has a scale of 1 inch = 50 miles. Answer each question.

Maria left Cincinnati for Indianapolis. On her map, the two cities are 2.4 inches apart. What is the actual distance between them?

She left Cincinnati at 9 a.m. and drove at an average speed of 60 mph (miles per hour). What time did she arrive in Indianapolis?

She then drove 240 miles to St. Louis. What would be the distance between Indianapolis and St. Louis on her map?

Maria left Indianapolis at 2 p.m. and reached St. Louis at 5:45 p.m. What was her average speed from Indianapolis to St. Louis?

Maria's car gets 40 miles per gallon. The price of gas is \$2.70/gallon. How much did Maria spend on gas going from Cincinnati to St. Louis?

The straight-line distance between Cincinnati and St. Louis is 6 inches on the map. What is the actual straight-line distance between them?

DAY 152 Sample Spaces

A. A **sample space** is the set of all possible outcomes. It can be represented by using an organized list, a table, or a tree diagram. Shown below is the sample space of tossing a coin twice. The possible outcomes are HH, HT, TH, and TT where H stands for heads and T for tails.

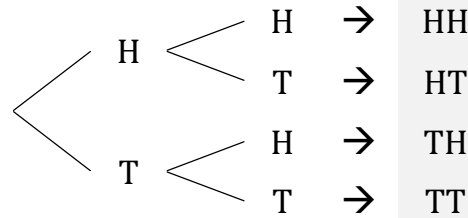
Organized list:

HH, HT, TH, TT

Table:

1st 2nd	H	T
H	HH	HT
T	TH	TT

Tree diagram:



B. The **fundamental counting principle** is a way of figuring out the total number of outcomes without listing them all. It states that if one event has p possible outcomes and another event has q possible outcomes, then there are a total of $p \times q$ possible outcomes for the two events together. In the example above, each coin toss has 2 possible outcomes, so the sample space has $2 \times 2 = 4$ possible outcomes. What if you toss two coins and roll a die? Then the sample space will have $2 \times 2 \times 6 = 24$ possible outcomes.

C. List the sample space for each situation.

Drawing a single coin from a coin jar containing pennies, nickels, dimes, and quarters

Making a 2-digit number using the numbers 1, 2, and 3 with repetition allowed

Tossing a coin three times

D. Find the total number of possible outcomes in each situation.

Jack selects a day from a non-leap year. (A leap year has 366 days.)

Chloe takes a quiz consisting of 5 true-false questions.

Eli tosses a coin and selects a letter from the alphabet.

Brian makes an outfit from 3 different shirts, 3 different pairs of pants, and 2 different pairs of shoes.

Jack buys a combo meal that consists of 1 sandwich, 1 side, and 1 drink. He has 5 choices of sandwiches, 6 choices of sides, and 2 choices of drinks.

DAY 152 Practice

A. List the sample space for each situation.

Drawing a number from 2-digit square numbers

Drawing a letter from the alphabet of 26 letters

Tossing a coin and rolling a die

Answering 3 true-false questions

Making an outfit from 3 shirts (red, blue, and tan) and 2 pairs of pants (tan and blue)

B. Find the total number of possible outcomes in each situation.

Jacob rolls a die twice.

Larry tosses a coin five times.

Jamal rolls a die and selects one day of the week.

Cheryl tosses a coin and selects a month of the year.

Mark selects an integer from 1 to 10 and a letter from the word SAMPLE.

Ron has a choice of ham, tuna, or turkey and a choice of white or wheat bread to make a sandwich.

A café sells fruit smoothies. Chad can choose small, medium, or large. Then he can choose bananas, kiwis, or oranges.

Cheyenne tosses two coins and spins a spinner with eight equal sections numbered 1 through 8.

Alison takes a multiple choice test which consists of 4 questions. Each question has 4 choices. You may use a calculator.

Grace makes a 4-digit password using the numbers 1 to 9 with repetition allowed. You may use a calculator.
