Victoria's Guide to Third Grade Mathematics

Gold Award Project

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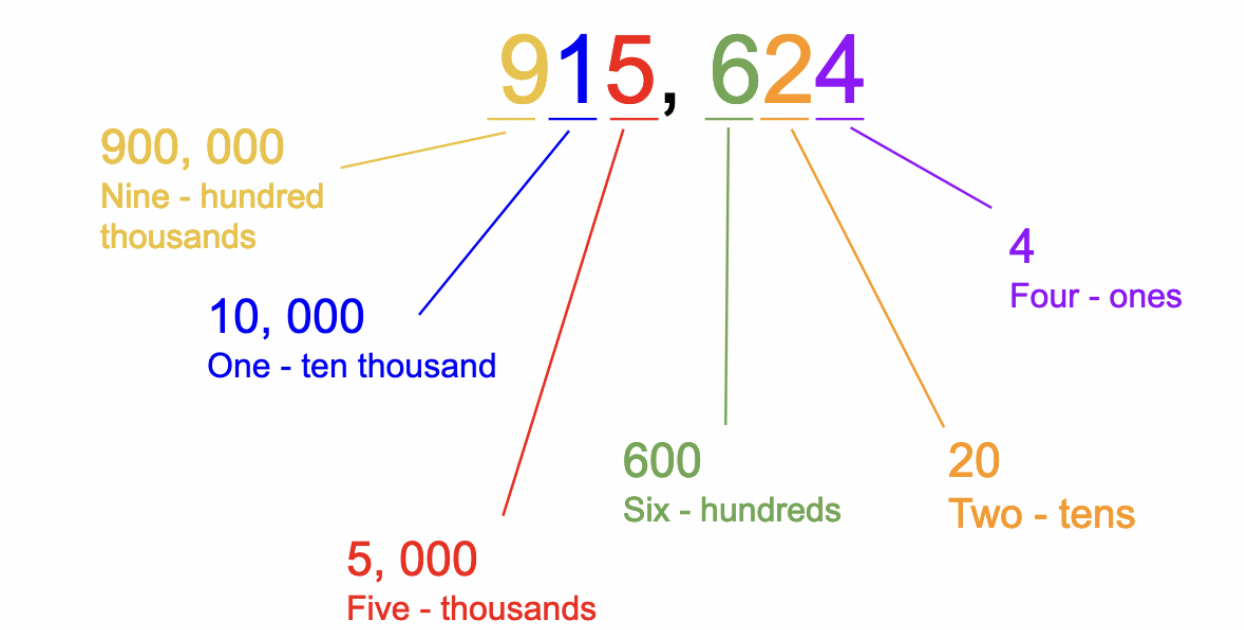
Beginning of Curriculum:

Place Values

System where the position of a digit determines its value



Word form: Nine hundred fifteen thousandths, six hundred twenty four

Place value of 9 → 900,000
Place value of 1 → 10,000
Place value of 5 → 5,000
Place value of 6 → 600
Place value of 2 → 20
Place value of 4 → 4

Total → 915,624

Place Values Practice

1. What are the **values** of the digits underlined?

600,514

answer: 500

2. What is the place value for the digits underlined?

600,514

answer: hundreds

3. Write each number in digit form

Fifty thousand, four hundred and one

answer: 50, 401

Nine hundred forty one thousand, eight hundred and sixty one

answer: 941, 861

Two hundred and twenty two

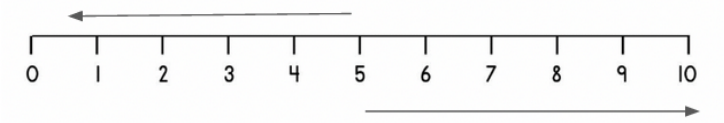
answer: 222

Rounding

Changing a number to make it simpler, while keeping it's value somewhat the same

Four and Below → Closest to 0

Five and Above → Closest to 10



1 (original value) +1 (9 → 10) = 2

5, 619 → 5, 620

Rounds up

5, 611 → 5, 610

Rounds down

Rounds to the nearest ten → last digit is a 0 — 1791 → 1790

Rounds to the nearest hundred → last two digits are 0 — 1791 → 1800

Rounds to the nearest thousand → last three digits are 0 — 1791 → 2000

Rounding Practice

1. Round to the nearest ten:

51	answer: 50
999	answer: 1, 000
1,245	answer: 1,250
9,999	answer: 10,000

2. Round to the nearest hundred:

51	answer: 0
999	answer: 1, 000
1,245	answer: 1,200
9,999	answer: 10,000

3. Round to the nearest thousand:

51	answer: 0
999	answer: 1, 000
1,245	answer: 1, 000
9,999	answer: 10,000

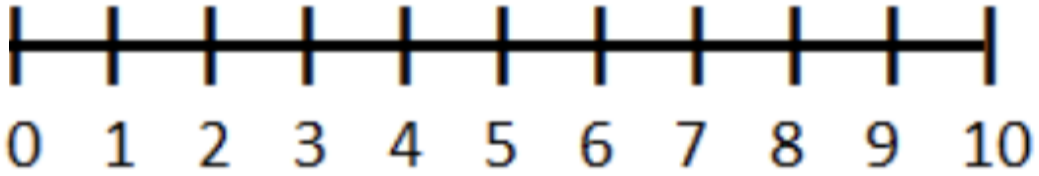
Compare & Order of Numbers

Ordering numbers based on value: larger, smaller, or equal to

$1 < 2$ means 1 is **smaller** than 2 or 2 is **greater** than 1

Numbers pointed to are smaller (1 is pointed at and is smaller)

Numbers opened at are larger (the arrow is opened to 2 and 2 is larger)



Numbers on the left side of the line are **smaller** than numbers on the right side

For example, 0 is **smaller** than 10, thus 0 < 10

2,000 is greater than 1,000 → 2,000 > 1,000

99 is less than 100 → 99 < 100

22 is equal to 22 → 22 = 22

 is less than  →  < 

Larger number > Smaller number

Smaller number < Larger number

Same number = Same number

Compare & Order of Numbers Practice

1. Order the following numbers from greatest to least:

2 and 13 answer: 13, 2

1,387 and 1,388 answer: 1,388, 1.387

10, 11, 25 answer: 25, 11, 10

200 , 210 , 220 , 230 answer: 230, 220, 210, 200

0 and 1 answer: 1, 0

14 and 14 answer: 14, 14

2. Use the symbols <, >, = to show the relationship between the following numbers:

2 is greater than 0 answer: 2 < 0

2,000 is greater than 1,000 answer: 2,000 > 1,000

20 is less than 25 answer: 20 < 25

6,126 is less than 6,127 answer: 6,126 < 6,127

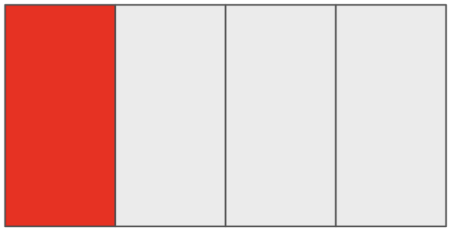
16 is equal to 16 answer: 16 = 16

17 is greater than 10 answer: 17 > 10

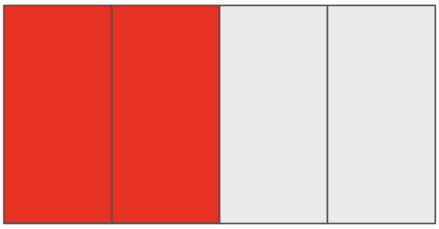
Fractions

Writing out in number form parts of a whole

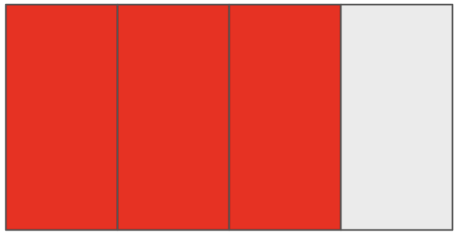
Fraction form: $\frac{\text{Part}}{\text{Whole}}$



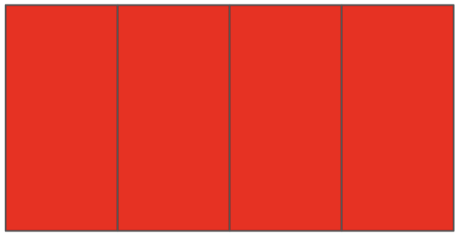
Whole: 4 parts
Red: 1 part
Fraction: 1/4



Whole: 4 parts
Red: 2 parts
Fraction: 2/4

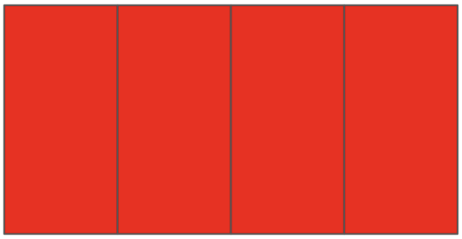


Whole: 4 parts
Red: 3 parts
Fraction: 3/4



Whole: 4 parts
Red: 4 parts
Fraction: 4/4

Fractions pt. 2



Fraction: 4/4 = 1
All parts of the whole = 1

What if the fraction has more parts than the whole? Transform the improper fraction to a proper fraction

Improper fractions: Proper fractions:

$\frac{5}{4}$ Has 5 parts, but 4 parts of the whole → One whole and one part $1\frac{1}{4}$

$\frac{13}{12}$ Has 13 parts, but the whole has only 12 → One whole and one part $1\frac{1}{12}$

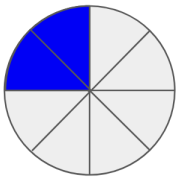
1 wholes = 12 parts
12 + 1 = 13 parts

$\frac{11}{4}$ Has 11 parts, but the whole has only 4 → Two whole sand three parts $2\frac{3}{4}$

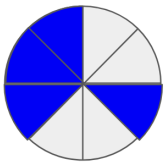
2 wholes = 4 + 4 parts = 8 parts
8 + 3 = 11 parts

Fractions Practice

1. Make fractions from the pictures:



answer: $\frac{2}{8}$



answer: $\frac{4}{8}$

2. Rewrite in fraction form:

2 parts of 11

answer: $\frac{2}{11}$

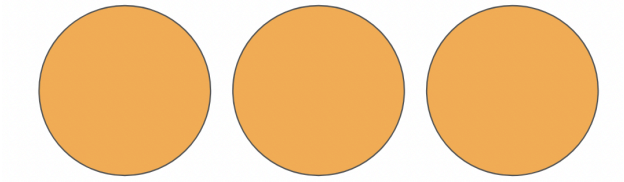
6 slices of a cake that has 11 total slices

answer: $\frac{6}{11}$

3. Rewrite these improper fractions to proper fractions:

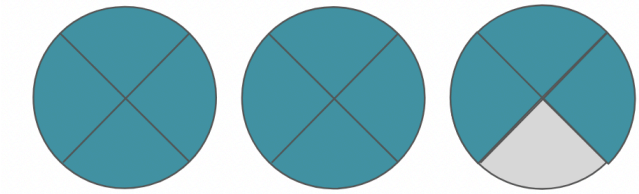
$\frac{3}{1}$

answer: 3



$\frac{11}{4}$

answer: $2\frac{3}{4}$

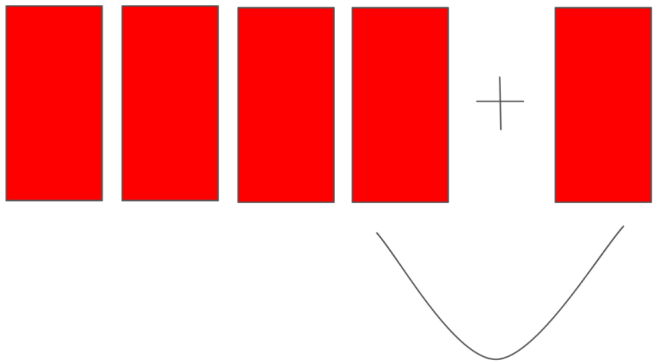


Sum and Difference

Combining numbers together or removing numbers from each other

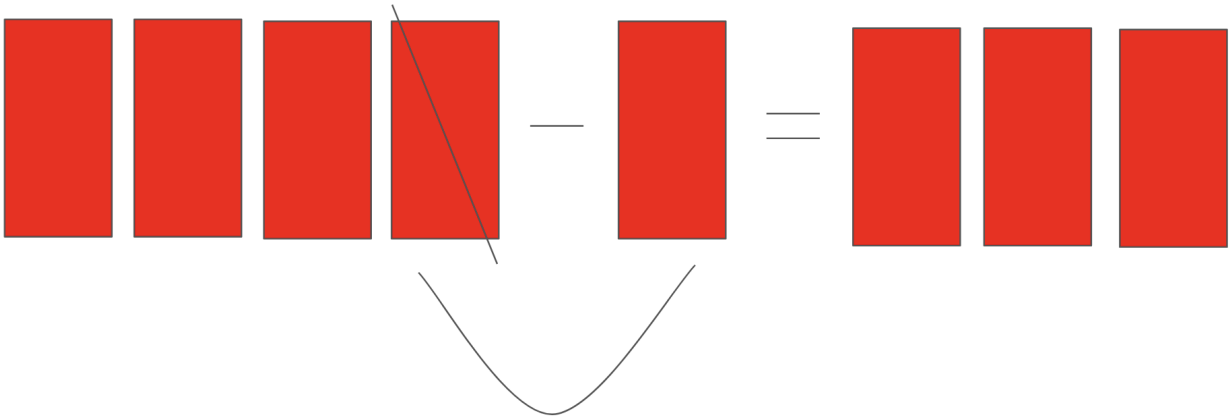
Number + number	→	combine the two numbers
Number #1 - number #2	→	Remove number #2 from number #1

Addition:



Combine 4 and 1

Subtraction:



Cross off 1 from 4

Example:

4 + 1 = 5

4 - 1 = 3

9,999 - 1,000 = 8,999

8,999 - 1,999 = 7,000

Sum and Difference Practice

1. Solve these problems:

20 - 19 =

answer: 1

2,222 - 1,999 =

answer: 223

23 - 16 =

answer: 7

2,222 + 19 =

answer: 2,241

26 + 0 =

answer: 26

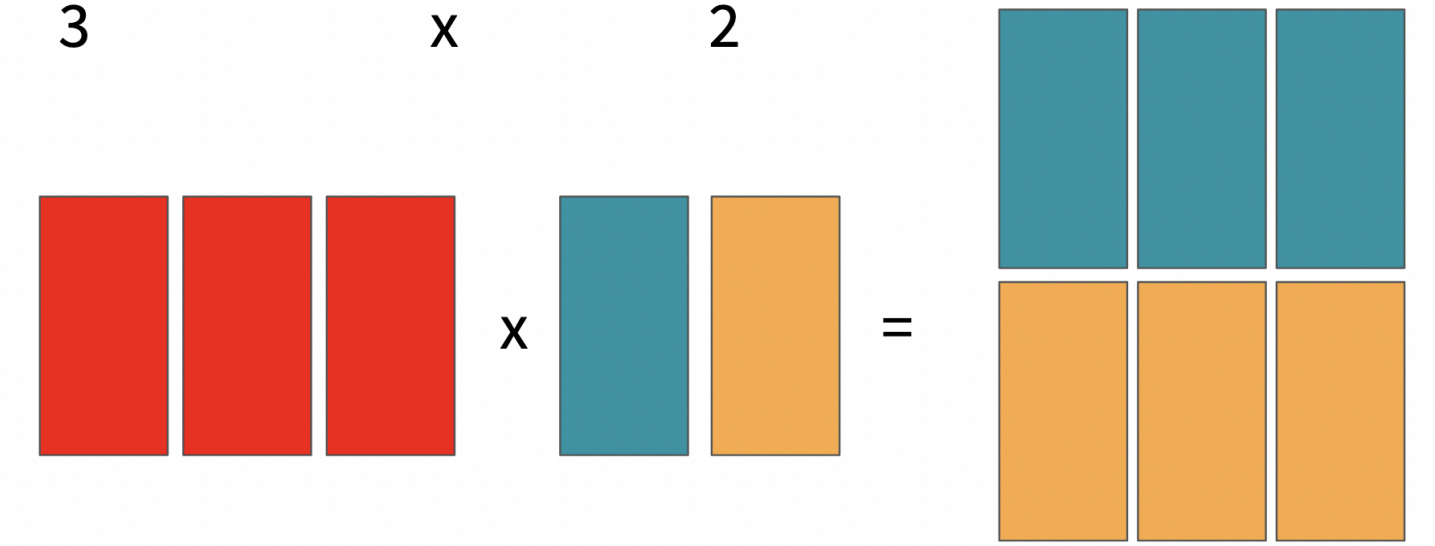
2,481 + 3,030 =

answer: 5,511

Multiplication and Division

Adding or subtracting numbers a certain number of times

Multiplication:

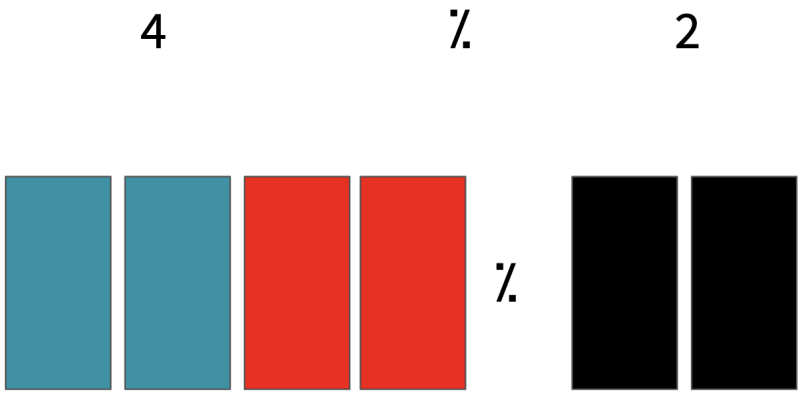


Example:

10 x 5 = 50

16 x 3 = 48

Division: group the first numbers based on the second number



Example:

10 ÷ 5 = 2

92 ÷ 2 = 46

Multiplication and Division Practice

1. Solve these problems:

1 x 1 =

answer: 1

10 x 5 =

answer: 50

32 x 2 =

answer: 64

16 x 1 =

answer: 16

44 ⁚. 2 =

answer: 22

31 ⁚. 1 =

answer: 31

0 ⁚. 2 =

answer: 0

Multiplication Facts

1 x 1 = 1	2 x 1 = 2	3 x 1 = 3	4 x 1 = 4	5 x 1 = 5	6 x 1 = 6	7 x 1 = 7	8 x 1 = 8	9 x 1 = 9	10 x 1 = 10
1 x 2 = 2	2 x2 = 4	3 x 2 = 6	4 x 2 = 8	5 x 2 = 10	6 x 2 = 12	7 x 2 = 14	8 x 2 = 16	9 x 2 = 18	10 x 2 = 20
1 x 3 = 3	2 x 3 = 6	3 x 3 = 9	4 x 3 = 12	5 x 3 = 15	6 x 3 = 18	7 x 3 = 21	8 x 3 = 24	9 x 3 = 27	10 x 3 = 30
1 x 4 = 4	2 x 4 = 8	3 x 4 = 12	4 x 4 = 16	5 x 4 = 20	6 x 4 = 24	7 x 4 = 28	8 x 4 = 32	9 x 4 = 36	10 x 4 = 40
1 x 5 = 5	2 x 5 = 10	3 x 5 = 15	4 x 5 = 20	5 x 5 = 25	6 x 5 = 30	7 x 5 = 35	8 x 5 = 40	9 x 5 = 45	10 x 5 = 50
1 x 6 = 6	2 x 6 = 12	3 x 6 = 18	4 x 6 = 24	5 x 6 = 30	6 x 6 = 36	7 x 6 = 42	8 x 6 = 48	9 x 6 = 54	10 x 6 = 60
1 x 7 = 7	2 x 7 = 14	3 x 7 = 21	4 x 7 = 28	5 x 7 = 35	6 x 7 = 42	7 x 7 = 49	8 x 7 = 56	9 x 7 = 63	10 x 7 = 70
1 x 8 = 8	2 x 8 = 16	3 x 8 = 24	4 x 8 = 32	5 x 8 = 40	6 x 8 = 48	7 x 8 = 56	8 x 8 = 64	9 x 8 = 72	10 x 8 = 80
1 x 9 = 9	2 x 9 = 18	3 x 9 = 27	4 x 9 = 36	5 x 9 = 45	6 x 9 = 54	7 x 9 = 63	8 x 9 = 72	9 x 9 = 81	10 x 9 = 90
1 x 10 = 10	2 x 10 = 20	3 x 10 = 30	4 x 10 = 40	5 x 10 = 50	6 x 10 = 60	7 x 10 = 70	8 x 10 = 80	9 x 10 = 90	10 x 10 = 100

Addition and Subtraction of Fractions

Combining fractions together or removing them from each other

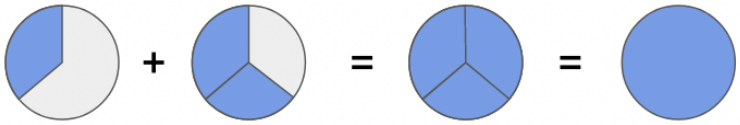
How to combine fractions:

Count how many 'parts' there are to find the total number

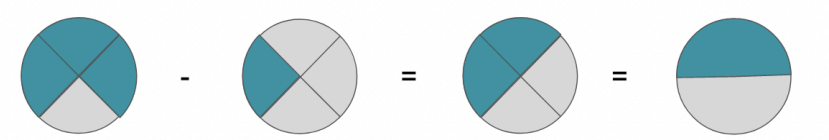
$$1\frac{1}{2} + \frac{1}{2} = 3\,parts + 1\,part = 4\,parts = 2\,wholes$$

Examples:

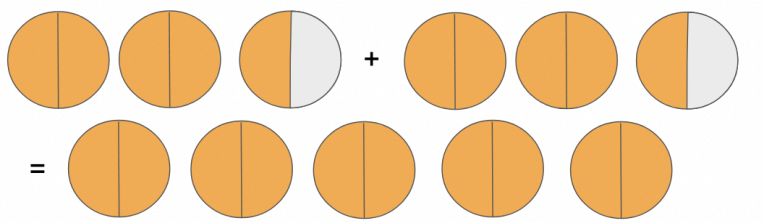
1. $\frac{1}{3} + \frac{2}{3} = \frac{2+1}{3} = \frac{3}{3} = 1$



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



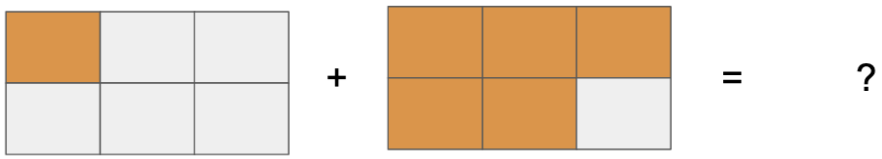
3. $\frac{5}{2} + \frac{5}{2} = \frac{5+5}{2} = \frac{10}{2} = \frac{10 \div 2}{2 \div 2} = \frac{5}{1} = 5$



Addition and Subtraction of Fractions Practice

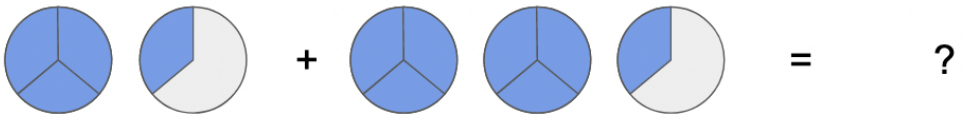
1. Solve these problems:

$\frac{1}{6} + \frac{5}{6} =$



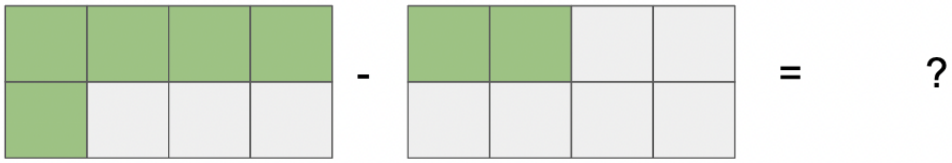
answer: 1

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



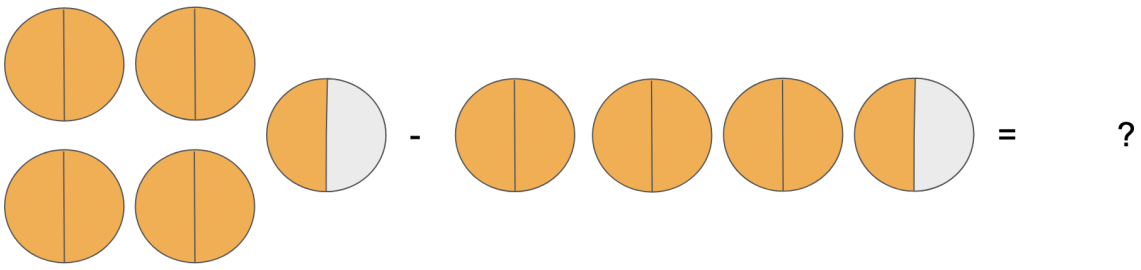
answer: $3\frac{2}{3}$

$\frac{5}{8} - \frac{2}{8} =$



answer: $\frac{3}{8}$

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



answer: 1

Value of Bills and Coins

Finding the value of American currency

Penny: $0.01 

Nickel: $0.05 

Dime: $0.10 

Quarter: $0.25 

Dollar Bill: $1.00 

How to combine coins:

1. Group the coins based on type (pennies with pennies, quarters with quarters)
2. Count how many of each coin you have
3. Find the value of each coin (see above)
4. Combine their values

Examples:

Find the value of 

3 pennies =	$0.03
1 nickel =	$0.05
1 dime =	$0.10
1 quarter =	$0.25
Total =	$0.43

Value of Bills and Coins pt. 2

How to find change:

1. Find the difference between the given amount and the needed amount
2. Express the value in coins

Examples:

Total given: $5.00 Total needed: $1.25

Subtract the needed from the given: $5.00 - $1.25 = $3.75

Total given: $0.25 Total needed: $0.22

Subtract the needed from the given: $0.25 - $0.22 = $0.03

Total given: $0.75 Total needed: $0.66

Subtract the needed from the given: $0.75 - $0.66 = $0.09

Total given: $3.75 Total needed: $3.24

Subtract the needed from the given: $0.51

Value of Bills and Coins Practice

1. Find the total value:

a. 

answer: $0.56

b. 

answer: $2.02

c. 

answer: $1.26

2. Compare (<, >, =) between the two:

a. 

answer: <

b. 

answer: =

c. 

answer: >

3. Find the change given back in coins:

   a. Given: $1.00 Needed: $0.75

   answer: 1 quarter

   b. Given: $5.00 Needed: $4.35

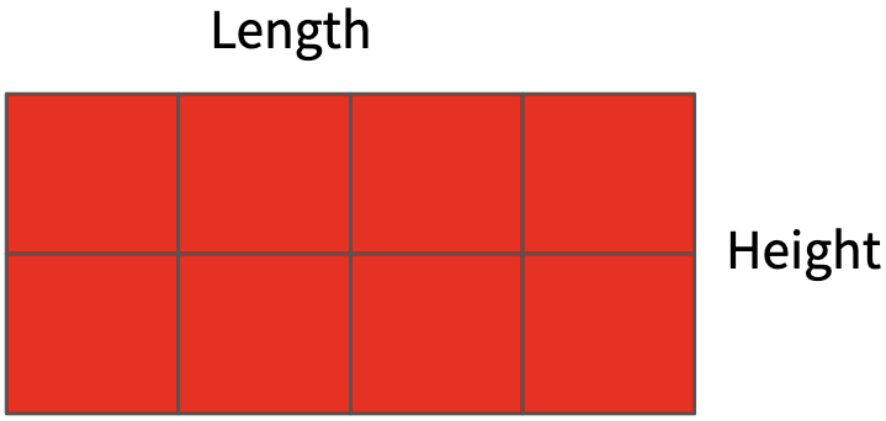
   answer: 2 quarters, 1 dime, 1 nickel

   c. Given: $4.00 Needed: $3.99

   answer: 1 penny

Measuring Distance and Surface Area

Using the metric system to measure lengths and areas



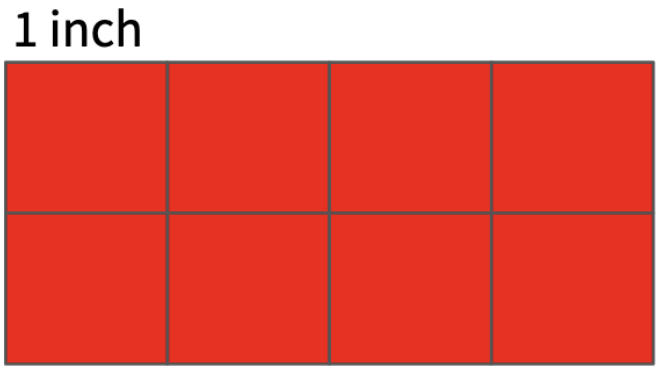
Area = Units that cover the shape

Expressed in square units or units^2

Perimeter = Length around the figure = Length + Length + Height + Height

Expressed in units

Example:



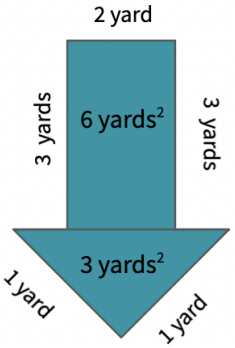
Area = 4 inches x 2 inches = 8 square inches

Perimeter = 4 inches + 4 inches + 2 inches + 2 inches = 12 inches

Measuring Distance and Surface Area Practice

Using the metric system to measure

Find the area of the blue shape.

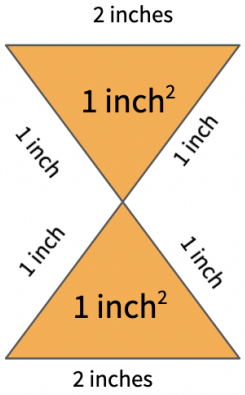


answer: 9 yards²

Find the perimeter.

answer: 10 yards

Find the area of the orange shape.



answer: 2 inches²

Find the perimeter.

answer: 8 inches

Find the area of the green yard.

answer: 12 yards²

If someone wants to build a fence around the whole yard, how many yards of fence would be needed?

answer: 14 yards

Reading Time (Analog and Digital)

Using a clock to measure time

Digital Clock: Displays the time in a number format that is easy to read

Usually has a "pm" or "am" to indicate whether it is the first or second half of the day

Is read as **Hour : Minute**

This clock reads seven twenty-two pm.

Analog Clock: Displays the time using two hands to indicate the hour and minute

Does not have a "pm" or "am" to indicate whether it is the first or second half of the day

The small hand indicates the hour. When the small hand is between two numbers, it is pointing at how far in the hour it is, so the smaller number indicates the hour. This clock's small hand is between 8 and 9, so the hour is 8.

The number the large hand rests on indicates the minute. The tick at 12 is minute 0, the tick next to 12 on the right side is minute 1. The tick at 1 is minute 5. The tick at 2 is minute 10, and so on. This clock is on minute 20.

The thin red (sometimes it is black) hand indicates the second. It is read the same way as a minute hand. Most people do not read out the second when reading analog clocks because of how small a second is. This clock is at 45 seconds.

This clock reads two fifty.

There are 24 hours in a day split up into two 12-hour increments, which is why clocks are read in periods of 12 hours. There are 60 minutes in an hour and 60 seconds in a minute.

Reading time pt. 2

Days, weeks, months, and years

The calendar displays each day in a year. In most years there are 365 days in a year, but every 4 years there is an additional day added to the calendar. The years where there is an additional day are called leap years. That is why there are about 365 and 1/4th days in a year.

June

Mon	Tue	Wed	Thu	Fri	Sat	Sun
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

There are 12 months in a year: January, February, March, April, May, June, July, August, September, October, November, and December.

January has 31 days

February has 28 in a normal years and 29 on leap years

March has 31 days

April has 30 days, May has 31 days

June has 30 days

July has 31 days

August has 31 days

September has 30 days

October has 31 days

November has 30 days

December has 31 days

Reading Time Practice

1. What time do these clocks read?

answer: 9:00

answer: 12:08

answer: 10:08

2. It is currently 4:30pm. Three hours pass by. What time is it now?

answer: 7: 30pm

3. It is currently 10:11am. Four hours pass by. What time is it now?

answer: 2:11 pm

4. How much time has passed between 3:44am and 8:44am?

answer: 5 hrs

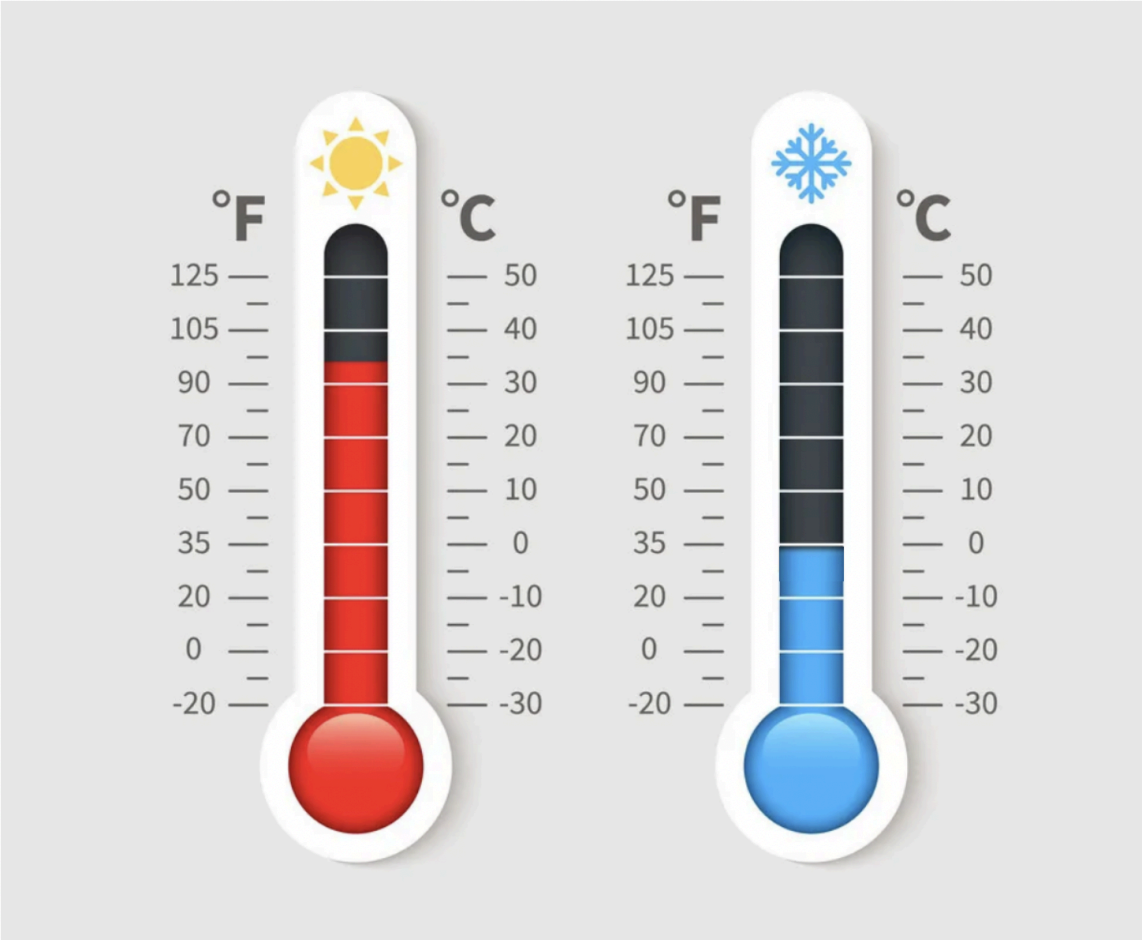
5. How much time has passed between 12:01am and 1:01 pm?

answer: 13 hr

Reading Temperature

Determining the temperature of an environment using Fahrenheit and Celcius

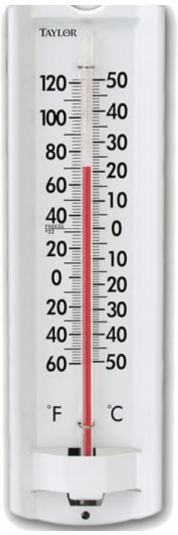
Thermometers: measure the temperature



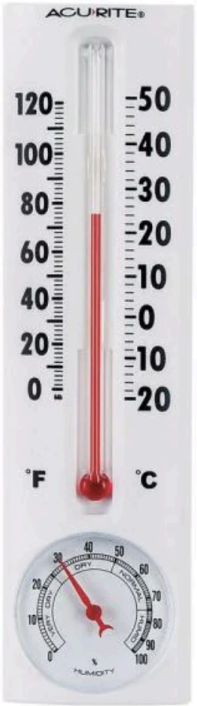
- The higher the liquid level is, the high the temperature and warmer the environment is
- Read Fahrenheit on the left, which is represented by ℉
- Reach Celcius on the right, which is represented by ℃
- The ticks measure the degrees
- The thermometer on the left reads 98 ℉ and 35 ℃
- The thermometer on the right reads 35 ℉ and 0 ℃

Reading Temperature Practice

1. Read these thermometers in Fahrenheit and Celcius to the nearest degree



answer: 70 ℉ and 22 ℃



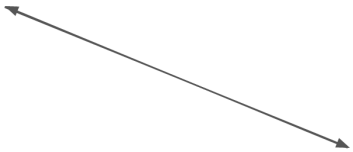
answer: 76 ℉ and 24 ℃

Lines, Line Segments, Rays, & Angles

- Points: an exact location in space with no length, width, or height

although it may seem like this orange point has dimensions, the fact that it is classified as a point means that it does not

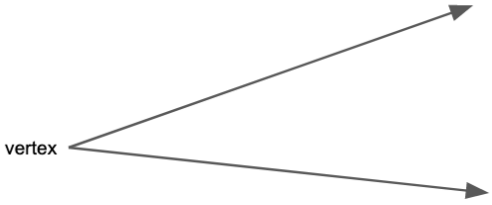
- Lines: collection of points with no endpoints (extends forever); has no width or height

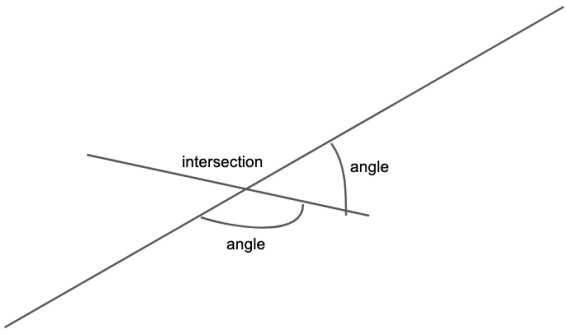


- Line Segments: A piece of line that has endpoints (does not extend forever); has no width or height

- Rays: A piece of line that has one endpoint (extends forever in one direction); has no width or height

- Angles: Two rays that share an endpoint, called the vertex or wherever lines and/or line segments intersect





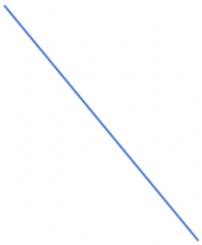
Lines, Line Segments, Rays, and Angles Practice

1. Classify the following as points, lines, line segments, or rays:

answer: line

answer: point

answer: ray

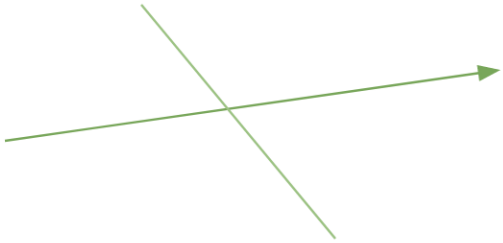


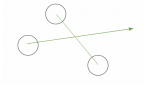
answer: line segment

2. Circle the vertex in the following angle:

answer: 

3. Circle the endpoints in the following drawing:



answer: 

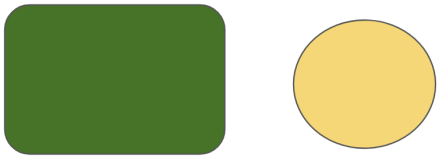
Polygons

A closed plane figure formed by three or more line segments that do not intersect

- The sides of polygons are line segments (cannot have curves), while the angles are formed by the line segments' endpoints meeting at a vertex

These are polygons:

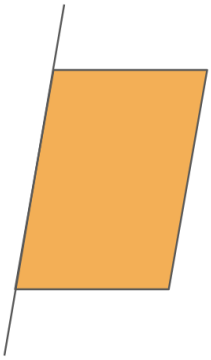
These are not polygons:



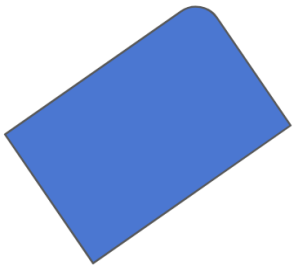
- Triangle: polygon with **three** sides
- Quadrilateral: polygon with **four** sides
- Pentagon: polygon with **five** sides
- Hexagon: polygon with **six** sides
- Heptagon: polygon with **seven** sides
- Octagon: polygon with **eight** sides
- Nonagon: polygon with **nine** sides
- Decagon: polygon with **ten** sides

Polygons Practice

1. Identify if the following shapes are polygons, and if they are, classify them:

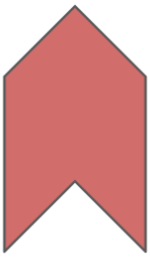


answer: yes, quadrilateral



answer: no

answer: yes, heptagon

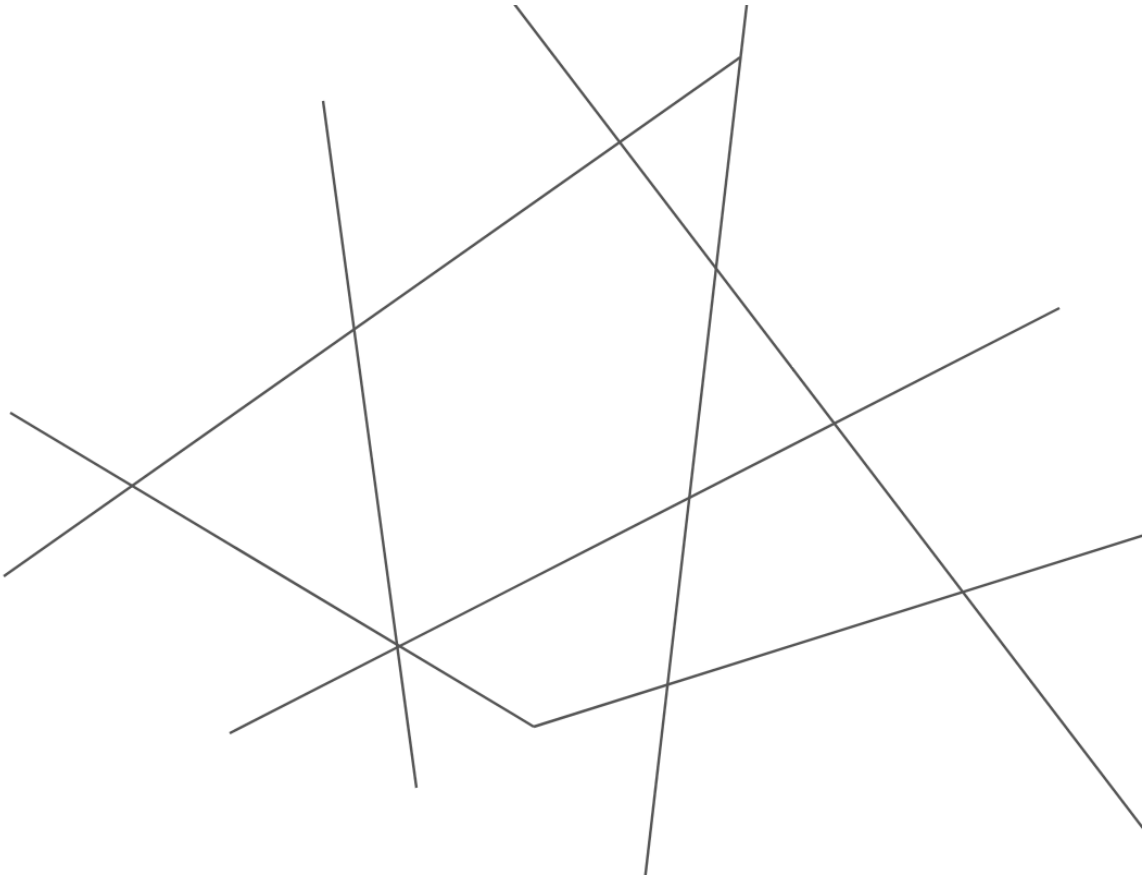


answer: yes, hexagon

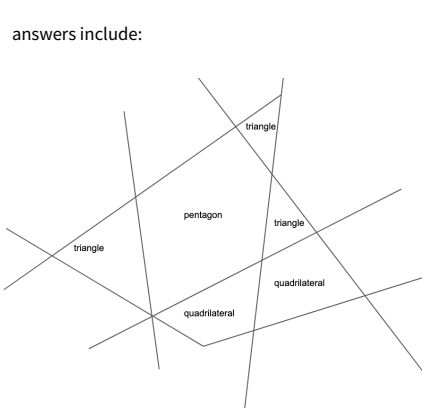
answer: no

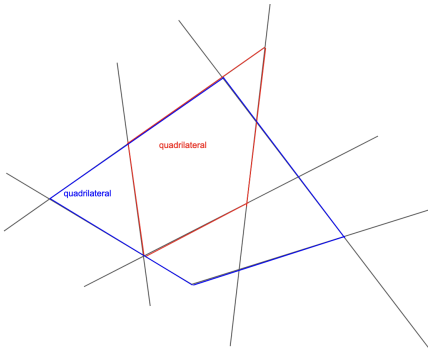
Combining and Subdividing Polygons Practice

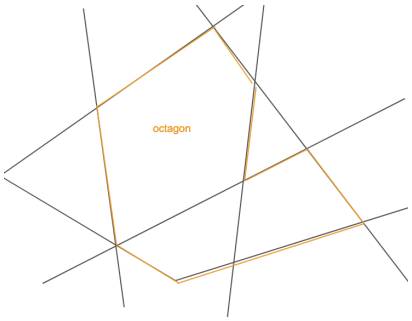
1. Identify as many polygons as you can in this picture and classify them

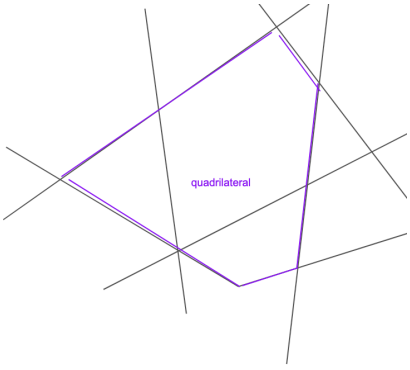


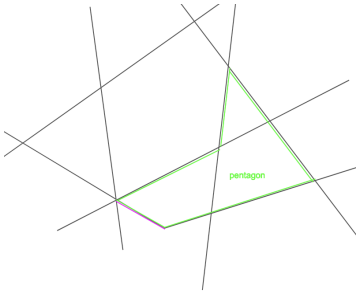
answers include:

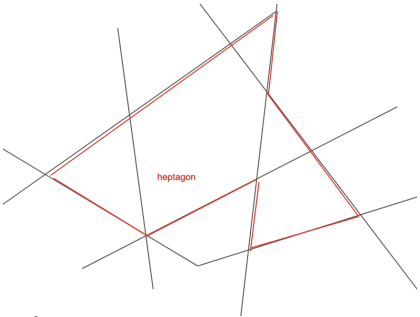


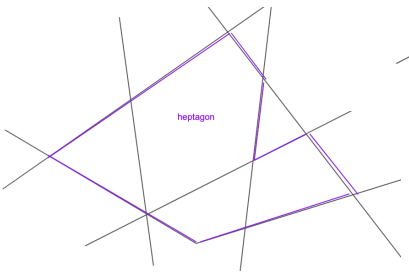






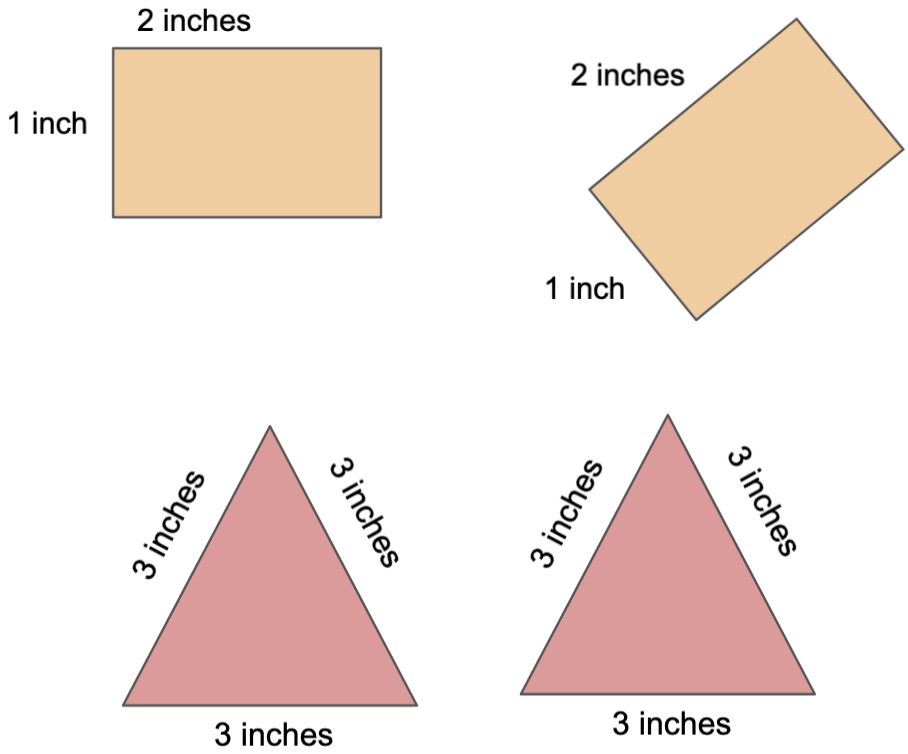




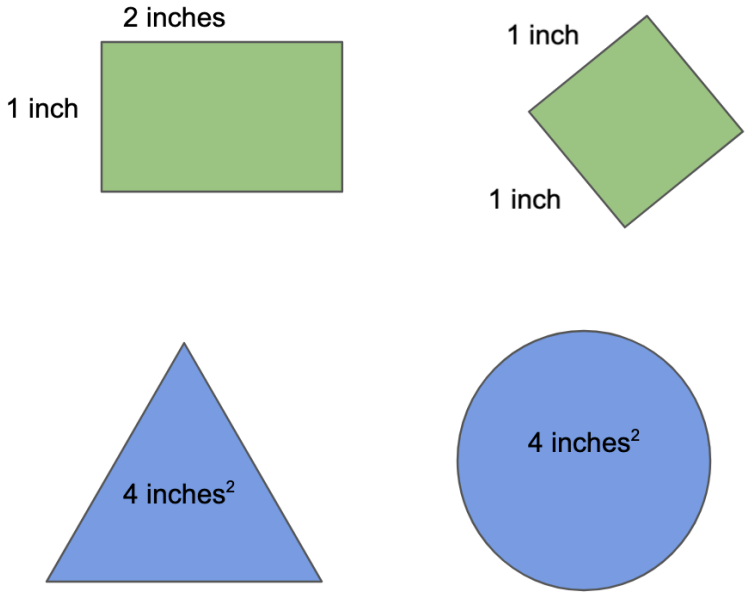


Congruent & Noncongruent Figures

Congruent Figures: Figures that have the same size and shape

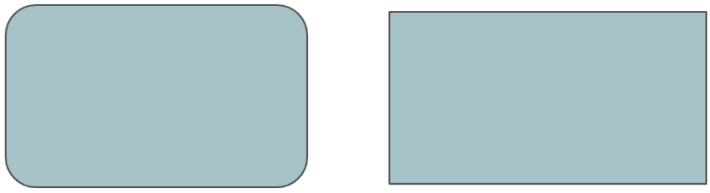


Noncongruent Figures: Figures that do not have the same size and shape

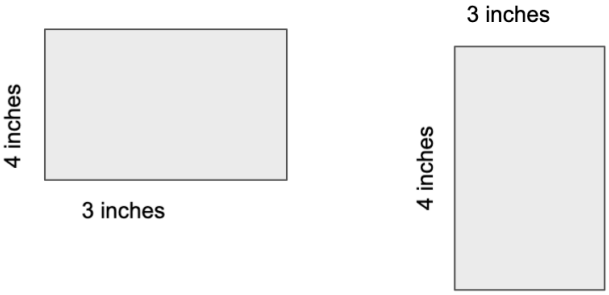


Congruent & Noncongruent Figures Practice

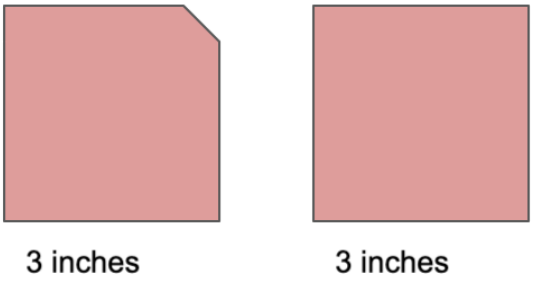
1. Determine whether the following figures are congruent



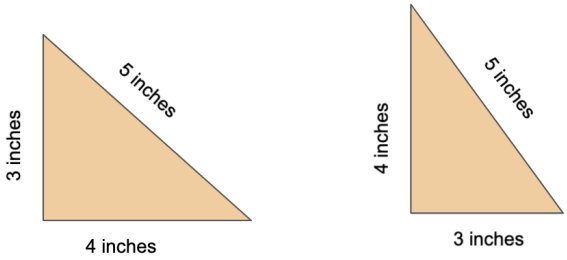
answer: noncongruent



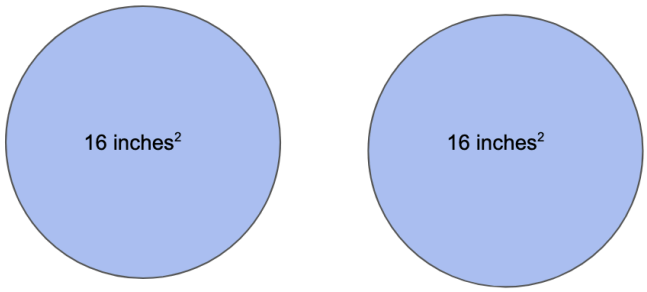
answer: congruent



answer: noncongruent



answer: congruent



answer: congruent

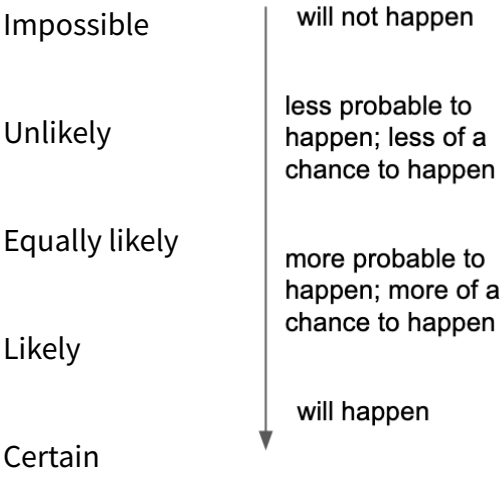
Probability

Measurement of Chance

Probability is the measurement of the chance of an event to occur (or to reach an outcome)

Experimental probability: the measurement of chance by performing an experiment. For example, experimenting with flipping a coin. The more trials that are done (the act of flipping the coin), the more accurate your measurement of chance is.

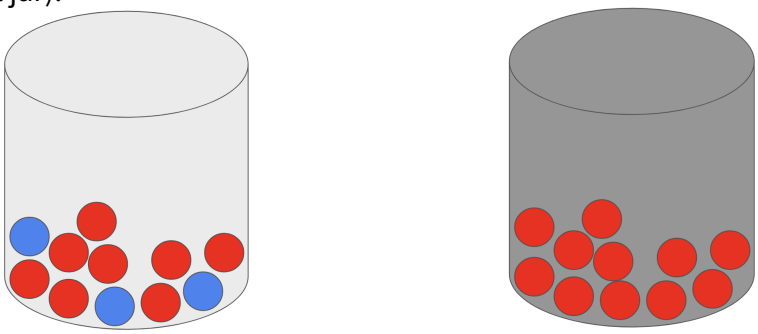
Terms to describe probability:



Outcome: the events that can happen. When flipping a coin, the outcomes are heads and tails. When guessing the weather for tomorrow, the outcomes can include rainy, snowy, sunny, and cloudy.

Examples:

It is likely that you will pick a red marble and unlikely that you will pick a blue marble from the light gray jar (left jar).



It is certain that you will pick a red marble and impossible that you will pick a blue marble from the dark gray jar (right jar).

Probability Practice

1. List as many outcomes as you can for the following events:

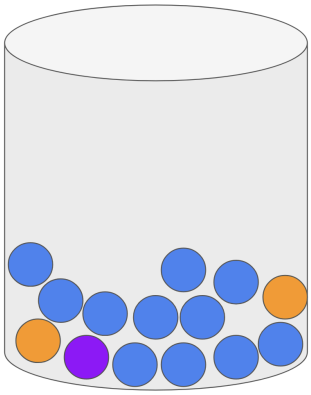
   Rolling a six sided dice

   answer: 1, 2, 3, 4, 5, 6

   Randomly picking a fruit out of this basket:

   answer: orange, apple, pear, kiwi

2. Write a statement about the probability of the outcomes below:



   Picking a purple marble out of the jar above

   answer: it is unlikely to pick a purple marble

   Picking a blue marble out of the jar above

   answer: it is likely to pick a blue marble

   Picking a green marble out of the jar above

   answer: it is impossible to pick a green marble

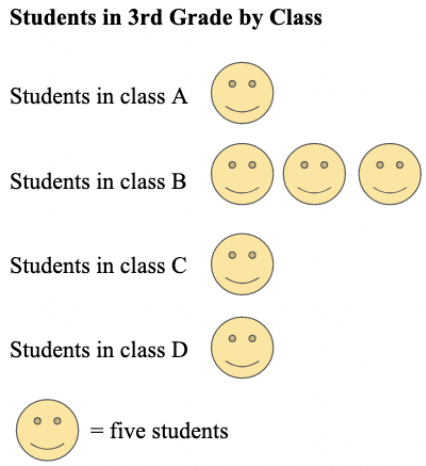
   Picking an orange marble out of the jar above

   answer: it is unlikely to pick an orange marble

Pictographs and Bar Graphs

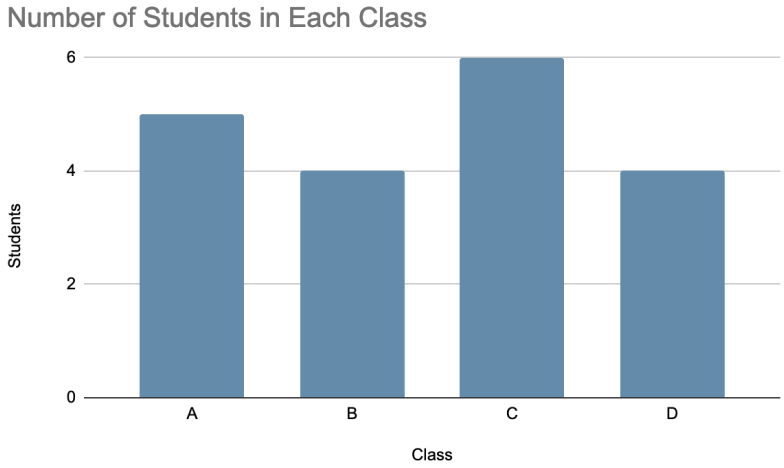
Using graphs the analyze data

Pictographs: uses images or symbols to represent data



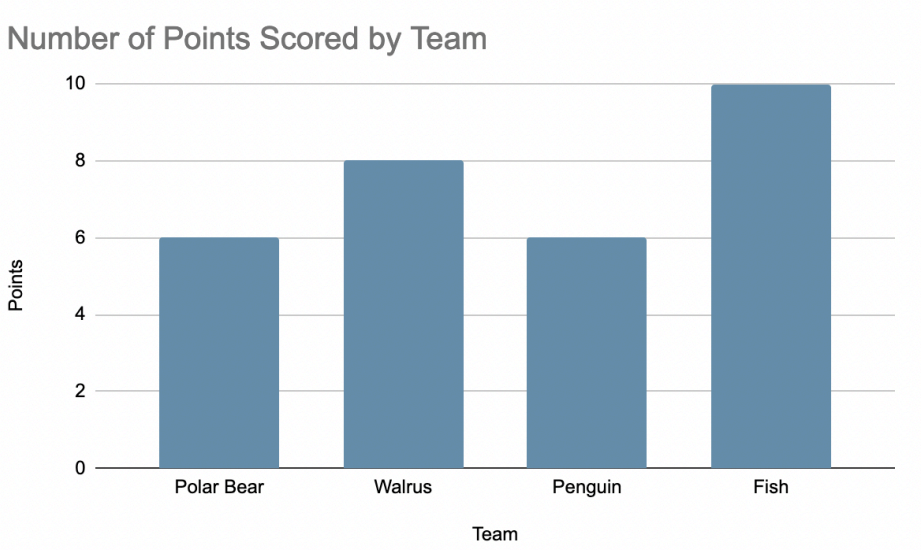
In this pictograph, each smiley face represents five students, so there are 5 students in class A, 15 students in class B, 5 students in class C, and 5 students in class D.

Bar Graphs: use increments to represent categorical data



The bar graph represents the same data as the pictograph above, so there are 5 students in class A, 4 students in class B, 6 students in class C, and 4 students in class D.

Pictographs and Bar Graphs Practice

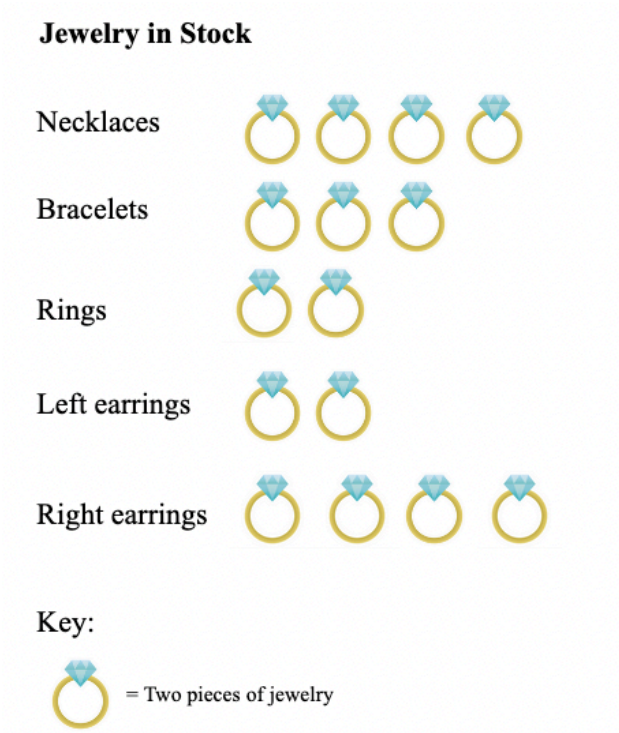


1. How many points did team Polar Bear earn?
2. Which team earned the most points?
3. What is the title of this bar graph?

answer: 6

answer: Fish

answer: Numbers of Points Scored by Team



4. How many rings are in stock?
5. How many necklaces are in stock?
6. Which category(s) of jewelry is least in stock?
7. Which item(s) should the jeweler restock?

answer: 30

answer: 8

answer: Left earrings and rings

answer: Left earrings and rings

Patterns

Sets of numbers or symbols that repeat or relate to each other

Numeric Repeating Patterns: A sequence of numbers that repeat

Examples:

2, 8, 5, 2, 8, 5, 2, 8, 5, 2, 8, 5…

3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3…

Numeric Growing Patterns: A series of numbers that change in value

Examples:

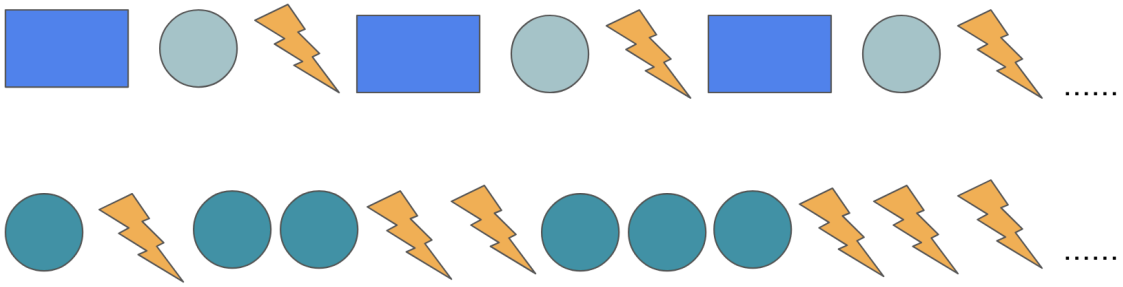
1, 2, 3, 4, 5, 6, 7, 8, 9…

3, 10, 17, 24, 31…

60, 55, 50, 45, 40, 35, 30…

Geometric Figure Patterns: A series of figures that either repeats or grows

Examples:



Rule: the rule is how a pattern changes. This applies to growing patterns, where you are adding or subtracting, and to repeating patterns, where the core is repeating. For tables, rules tell you what to do with the input values.

Examples:

3, 10, 17, 24, 31… Rule is to add 7

60, 55, 50, 45, 40, 35, 30… Rule is to subtract 5

Rule: Add 3

Input	Output
1	4
5	8
9	12

Patterns Practice

1. Find the rule for the patterns below

   4, 6, 8, 10, 12…

   answer: add 2

   10, 20, 30, 40, 50 …

   answer: add 10

   50, 40, 30, 20, 10 …

   answer: subtract 10

   answer: add 

2. Find the missing term in the patterns below

   16, 13, __, 7, 4, 1 …

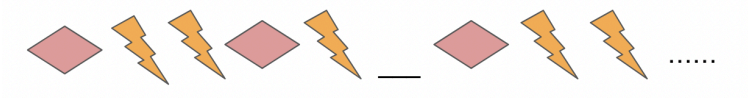
   answer: 10

   37, 41, __, __, 53 …

   answer: 45, 49

   __, 22, 31, 40, __ …

   answer: 13, 49

   answer: lightning bolt

3. Find the output values for the table below

   Rule: Add 6

Input	Output
6	answer: 12
13	answer: 19
20	answer: 26

4. List the first four terms based on the rule and starting value

   rule: subtract 3 25, __, __, __

   answer: 25, 22, 19, 16

   rule: add 4 7, __, __, __

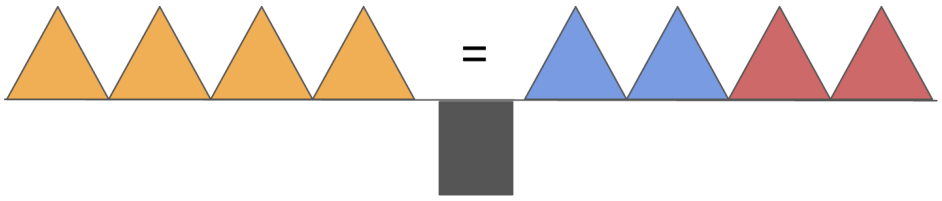
   answer: 7, 11, 15, 19

Equations

Used to represent things of equal value

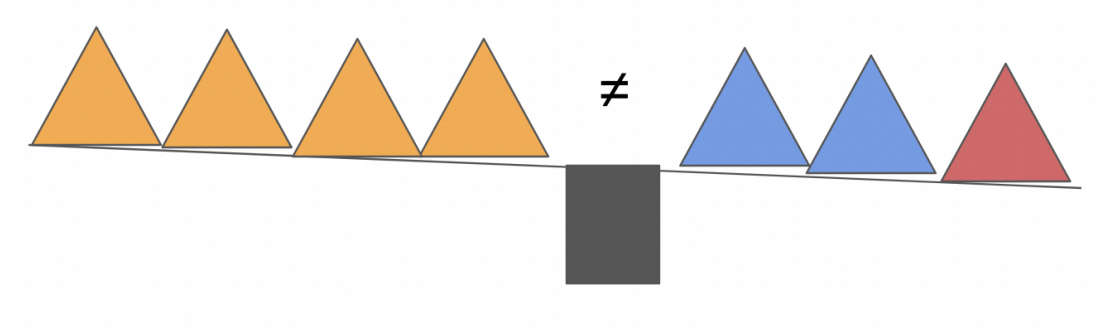
= is used to represent two balanced things, one on each side, of equal value

For example: 4 = 2 + 2



≠ is used to represent two unbalanced things, one on each side, not of equal value

For example: 4 ≠ 2 + 1



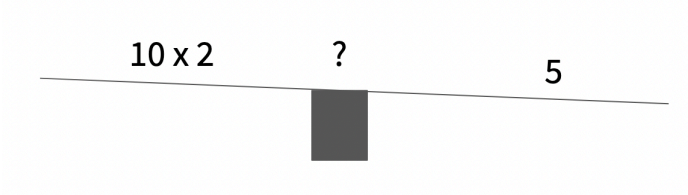
Equation: any mathematical expression with an equal sign (cannot use ≠). Each side of the equal sign is balanced, meaning they have the same value

Equations Practice:

1. Fill in the blanks

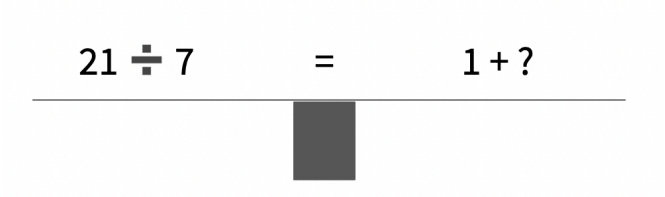
   10 x 2 __ 5

   answer: ≠



   21 ÷ 7 = 1 + __

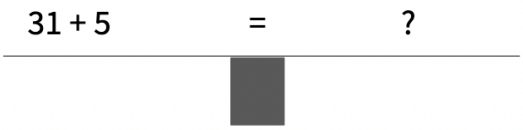
   answer: 2



2. Create your own left side of the equation

   31 + 5 =

   answers can include: 36, 30+6, …



   20 =

   answers can include: 5 x 4, 19 + 1, …