

# Spark of Math

## Teacher Book 5



Second Edition  
2023

# Spark of Math

BOOK 5

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# C o n t e n t s

## Unit 1 | Understanding Operations and their order

(1-1) Multiplication up to 3-Digits by 2-Digits	6
(1-2) Division of 3-Digits by 2-Digits.	8
(1-3) Divisibility.	10
(1-4) Order of Operations.	15
(1-5) Problem Solving.	18
Show Your Turn.	20

## Unit 2 | Fractions and Decimals

(2-1) Mixed numbers.	24
(2-2) Simplifying Fractions.	26
(2-3) Adding Fractions.	28
(2-4) Subtracting Fractions.	32
(2-5) Decimals.	35
(2-6) Comparing Decimals.	39
(2-7) Problem Solving.	41
Show Your Turn.	42

## Unit 3 | Measurement and Geometry

(3-1) Metric Units.	48
(3-2) Volume Units.	51
(3-3) Capacity Units.	53
(3-4) Mass Units.	54
(3-5) Measuring Angles.	56
(3-6) Problem Solving.	58
Show Your Turn.	59

## Unit 4 | Statistics

(4-1) Bar Graph.	62
(4-2) Line Graph.	65
(4-3) Circle Graph.	68
Show Your Turn.	70





$$= (14 + \frac{4}{7}) + (10 + \frac{2}{3}9)$$
$$p(48 + 13c)(35 - 189)$$
$$z = \frac{3}{4}(\frac{p}{68} - \frac{c}{13})(88 + 122)$$

# Unit 1

## Understanding Operations and their order



## Vocabulary.

- Multiply
- Multiplication
- Factors
- Divide
- Divisibility
- Order of operations
- Mathematical expression
- Multiplicand
- Multiplier
- Product
- Division
- Remainder

## Objectives.



- Multiply up to 3-digits by 2-digits.
- Multiply up to 3-digits by 2-digits using the partial method.
- Divide up to 3-digits by 2-digits.
- Apply divisibility rules of (2, 3, 6, 5 and 10).
- Use order of operations to solve mathematical expressions.
- Solve multiplication and division problems in given contexts.





# (1-1) Multiplication up to 3-Digits by 2-Digits.

factors

$$\left\{ \begin{array}{l} 781 \longrightarrow \text{multiplicand} \\ \times 95 \longrightarrow \text{multiplier} \\ \hline 74195 \longrightarrow \text{product} \end{array} \right.$$

- First step:** multiply the ones digit of the bottom factor (multiplier) by the top factor (multiplicand) and write the result on the line below. ( $5 \times 781$ )

1

$$\begin{array}{r} \phantom{0}^4 781 \\ \times \phantom{0} 95 \\ \hline 3905 \end{array}$$

- Second step:** multiply the digit in the tens digit of the bottom factor by the top factor and write the result on the line below. ( $90 \times 781$ )

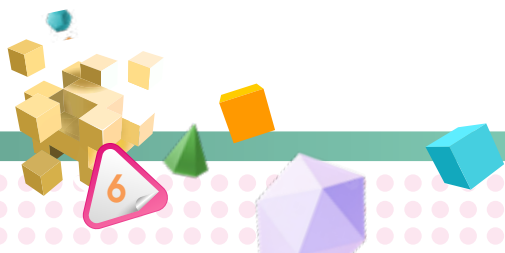
2

$$\begin{array}{r} \phantom{0}^7 781 \\ \times \phantom{0} 95 \\ \hline 3905 \\ 70290 \end{array}$$

- Third step:** add the products.

3

$$\begin{array}{r} \phantom{0}^7 781 \\ \times \phantom{0} 95 \\ \hline 3905 \\ + 70290 \\ \hline 74195 \end{array}$$



## Multiply.

$$\begin{array}{r} 621 \\ \times 13 \\ \hline 8,073 \end{array}$$

$$\begin{array}{r} 153 \\ \times 64 \\ \hline 9,792 \end{array}$$

$$\begin{array}{r} 407 \\ \times 52 \\ \hline 21,164 \end{array}$$

## Fill the missing numbers.

$$\begin{array}{r} 50 \\ \times 93 \\ \hline + \boxed{1} \boxed{5} \boxed{0} \\ \boxed{4} \boxed{5} \boxed{0} \boxed{0} \\ \hline \boxed{4} \boxed{6} \boxed{5} \boxed{0} \end{array}$$

$$\begin{array}{r} 74 \\ \times 67 \\ \hline + \boxed{5} \boxed{1} \boxed{8} \\ \boxed{4} \boxed{4} \boxed{4} \boxed{0} \\ \hline \boxed{4} \boxed{9} \boxed{5} \boxed{8} \end{array}$$

$$\begin{array}{r} 876 \\ \times 59 \\ \hline + \boxed{7} \boxed{8} \boxed{8} \boxed{4} \\ \boxed{4} \boxed{3} \boxed{8} \boxed{0} \boxed{0} \\ \hline \boxed{5} \boxed{1} \boxed{6} \boxed{8} \boxed{4} \end{array}$$

## Answer using the partial product method. Check using a calculator.

$$\begin{array}{r} 615 \\ \times 47 \\ \hline \boxed{3} \boxed{5} \quad 7 \times 5 \\ \boxed{7} \boxed{0} \quad 7 \times 10 \\ \boxed{4} \boxed{2} \boxed{0} \boxed{0} \quad 7 \times 600 \\ \boxed{2} \boxed{0} \boxed{0} \quad 40 \times 5 \\ \boxed{4} \boxed{0} \boxed{0} \quad 40 \times 10 \\ + \boxed{2} \boxed{4} \boxed{0} \boxed{0} \boxed{0} \quad 40 \times 600 \\ \hline \boxed{2} \boxed{8} \boxed{9} \boxed{0} \boxed{5} \end{array}$$

$$\begin{array}{r} 903 \\ \times 86 \\ \hline \boxed{1} \boxed{8} \quad 6 \times 3 \\ \boxed{5} \boxed{4} \boxed{0} \boxed{0} \quad 6 \times 900 \\ \boxed{2} \boxed{4} \boxed{0} \quad 80 \times 3 \\ + \boxed{7} \boxed{2} \boxed{0} \boxed{0} \boxed{0} \quad 80 \times 900 \\ \hline \boxed{7} \boxed{7} \boxed{6} \boxed{5} \boxed{8} \end{array}$$

### Your Work

Write two numbers of 3-digits and 2-digits, find their product, then check your answer.





## (1-2) Division of 3-Digits by 2-Digits.

The 5 is placed directly above the 9

$5 \times 15 = 75$   
75 goes directly below the 89

The remainder, the difference between 89 & 75, goes under the 75

$$\begin{array}{r}
 059 \text{ r}10 \\
 15 \overline{) 895} \\
 \underline{-75} \phantom{0} \\
 145 \\
 \underline{-135} \\
 10
 \end{array}$$

The number from the ones column is then dropped down next to the 14

## Divide.

$$\begin{array}{r}
 063 \\
 12 \overline{) 756} \\
 \underline{72} \phantom{0} \\
 036 \\
 \underline{36} \\
 00
 \end{array}$$

$$\begin{array}{r}
 016 \\
 32 \overline{) 516} \\
 \underline{32} \phantom{0} \\
 196 \\
 \underline{192} \\
 004
 \end{array}$$

$$\begin{array}{r}
 005 \\
 65 \overline{) 388} \\
 \underline{325} \\
 063
 \end{array}$$





 Find the missing numbers.

$$\begin{array}{r}
 315 \\
 \hline
 \begin{array}{r}
 12 \\
 \hline
 \end{array}
 \begin{array}{r}
 3781 \\
 \hline
 36 \\
 \hline
 18 \\
 \hline
 12 \\
 \hline
 61 \\
 \hline
 60 \\
 \hline
 \text{R } 1
 \end{array}
 \end{array}$$

$$\begin{array}{r}
 271 \\
 \hline
 \begin{array}{r}
 20 \\
 \hline
 \end{array}
 \begin{array}{r}
 5433 \\
 \hline
 40 \\
 \hline
 143 \\
 \hline
 140 \\
 \hline
 33 \\
 \hline
 20 \\
 \hline
 \text{R } 13
 \end{array}
 \end{array}$$

$$\begin{array}{r}
 290 \\
 \hline
 \begin{array}{r}
 31 \\
 \hline
 \end{array}
 \begin{array}{r}
 9005 \\
 \hline
 62 \\
 \hline
 280 \\
 \hline
 279 \\
 \hline
 015 \\
 \hline
 000 \\
 \hline
 \text{R } 15
 \end{array}
 \end{array}$$

$$\begin{array}{r}
 336 \\
 \hline
 \begin{array}{r}
 25 \\
 \hline
 \end{array}
 \begin{array}{r}
 8420 \\
 \hline
 75 \\
 \hline
 92 \\
 \hline
 75 \\
 \hline
 170 \\
 \hline
 150 \\
 \hline
 \text{R } 20
 \end{array}
 \end{array}$$



## (1-3) Divisibility.

A number is **divisible** by another number, when you divide, the remainder is 0.

$$\begin{array}{r} 3 \\ 8 \overline{) 24} \\ \underline{- 24} \\ 0 \end{array}$$

24 is divisible by 8.

$$\begin{array}{r} 2 \\ 9 \overline{) 24} \\ \underline{- 18} \\ 6 \end{array}$$

24 is not divisible by 9.

Since the remainder is 0, then 24 is divisible by 8, 8 is called a **factor** of 24.

Here are all the factors of 24.

Factors of 24: 1, 2, 3, 4, 6, 8, 12, 24

Are the following numbers divisible by 3, 5, 6 and 8.

Complete the tables with (✓) or (✗).

	3	5	6	8
408	✓	✗	✓	✓
176	✗	✗	✗	✓
900	✓	✓	✓	✗
6120	✓	✓	✓	✓





## Divisibility by 2, 3 and 6.

complete

	divisible by 2	divisible by 3	divisible by 6
42	✓	✓	✓
30	✓	✓	✓
18	✓	✓	✓
64	✓	✗	✗
81	✗	✓	✗
66	✓	✓	✓
702	✓	✓	✓

a

When the number is even (ending in 0, 2, 4, 6 or 8)

b

When the number is divisible by both 2 and 3.

Example: 924 is divisible by 2 and 3

c

When the sum of the numbers digits is divisible by 3.

Example:  $285:2+8+5=15$

The number is divisible by 2 when

(a, b, c)

The number is divisible by 3 when

(a, b, c)

The number is divisible by 6 when

(a, b, c)



1

Circle the numbers that are divisible by 2.

100

233

46

1,131

960

2,109

2

Circle the numbers that are divisible by 3.

504

99

1,000

339

23

7,125

3

Circle the numbers that are divisible by 6.

4,222

333

7,770

6,606

999

1,134



**Divisibility by 5 and 10.**

	Divisible by 5	Divisible by 10
300	✓	✓
204	✗	✗
516	✗	✗
9105	✓	✗
2070	✓	✓

The number is divisible by 5 when it ends with 5 or 0

The number is divisible by 10 when it ends with 0

**Circle the numbers that are divisible by both 5 and 10.**

367

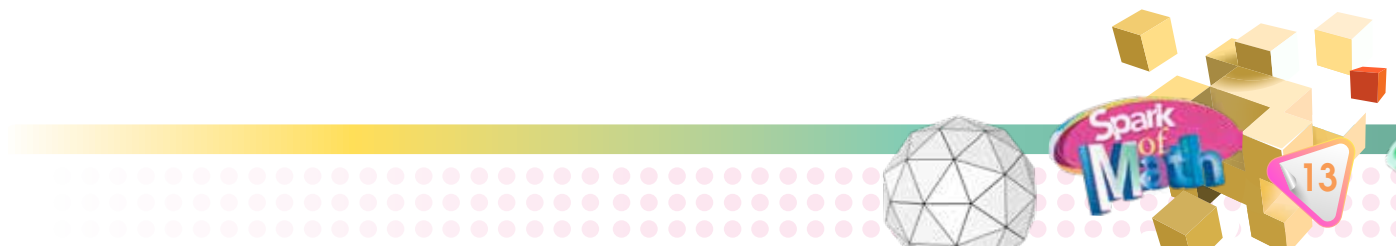
780

8,608

855

4,932

2,580



Color the numbers that are divisible by 3 **red**, and 6 **blue**.



Apply divisibility rules and color the numbers that are divisible by both 6 and 10.



## Your Work

Show a number that is divisible by 4? by 7?

$$1236 \div 4 = 309$$

$$3976 \div 7 = 568$$



## (1-4) Order of Operations.

The order of operations is a rule that tells you the sequence to follow when you are performing operations in a mathematical expression.

Parenteses <b>P</b>	expanents <b>E</b>	multiplication    division <b>M</b> or <b>D</b>	addition    subtraction <b>A</b> of <b>S</b>
( )	$y^x$	<b>X</b> $\div$	<b>+</b> <b>-</b>
Do <b>P</b> , then <b>E</b> . Then do <b>M</b> or <b>D</b> . Left to right. Lastly, do <b>A</b> or <b>S</b> , left to right.			

### Example.

$$1 + 2 \times 5 = ?$$

Correct Method

$$1 + 2 \times 5$$

$$= 1 + 10$$

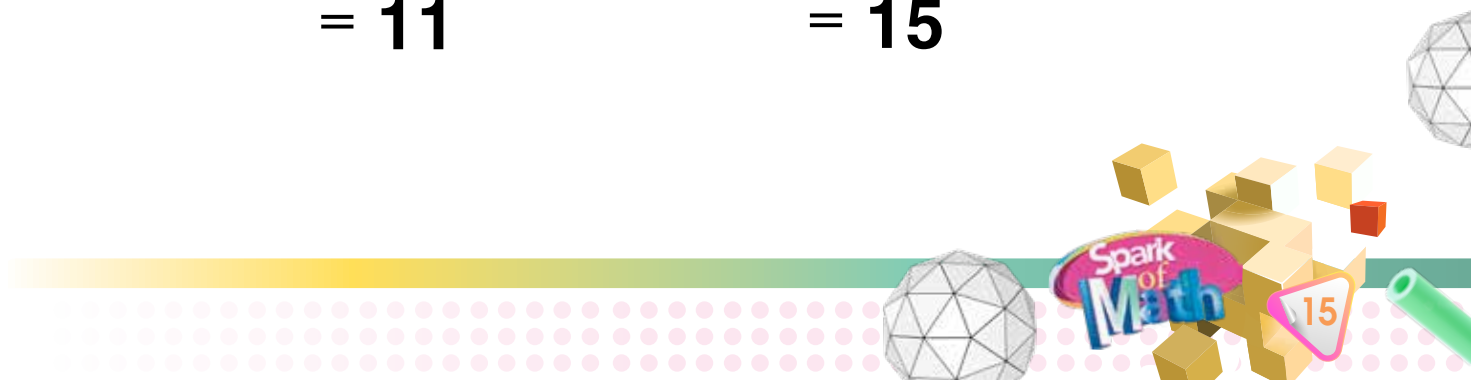
$$= 11$$

Incorrect Method

$$1 + 2 \times 5$$

$$= 3 \times 5$$

$$= 15$$



 Find the answer to each question.

1  $5 \times 2 + (37 + 3 \times 5) + 37 = 99$

2  $(20 + 30 + 14) + 21 + 1 \times 2^3 = 93$

3  $(31 - 6 - 16) + 14 \times 5 + 12 = 91$

4  $(30 - 11) - 16 + 30 + 17 - 22 = 28$





🕒 Add the operations symbols (+, -, ×, ÷) to complete the equations.



30  20 + 3 = 13

1 + 10  5 = 55

25  2 - 8 = 19

6  6 - 6 = 30

12  9 + 7 = 10

43  22 + 6 = 27





## (1-5) Problem Solving.

Find out if the numbers given below are divisible by any of the numbers 2, 3, 4, 5, 6 and 9. Write the number in the space provided below. A sample question has been solved for help.

- 1 450 is divisible by 2, 3, 5, 6 and 9.
- 2 3939 is divisible by 3
- 3 2432 is divisible by 2
- 4 6273 is divisible by 3, 9
- 5 A number which is divisible by 4, is divisible by 2
- 6 60550 is divisible by 2, 5
- 7 92454 is divisible by 2, 3, 6
- 8 73384 is divisible by 2 and 4
- 9 Give one number which is divisible by 6 2
- 10 9936 is divisible by 2, 3, 4, 6, 9
- 11 899991 is divisible by 3, 9
- 12 A number which is divisible by 2 and 3, is divisible by 6
- 13 If the last digit of a number is 0 then it is divisible by 15. (True, false)
- 14 1916 is divisible by 4. (True, false)



- A private art gallery managed to sell a total of 98 paintings in one day. The sales averaged out to 482\$ per painting. Find the revenue generated from the sales made by the art gallery?



$$98 \times 482 = 47,236$$

- Miss King has 483 raffle tickets for the upcoming carnival. She wants to give them out equally among her 32 students. How many would each student get? And how many tickets would she have left over?



$$483 \div 32 = 15.09$$

- Woodhill elementary schools 3rd and 4th grade classes are planning a joint field trip. There is a total of 454 students in these two grades and only 45 seats per bus. How many buses will be needed to fill all the students?



$$454 \div 45 = 10.08$$

**11 Buses will be needed**



# Show Your Turn

1 Multiply. Check the answer.

1

$$\begin{array}{r} 648 \\ \times 19 \\ \hline \end{array}$$

12,312

2

$$\begin{array}{r} 571 \\ \times 38 \\ \hline \end{array}$$

21,698

3

$$\begin{array}{r} 805 \\ \times 45 \\ \hline \end{array}$$

36,225

1 Divide. Check the answer.

1

$$\begin{array}{r} 019 \\ 40 \overline{) 798} \\ \underline{40} \\ 398 \\ \underline{360} \\ 038 \end{array}$$

2

$$\begin{array}{r} 020 \\ 32 \overline{) 671} \\ \underline{64} \\ 031 \\ \underline{00} \\ 31 \end{array}$$

3

$$\begin{array}{r} 014 \\ 56 \overline{) 821} \\ \underline{56} \\ 261 \\ \underline{224} \\ 037 \end{array}$$

1 Solve.

$$12 \div 2 \times 6 + 4 - 3 \times 3 = 31$$

$$9 \times (6 - 2) + 8^2 = 100$$



🕒 Circle the numbers that are.

Divisible by 8

370      400  
90  
140      104

Divisible by 7

350      147  
325  
221      190

🕒 Color the apple that is divisible by 5 **blue** 🍏, and that is divisible by 6 **red** 🍎. If both apply then color it **yellow** 🍌.

342      669      158      254      625      490

851      588      633      303      956      312      147





## Unit 2

# Fractions and Decimals

## Vocabulary.

- Improper fractions.
- Mixed numbers.
- Greatest Common Factor.
- Least Common Multiple.
- Simplifying.
- Decimals.
- Tenths place.
- Hundredths place.
- Thousandths place.



## Objectives.

- Define an improper fraction, a mixed number.
- Convert a mixed number to an improper fraction and vice versa.
- Find the Greatest Common Factor (GCF) of two numbers.
- Find the Least Common Multiple (LCM) of two numbers.
- Simplify fractions.
- Add and subtract fractions.
- Define a decimal.
- Compare decimals.
- Solve problems about fractions and decimals.



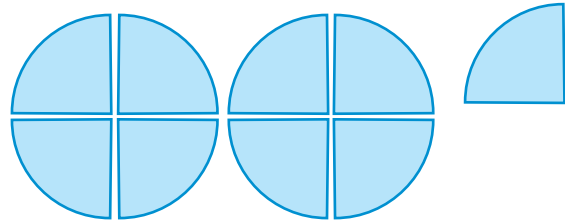
## (2-1) Mixed Numbers.

When a fraction has a numerator that is greater than or equal to the denominator it is called an **improper fraction**.

$\frac{9}{4}$  means there are 9 parts.  
Each part is  $\frac{1}{4}$  of a whole.

$$\frac{9}{4} = 2 \frac{1}{4}$$

Also  $2 \frac{1}{4}$  is called a **mixed number**.

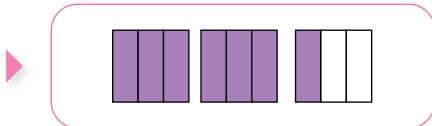


**Write the improper fractions by looking at the Models.**

Shapes

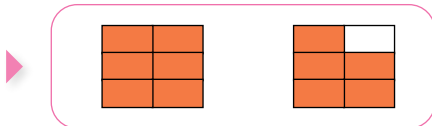
Improper fraction

Mixed number



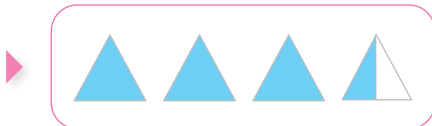
$$\frac{7}{3}$$

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



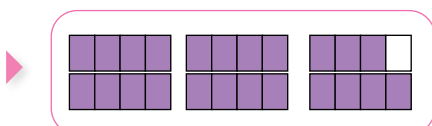
$$\frac{11}{2}$$

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



$$\frac{7}{4}$$

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



$$\frac{23}{3}$$

$$3 \frac{7}{8}$$



**○ To convert a mixed number to an improper fraction and vice versa.**

$$5 \frac{1}{2} = \frac{11}{2}$$

Diagram: A mixed number  $5 \frac{1}{2}$  is shown. A red circle with a '+' sign at the top and an 'x' at the bottom encircles the 5 and the fraction. An arrow points from the 5 to the numerator 1, and another arrow points from the 5 to the denominator 2.

$$\frac{13}{4} = 3 \frac{1}{4}$$

$$\begin{array}{r} 3 \\ 4 \overline{) 13} \\ \underline{12} \\ 1 \end{array}$$

denominator ← 4

1 → numerator

**○ Convert to an improper fraction.**

a)  $1 \frac{2}{3} = \frac{5}{3}$

b)  $6 \frac{1}{10} = \frac{61}{10}$

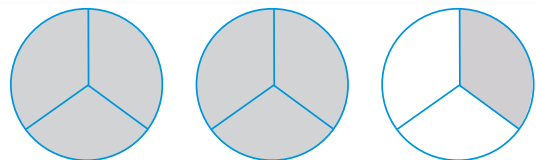
**○ Convert to a mixed number.**

a)  $\frac{15}{3} = 5$

b)  $\frac{17}{5} = 3 \frac{2}{5}$

**Your Work**

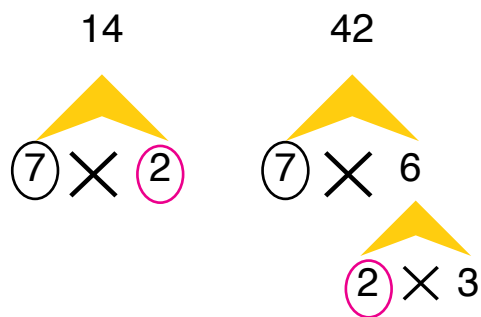
Use models to show  $2 \frac{1}{3}$





## (2-2) Simplifying Fractions.

To simplify the fraction  $\frac{14}{42}$ , find the Greatest Common Factor between the numerator and the denominator.



The Greatest Common Factor (GCF) =  $7 \times 2 = 14$

$$\text{so } \frac{14 \div 14}{42 \div 14} = \frac{1}{3}$$

( $\frac{14}{42}$ ,  $\frac{1}{3}$  are equivalent fractions)



### Simplify the fractions.

$$\text{a) } \frac{15}{20} = \frac{15 \div 5}{20 \div 5} = \frac{3}{4}$$

$$\text{b) } \frac{10}{16} = \frac{10 \div 2}{16 \div 2} = \frac{5}{8}$$

$$\text{c) } \frac{18}{20} = \frac{18 \div 2}{20 \div 2} = \frac{9}{10}$$

$$\text{d) } \frac{45}{50} = \frac{45 \div 5}{50 \div 5} = \frac{9}{10}$$



 Circle the equivalent fractions.

a)  $\frac{16}{20}$  ,  $\frac{4}{5}$



b)  $\frac{3}{8}$  ,  $\frac{24}{9}$

c)  $\frac{24}{30}$  ,  $\frac{16}{20}$

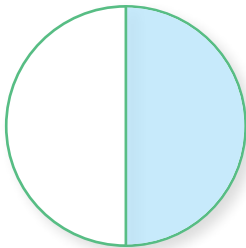


d)  $\frac{36}{45}$  ,  $\frac{18}{30}$  ,  $\frac{8}{10}$

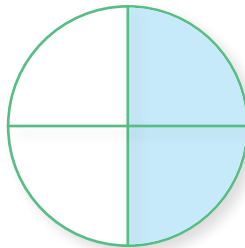
## Your Work

Write three equivalent fractions.  
Use models to show.

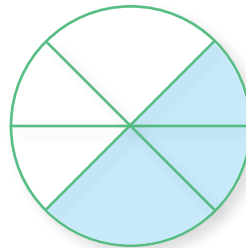
$$\frac{1}{2}$$



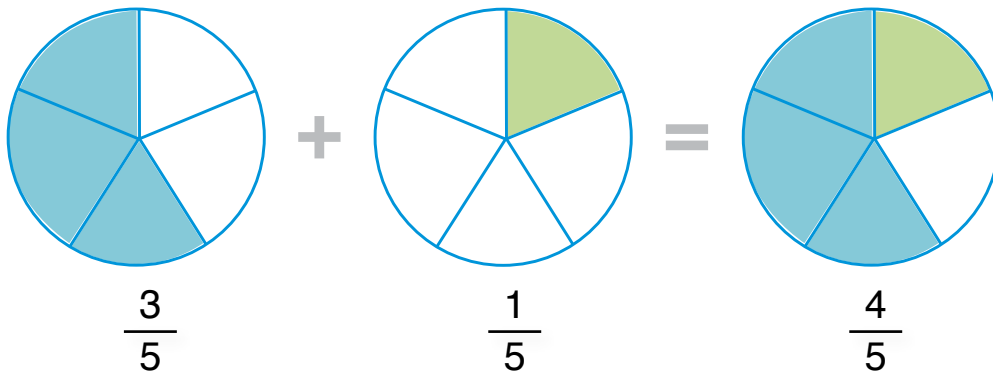
$$\frac{2}{4}$$



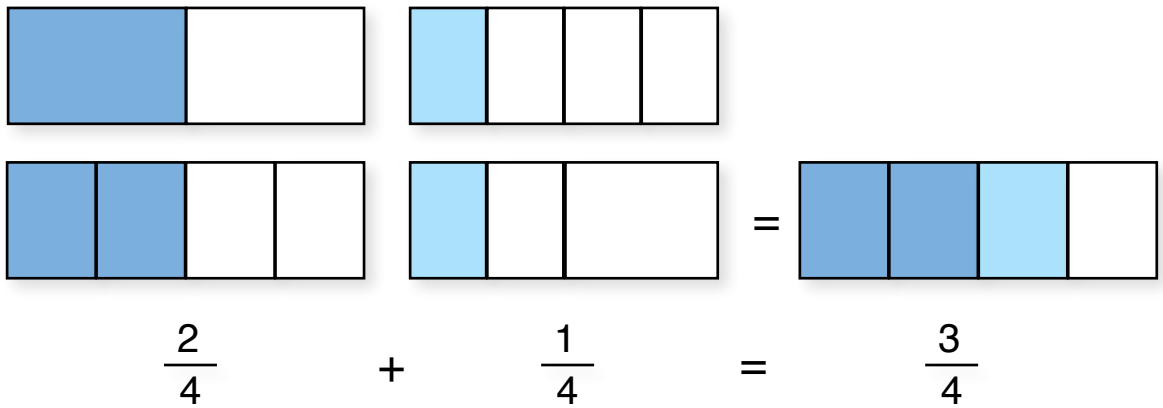
$$\frac{3}{6}$$



### (2-3) Adding Fractions.



$$\frac{1}{2} + \frac{1}{4} = ?$$



since  $\frac{1}{2} = \frac{2}{4}$  (the Least Common Multiple of 2, 4 is 4)

$$\text{so } \frac{1}{2} + \frac{1}{4} = \frac{2}{4} + \frac{1}{4} = \frac{3}{4}$$

Think how to find  $\frac{1}{2} + \frac{3}{5}$  using models.



 Find.

a)  $\frac{2}{3} + \frac{1}{4}$

$$= \frac{2 \times 4}{3 \times 4} + \frac{1 \times 3}{4 \times 3} = \frac{8}{12} + \frac{3}{12} = \frac{11}{12}$$

b)  $\frac{5}{8} + \frac{1}{4}$

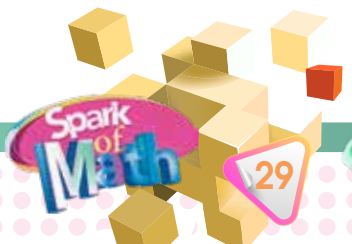
$$= \frac{5}{8} + \frac{2 \times 1}{2 \times 4} = \frac{5}{8} + \frac{2}{8} = \frac{7}{8}$$

c)  $\frac{1}{7} + \frac{1}{2}$

$$= \frac{2 \times 1}{2 \times 7} + \frac{7 \times 2}{7 \times 2} = \frac{2}{14} + \frac{7}{14} = \frac{9}{14}$$

d)  $\frac{1}{8} + \frac{2}{6}$

$$= \frac{3 \times 1}{3 \times 8} + \frac{4 \times 2}{4 \times 6} = \frac{3}{24} + \frac{8}{24} = \frac{11}{24}$$



## Adding mixed numbers.

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

Step 1

Add the whole number.  
«store» the answer for  
later use!

$$2 + 1 = 3$$

Step 2

Add the fraction parts.

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

6 is a common multiple of 3 and 2

Change the first fraction to  
an equivalent fraction with  
a denominator of 6.

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

Do the same for the  
second fraction.

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

Add the fraction parts.  
Convert to a mixed  
number if necessary.

$$\frac{1}{3} + \frac{1}{2} = \frac{2}{6} + \frac{3}{6} = \frac{5}{6}$$

Step 3

And finally. Add the  
results of the whole  
number addition.

$$2\frac{1}{3} + 1\frac{1}{2} = 3\frac{5}{6}$$



 Add, and write in the simplest form.

$$a) 1\frac{3}{8} + 2\frac{3}{4} = 1\frac{3}{8} + 2\frac{3 \times 2}{4 \times 2} = 3\frac{9}{8} = 4\frac{1}{8} \left( \frac{9}{8} = 1\frac{1}{8} \right)$$

$$b) 2\frac{2}{3} + 1\frac{3}{4} = \frac{4 \times 8}{4 \times 3} + \frac{3 \times 7}{3 \times 4} = \frac{32}{12} + \frac{21}{12} = \frac{56}{12} = 4\frac{8}{12}$$

$$c) 1\frac{3}{7} + 5\frac{1}{2} = \frac{2 \times 10}{2 \times 7} + \frac{11 \times 7}{2 \times 7} = \frac{20}{14} + \frac{77}{14} = \frac{97}{14} = 6\frac{13}{14}$$

$$d) 1\frac{6}{12} + 3\frac{1}{2} = \frac{17}{12} + \frac{7 \times 6}{2 \times 6} = \frac{17}{12} + \frac{42}{12} = \frac{59}{12} = 4\frac{11}{12}$$

$$e) 2\frac{4}{5} + 1\frac{2}{3} = \frac{3 \times 14}{3 \times 5} + \frac{5 \times 5}{5 \times 3} = \frac{42}{5} + \frac{25}{5} = \frac{67}{5} = 13\frac{2}{5}$$

## Your Work

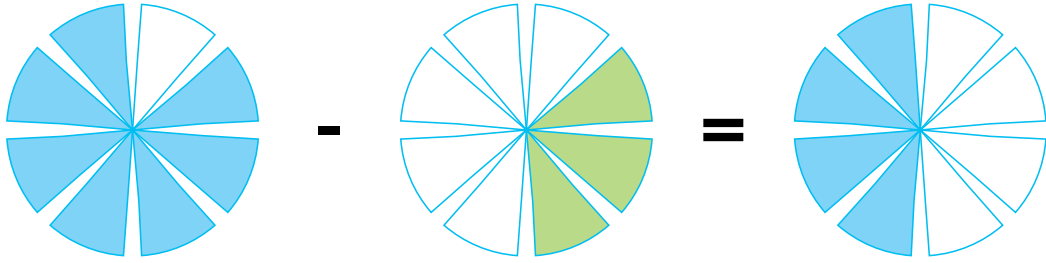
Write two mixed numbers with different denominators.  
What is their sum?

$$2\frac{3}{5} + 3\frac{1}{7} = 5\frac{26}{35}$$



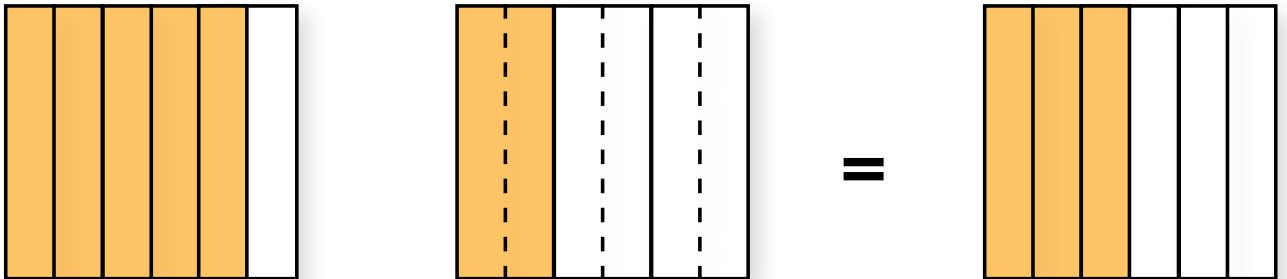


## (2-4) Subtracting Fractions.



$$\frac{7}{8} - \frac{3}{8} = \frac{4}{8}$$

note  $\frac{7}{8} - \frac{3}{8} = \frac{7-3}{8} = \frac{4^1}{8^2} = \frac{1}{2}$



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





a. Find the Least Common Multiple (LCM) of the denominators.

$$\text{LCM} = 6$$

b. Rewrite using the LCM.

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

c. Subtract the numerators, the denominator stays the same.

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

d. Simplify.

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

## Subtract.

$$\text{a} \quad \frac{2}{3} - \frac{2}{10} = \frac{14}{30}$$

$$\frac{2}{3} \times 10 \quad \frac{2}{10} \times 3$$

$$\frac{20}{30} - \frac{6}{30}$$

$$\text{b} \quad \frac{4}{5} - \frac{2}{4} = \frac{6}{20}$$

$$\frac{4}{5} \times 4 \quad \frac{2}{10} \times 3$$

$$\frac{16}{20} - \frac{10}{20}$$

## Subtract.

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

$$b \quad 5 \frac{3}{5} - 2 \frac{1}{10} = 3 \frac{5}{10}$$

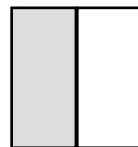
$$c \quad 3 \frac{1}{6} - 1 \frac{1}{6} = 2$$

$$d \quad 5 \frac{2}{3} - 4 \frac{2}{4} = 1 \frac{2}{12}$$

$$e \quad 2 - \frac{3}{5} = 1 \frac{2}{5}$$

**Your Work**

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



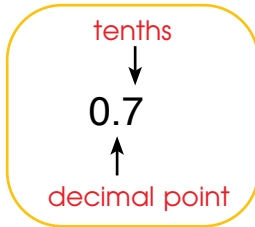
Find  $(3 \frac{1}{4} - 2 \frac{6}{8})$ , then find using models.



## (5-2) Decimals.

A **decimal** is a number that contains two parts separately with a decimal point. Digits can be placed to the left and right of the decimal point to show numbers greater than one or less than one. The decimal point is placed to the right of the ones place.

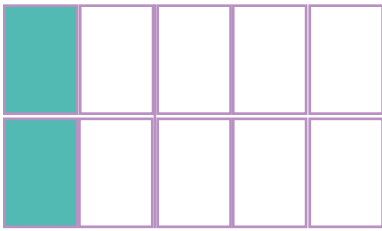
### ● tenths place



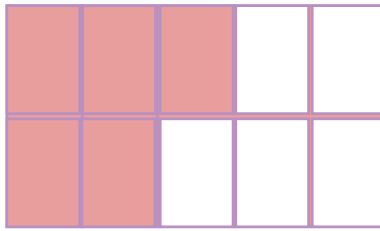
The first digit to the right of the decimal point is in the **tenths place**.

The decimal **0.7** is equal to seven tenths, or  $\frac{7}{10}$ .

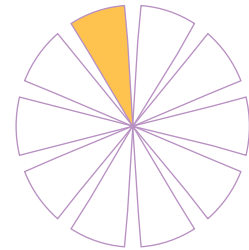
### Write the fraction and its equivalent decimal.



$$\frac{2}{10} = 0.2$$



$$\frac{5}{10} = 0.5$$



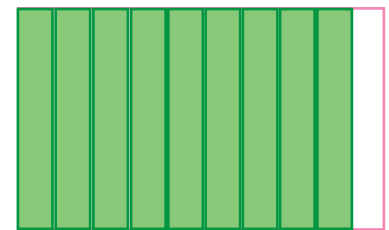
$$\frac{1}{10} = 0.1$$



$$2 \frac{8}{10} = 2.8$$

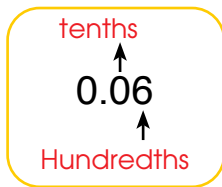


$$\frac{4}{10} = 0.4$$

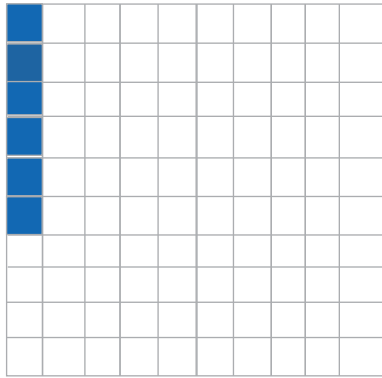


$$\frac{9}{10} = 0.9$$

## Hundredths place.



The second digit to the right of the decimal point is in the **hundredths place**.



The square has 100 equal parts.  
The part of the square that is shaded is.....  
The answer as a decimal.

$$\frac{6}{100} = 0.06$$

## Convert each fraction to a decimal.

$$\frac{15}{100} = 0.15$$

$$\frac{38}{100} = 0.38$$

$$\frac{4}{100} = 0.04$$

$$\frac{9}{100} = 0.09$$

## Write each decimal using a simplified fractions.

$$0.05 = \frac{5}{100} = \frac{1}{20}$$

$$0.01 = \frac{1}{100}$$

$$0.16 = \frac{16}{100}$$

$$0.03 = \frac{3}{100}$$



**○ The third digit to the right of the decimal is in the thousandths place.**

(a number written in words)

hundreds	tens	ones	tenths	hundredths	thousandths
4	5	2	7	8	1

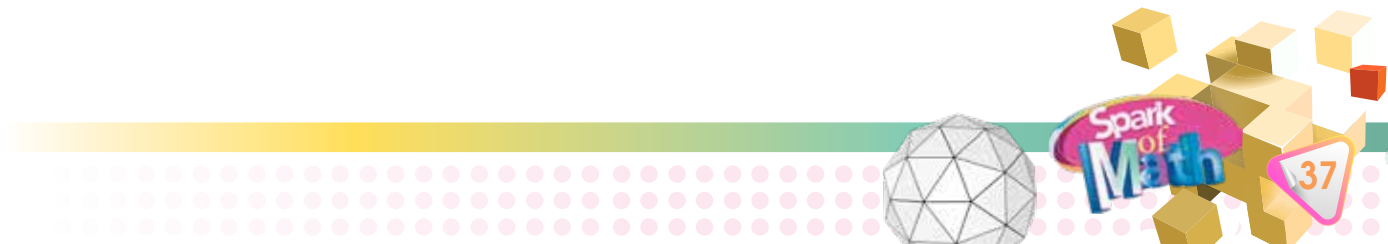


Instead of «point» read «and» when there is a decimal.



Four hundred fifty-two and seven hundred eighty-one thousand.

Fraction or Mixed Number	place value - Decimal to fraction					
	hun- dreds	tens	ones	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$
$\frac{9}{100}$			0	• 0	9	
$32\frac{78}{100}$		3	2	• 7	8	
$401\frac{839}{1000}$	4	6	1	• 8	3	9
$26\frac{7}{100}$		2	6	• 0	7	
$172\frac{301}{1000}$	1	7	2	• 3	0	1
$25\frac{4}{10}$		2	5	• 4		



Write down these numbers in expanded form.

1  $3.425 = 3 + 0.4 + 0.02 + 0.005$

2  $4.18 = 4 + 0.10 + 0.08$

3  $5.209 = 5 + 0.200 + 0.009$

4  $1.736 = 1 + 0.700 + 0.030 + 0.006$

Write the name of the decimal place value of the underlined digit in the given numbers.

a  $6.\underline{9}$   
the tenths

b  $23.3\underline{4}0$   
Hundredths

c  $8\underline{9}.321$   
Ones

d  $64.22\underline{5}$   
Thousandths

Your Work

Write a decimal of hundredths that equals a decimal of thousandths.



## 2-6 Comparing Decimals.

Step 1

Line up the numbers according to the place value.

12.4  
12.39

Step 2

Compare the numbers in each place starting from the left.

start here

10 = 10

2 = 2

0.4 is more than 0.3

so.....

12.4 is **greater than** 12.39  $\longrightarrow$   $12.4 > 12.39$

1	2	.	4	
1	2	.	3	9

Write ( $>$ ,  $<$  or  $=$ ).

a)  $0.823 < 0.839$

b)  $4.3 > 0.72$

c)  $2.5 = 2.50$

d)  $97 > 9.7$

Circle the greatest number.

2.34

23.4

0.234

234.0

Circle the smallest number.

90.9

9.09

9.9

90.09

Circle the equivalent fractions.

0.2

$\frac{7}{10}$

$\frac{4}{10}$

$\frac{2}{10}$

0.5

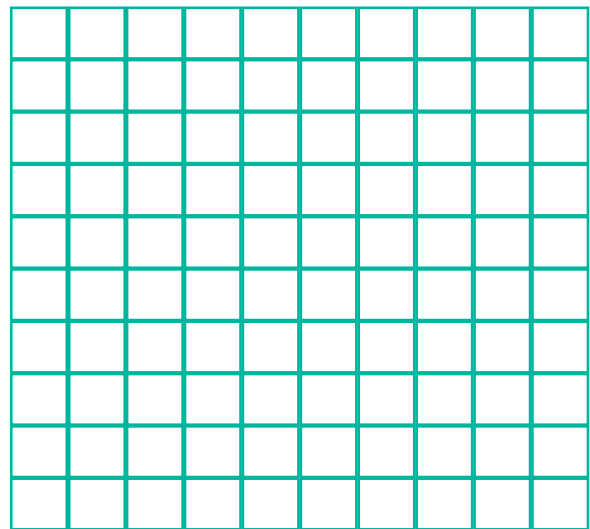
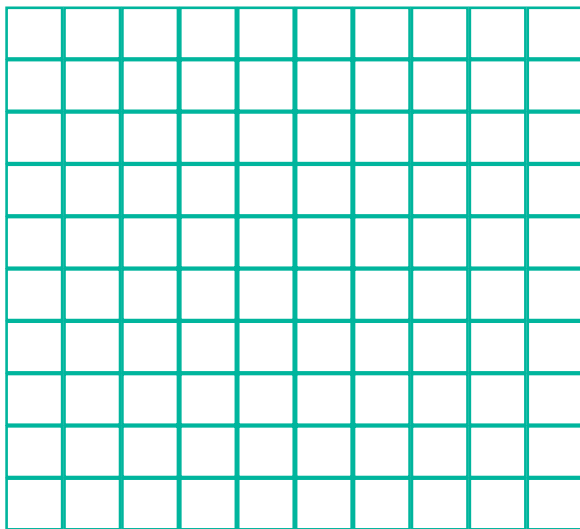
$\frac{1}{2}$

$\frac{1}{3}$

$\frac{1}{4}$

## Your Work

Use the models to show that  $0.3 = 0.30$





## (2-7) Problem Solving.

**1** A pitcher contains  $2\frac{3}{4}$  pints of orange juice.

After you pour  $\frac{1}{5}$  of a pint into a glass, how much is left in the pitcher? Write the answer using decimals.

$$2.75 + 0.2 = 2.95$$

---

**2** Susan swims a race in  $\frac{293}{10}$  seconds. Patty swims the

race in  $\frac{339}{10}$  seconds. Write each time using decimals. Who is the fastest?

$$33.4 > 29.3$$

---

**3** A swimming pool is open for  $7\frac{1}{2}$  hours during a day.

The pool keeps one lifeguard on duty at a time, and each lifeguards shift is  $1\frac{1}{2}$  hours long.

How many shifts are there per day?

$$7.5 \div 1.5 = 5$$

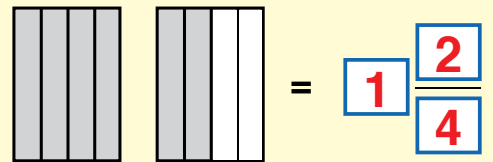
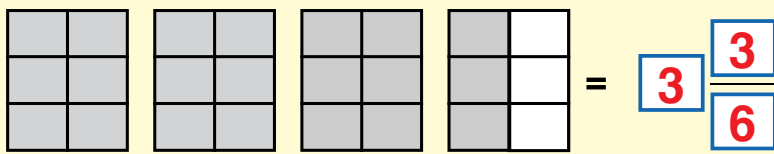
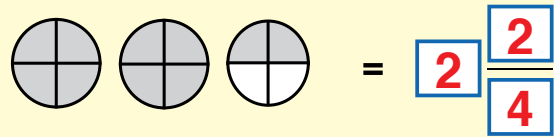
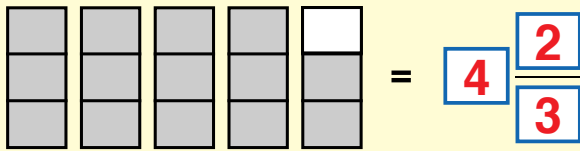
# Show Your Turn

○ Simplify the following fractions.

$$\frac{6}{12} \quad \frac{1}{6} \quad \frac{2}{8} \quad \frac{1}{4}$$

$$\frac{12}{36} \quad \frac{1}{3} \quad \frac{4}{20} \quad \frac{1}{5}$$

○ Write a mixed number for each of the shaded sets of shapes using the simplest form.



 Find the answer.

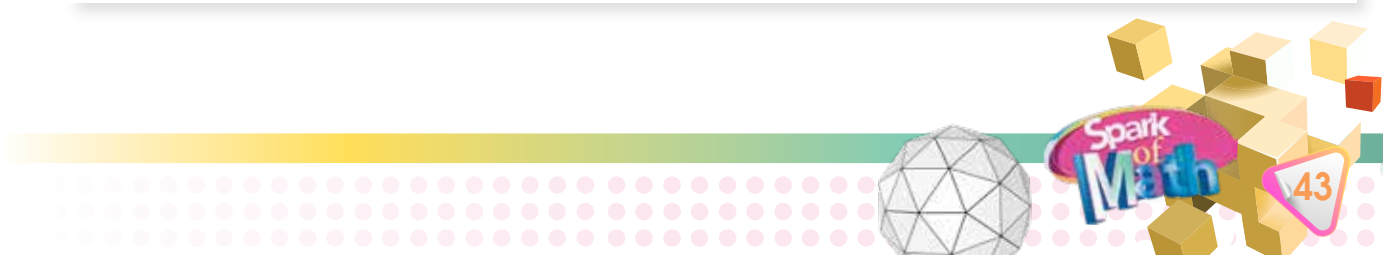
▶  $\frac{3}{4} + \frac{3}{5} + \frac{1}{2} =$   
 $\frac{15}{20} + \frac{12}{20} + \frac{10}{20} = 1 \frac{17}{20}$

▶  $\frac{2}{4} + \frac{2}{5} + \frac{2}{10} = 1 \frac{2}{20}$

▶  $3 \frac{5}{7} + 3 \frac{12}{21} = 7 \frac{4}{21}$

▶  $7 \frac{4}{5} + 3 \frac{8}{20} = 11 \frac{4}{20}$

▶  $9 \frac{8}{20} - 4 \frac{2}{5} - \frac{1}{2} = 4 \frac{10}{20}$



Write ( $>$ ,  $<$ ,  $=$ ).

$$6\frac{1}{4} - 3\frac{2}{20} \quad = \quad 6\frac{1}{4} - 3\frac{1}{10}$$

---

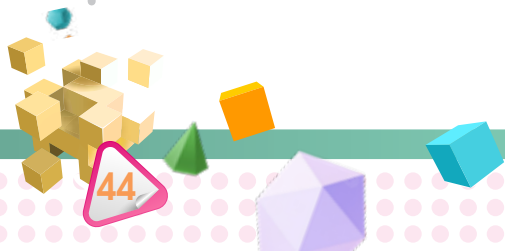
$$9\frac{5}{6} + 5\frac{2}{3} \quad > \quad 8\frac{7}{9} - 4\frac{1}{3}$$

---

$$5\frac{1}{4} - 1\frac{1}{8} \quad < \quad 3\frac{1}{2} + 5\frac{3}{6}$$

---

$$3\frac{1}{4} + 2\frac{4}{6} \quad < \quad 2\frac{1}{2} + 3\frac{1}{2}$$



Find the missing numbers.

$$4\frac{1}{2} - \boxed{1}\frac{\boxed{5}}{\boxed{8}} = 2\frac{7}{8}$$

$$7\frac{5}{8} - \boxed{2}\frac{\boxed{2}}{\boxed{8}} = 5\frac{3}{8}$$

$$\boxed{4}\frac{\boxed{4}}{\boxed{8}} + 8\frac{7}{8} = 13\frac{3}{8}$$

$$\boxed{9}\frac{\boxed{1}}{\boxed{2}} + 1\frac{1}{2} = 11$$





**Unit 3**

# Measurement and Geometry





## Vocabulary.

- Metric Units
- Kilometer (km)
- Meter (m)
- Decimeter (dm)
- Centimeter (cm)
- Millimeter (mm)
- Volume Units
- Cubic meter ( $m^3$ )
- Cubic decimeter ( $dm^3$ )
- Cubic centimeter ( $cm^3$ )
- Cubic millimeter ( $mm^3$ )
- Capacity Units
- Liter (l)
- Milliliter (ml)
- Mass Units
- Kilogram (kg)
- Gram (g)
- Protractor



## Objectives.

- Compare and convert the different units of Length.
- Compare and convert the different units of an Area.
- Compare and convert the different units of Volume.
- Compare and convert the different units of Capacity.
- Compare and convert the different units of Mass.
- Use a protractor to draw or measure the angles.



**POUNDS or GRAMS?**



### (3-1) Metric Units.

We use centimeter (cm) to measure the length of a pencil, the width of a book etc. But this unit is too big to measure the thickness of a pencil. So we use another unit called millimeter (mm).

We use another unit called meters (m). to measure the length of the classroom. Even meter is too small of a unit when we state the distance between two cities, there we need kilometers (km).



Review the sizes of millimeters, centimeters, meters, and kilometers and how to convert between them.

Kilometer	Meter	Decimeter	Centimeter	Millimeter
km	m	dm	cm	mm
1	1000	10,000	100,000	1,000,000
$\frac{1}{1000}$	1	10	100	1000
$\frac{1}{10,000}$	$\frac{1}{10}$	1	10	100
$\frac{1}{100,000}$	$\frac{1}{100}$	$\frac{1}{10}$	1	10

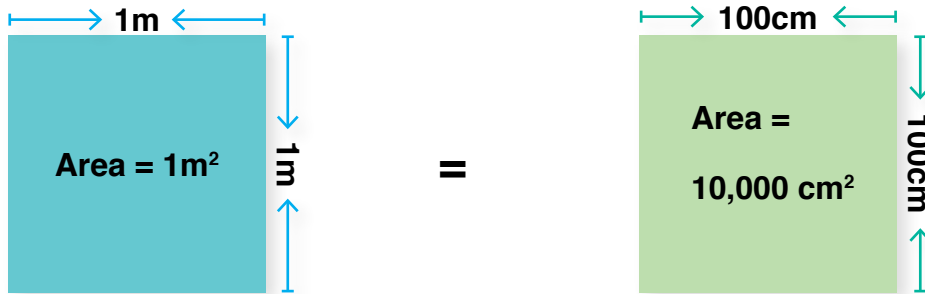
Since 1 km= 1000 m, then 7 km= 7000 m (7 × 1000= 7000)

Since 1 m= 100 cm, then 500 cm= 5 m (500 ÷ 100= 5)

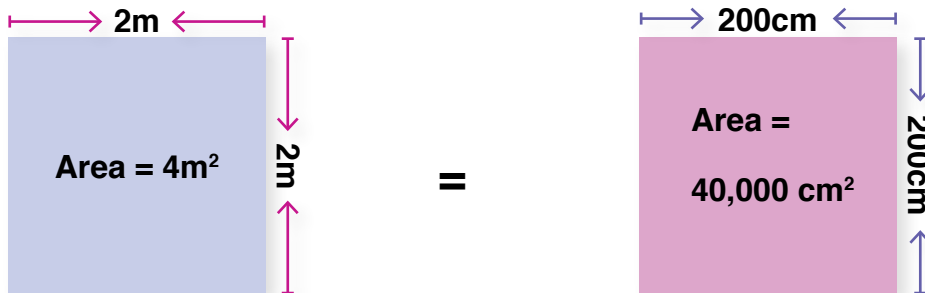




## Converting Metric Units - Area.



$$1\text{ m}^2 = 1\text{m} \times 1\text{m} = (100\text{ cm}) \times (100\text{ cm}) = 10,000\text{ cm}^2$$



$$4\text{ m}^2 = \underline{\quad} \times \underline{\quad} = \underline{\quad} \times \underline{\quad} = \underline{\quad} \text{ cm}^2$$

## Convert.

$$13\text{ m} = 130\text{ dm}$$

$$180\text{ cm} = 1800\text{ mm}$$

$$4\text{ km} = 40000\text{ dm}$$

$$11\text{ m}^2 = 110\text{ cm}^2$$

$$200\text{ cm} = 2\text{ m}$$

$$49000\text{ cm}^2 = 490000\text{ mm}^2$$

$$2300\text{ mm} = 23\text{ dm}$$

$$25\text{ m}^2 = 25000\text{ mm}^2$$



Write (<, > or =).

45 cm

<

6 dm

12 km

>

1200 m

1 m<sup>2</sup>

=

10 dm<sup>2</sup>

62000 mm<sup>2</sup>

>

73 cm<sup>2</sup>

## Your Work

300 cm =

0.3

km. Why?

Because when we

$$\frac{300}{1000} = \frac{3}{10} = 0.3 \text{ km}$$



## (3-2) Volume Units.

**Volume** is the measurement of an amount of space occupied by an object.

Volume is measured in cubic units, such as  $\text{cm}^3$ ,  $\text{dm}^3$ ,  $\text{mm}^3$ .  
The unit we use to measure the volume of a room is ( $\text{m}^3$ ),  
the unit used to measure a small eraser is ( $\text{cm}^3$ ).

$$1 \text{ m}^3 = 1000 \text{ cm}^3$$

$$\begin{aligned} \text{note } 1 \text{ m}^3 &= 1 \text{ m} \times 1 \text{ m} \times 1 \text{ m} \\ &= 10 \text{ cm} \times 10 \text{ cm} \times 10 \text{ cm} \\ &= 1000 \text{ cm}^3 \end{aligned}$$

## Convert.

$$455 \text{ cm}^3 =$$

**455000**

$\text{mm}^3$

$$25 \text{ m}^3 =$$

**25000**

$\text{cm}^3$

$$14000 \text{ dm}^3 =$$

**14**

$\text{m}^3$

$$11900000 \text{ cm}^3 =$$

**11.9**

$\text{m}^3$



 Write the suitable number.

$$7 \text{ m}^3 > \boxed{2} \text{ dm}^3$$

$$1200 \text{ dm}^3 < \boxed{130000} \text{ mm}^3$$

$$4800 \text{ cm}^3 < \boxed{50} \text{ m}^3$$

$$39200000 \text{ m}^3 > \boxed{20} \text{ km}^3$$

### Your Work

Ali has a box, its volume is  $15 \text{ cm}^3$ .

Dana's box volume is  $8 \text{ dm}^3$ . But Hana's is  $0.6 \text{ m}^3$ .

Who has the greatest box volume. Why?

**Hana =  $600 \text{ dm}^3$**

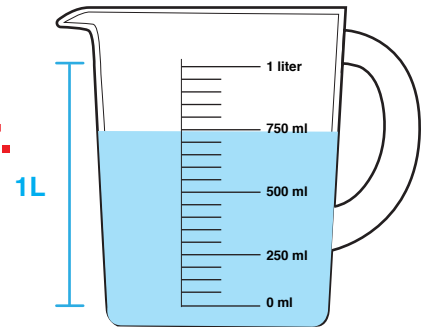


## (3-3) Capacity Units.

Capacity is the amount a container can hold.

The standard unit to measure capacity is **liter**.

We buy milk in liters (l) where liquids and medicines are measured in milliliter (ml).



$$1 \text{ liter (l)} = 1000 \text{ milliliter (ml)}$$

## Convert.

62 (l)=

**62,000**

(ml)

250 (l)=

**250,00**

(ml)

9000 (ml)=

**9**

(l)

40 (ml)=

**0.04**

(l)

### Your Work

Show the relationship between 1 Liter and 1 dm<sup>3</sup>.

**1,000 dm<sup>3</sup>**





## (3-4) Mass Units.

The **mass** is a measure of the amount of matter in an object. The unit used to measure the mass of sugar, rice, apple, ....etc is kilogram (kg).



But, items like ginger, chilies etc. are measured in gram (g).



In order to measure the mass of compounds or chemicals in medicines, we use a smaller unit called milligram (mg).

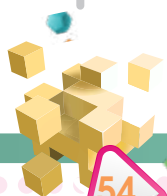


**The relations between these three units of measurements of Mass:**

**1 kilogram (kg)= 1000 grams (g)**

**1 gram (g)= 1000 milligrams (mg)**

**1 kilograms (kg)= 1,000,000 milligrams (mg) explain.**



 **Convert the mass.**

25 kg = **25,000** g

3 g = **3,000** mg

3000 mg = **0,003** kg

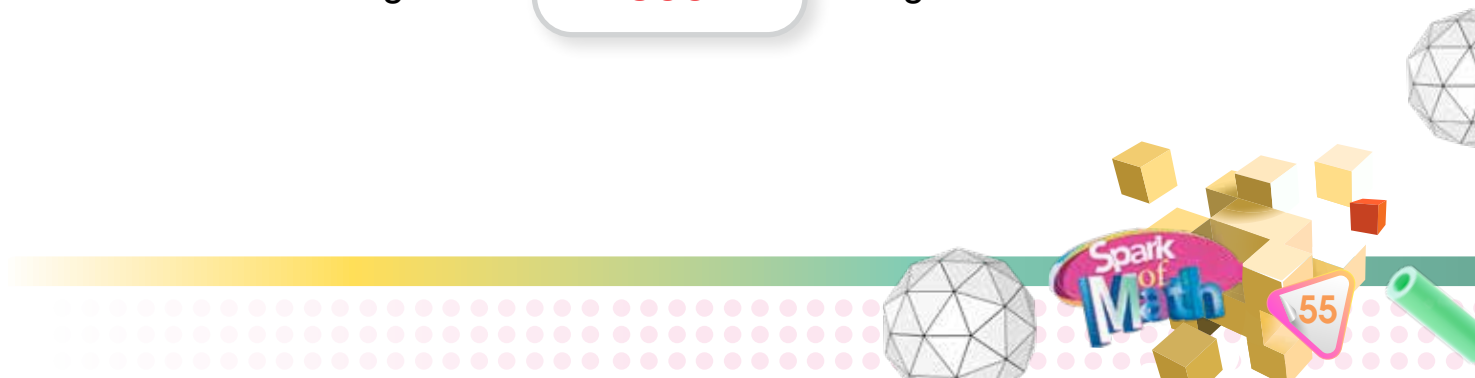
$\frac{1}{2}$  kg = **500** g

1000 g = **1** kg

 **Write the suitable number.**

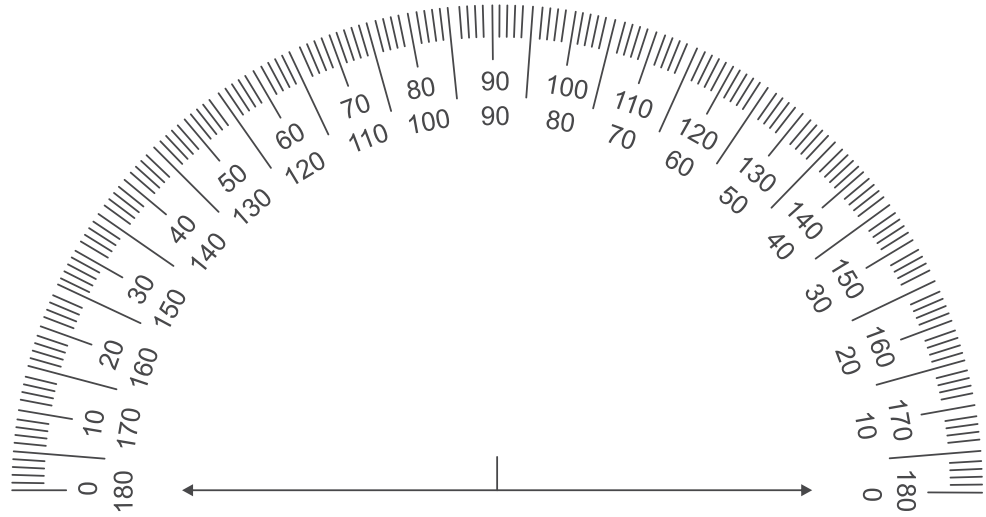
5400 kg > **5000** g

39200000 g < **300** kg



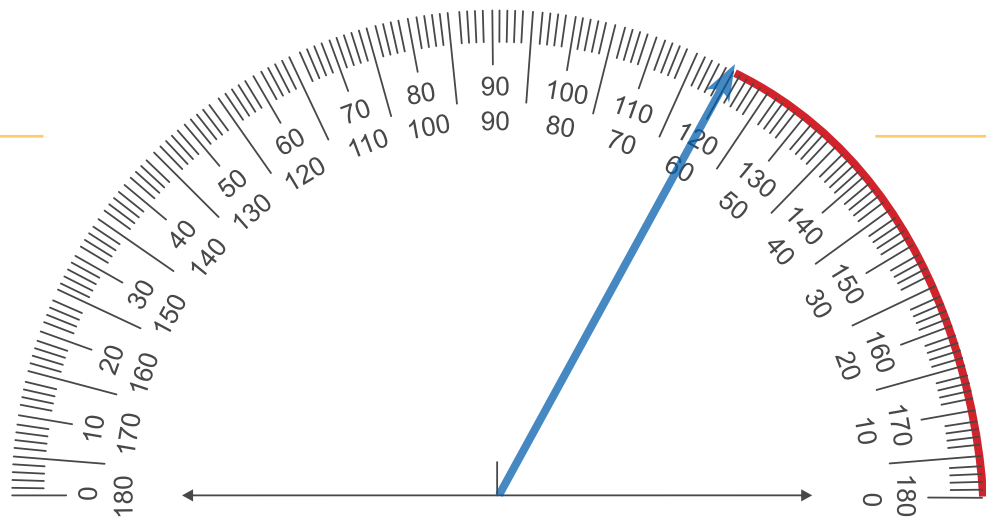


## (3-5) Measuring Angles.



### PROTRACTOR

A protractor is a tool used to measure angles.



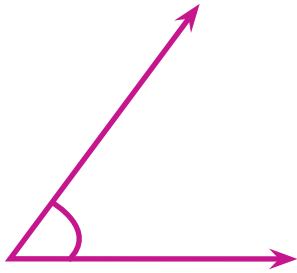
Centre of the protractor is over all the vertex.

Base line of the protractor is along one of the angle lines.



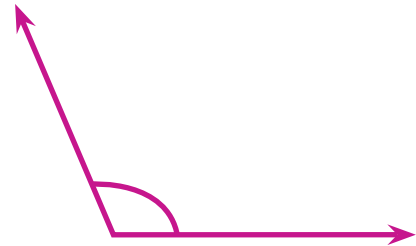


🕒 Measure each angle using a protractor.  
Identify the type.



Angle : \_\_\_\_\_

Type : Acute



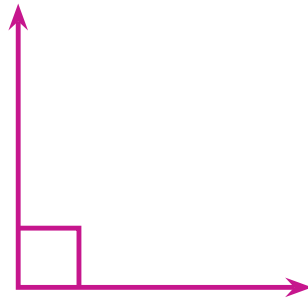
Angle : \_\_\_\_\_

Type : Obtuse



Angle : 0°

Type : straight line



Angle : 90°

Type : Right Angle

### Your Work

Draw two angles measuring  $70^\circ$  and  $140^\circ$ .



## — (3-6) Problem Solving.

- Mary wants new carpeting for her dining room. Her dining room is a 5 m by 4 m rectangle. How much carpeting does she need to buy to cover her dining room completely?



$$20 = 5 \times 4 \text{ m}^2$$

- During a long walk, Ahmad drank 5 full 600 ml bottles of water. How many Liters of water is this equal to?



$$=0.6$$

- The volume of a rectangular refrigerator is found by calculating (width $\times$ depth $\times$ height). If the refrigerator on sale is 80 cm wide,  $1\frac{1}{2}$  m high and 500 mm deep. Find the refrigerator's volume.

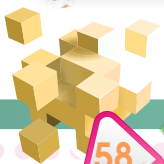


$$80 \text{ cm} \times 150 \text{ cm} \times 50 \text{ cm} = 600,000 \text{ cm}^3$$

- Masa and Zaid are twins. When they were born, Masa was 600 grams more than Zaid. If Zaid was 3 kgs at birth, then how much more was Masa at birth?

$$\text{Masa} = 3600 \text{ g}$$

$$\text{Zaid} = 3000 \text{ g}$$



## Show Your Turn

### Fill the blank.

①  $200\text{ g} + 800\text{ g} = 1\text{ kg}$

②  $500\text{ ml} + 500\text{ ml} = 1\text{ l}$

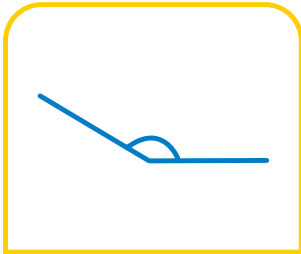
③  $250\text{ m} + 750\text{ m} = 1\text{ km}$

④  $2\text{ m}^3 = 200\text{ cm}^3$

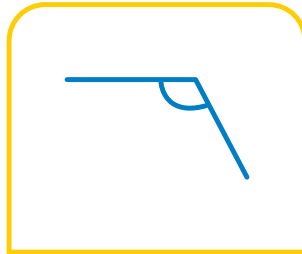
⑤  $3000\text{ g} + 1000\text{ g} = 4\text{ kg}$

⑥  $13\text{ l} = 13,000\text{ ml}$

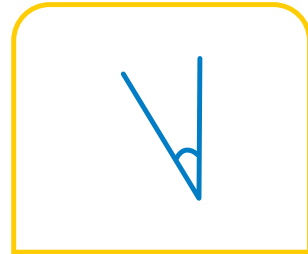
### Measure the angle with a protractor. Is it acute, obtuse, or a right angle?



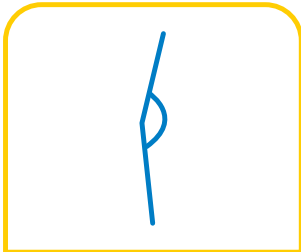
obtuse



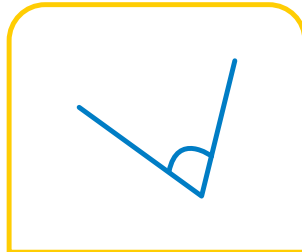
obtuse



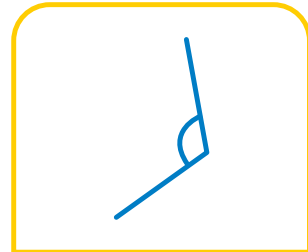
acute



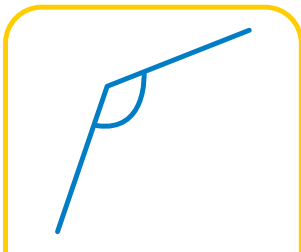
obtuse



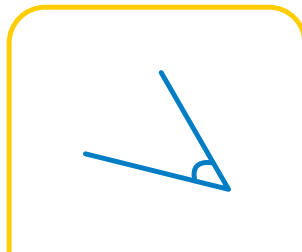
acute



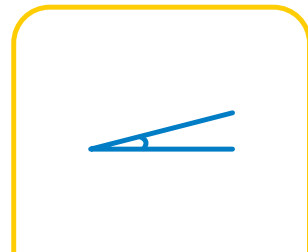
obtuse



obtuse



acute



acute

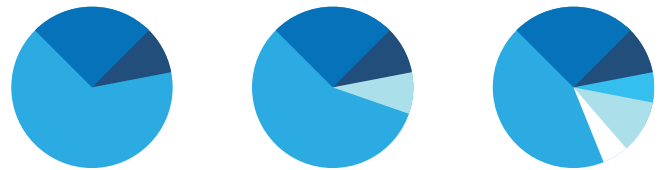
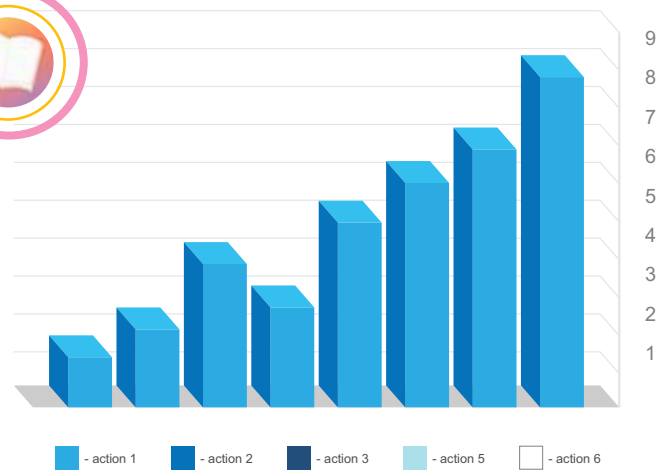
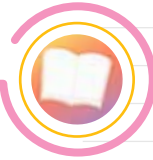


**Unit 4**

# Statistics

## Vocabulary.

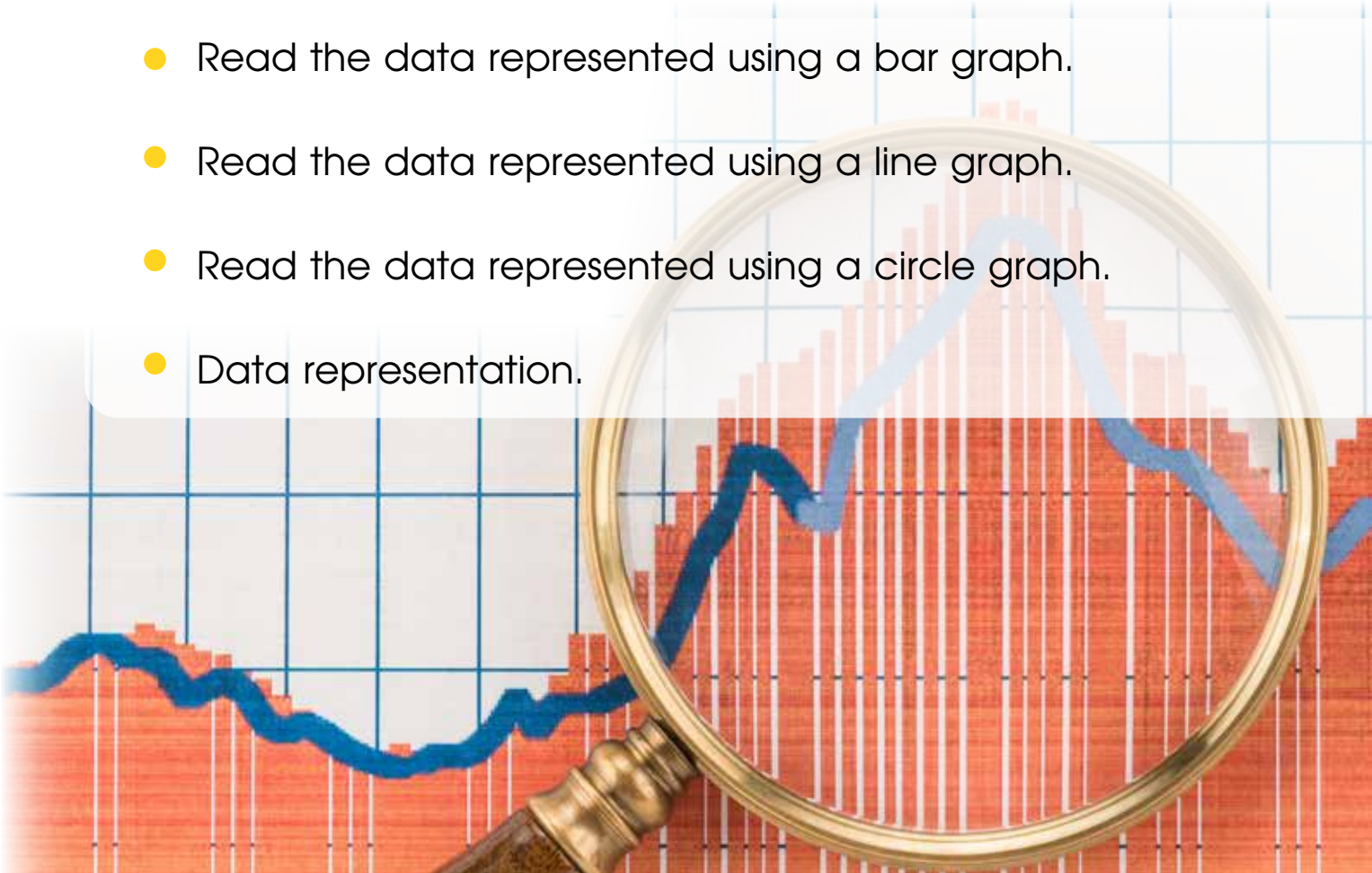
- Bar graphs
- Line graphs
- Circle graphs



## Objectives.



- Read the data represented using a bar graph.
- Read the data represented using a line graph.
- Read the data represented using a circle graph.
- Data representation.

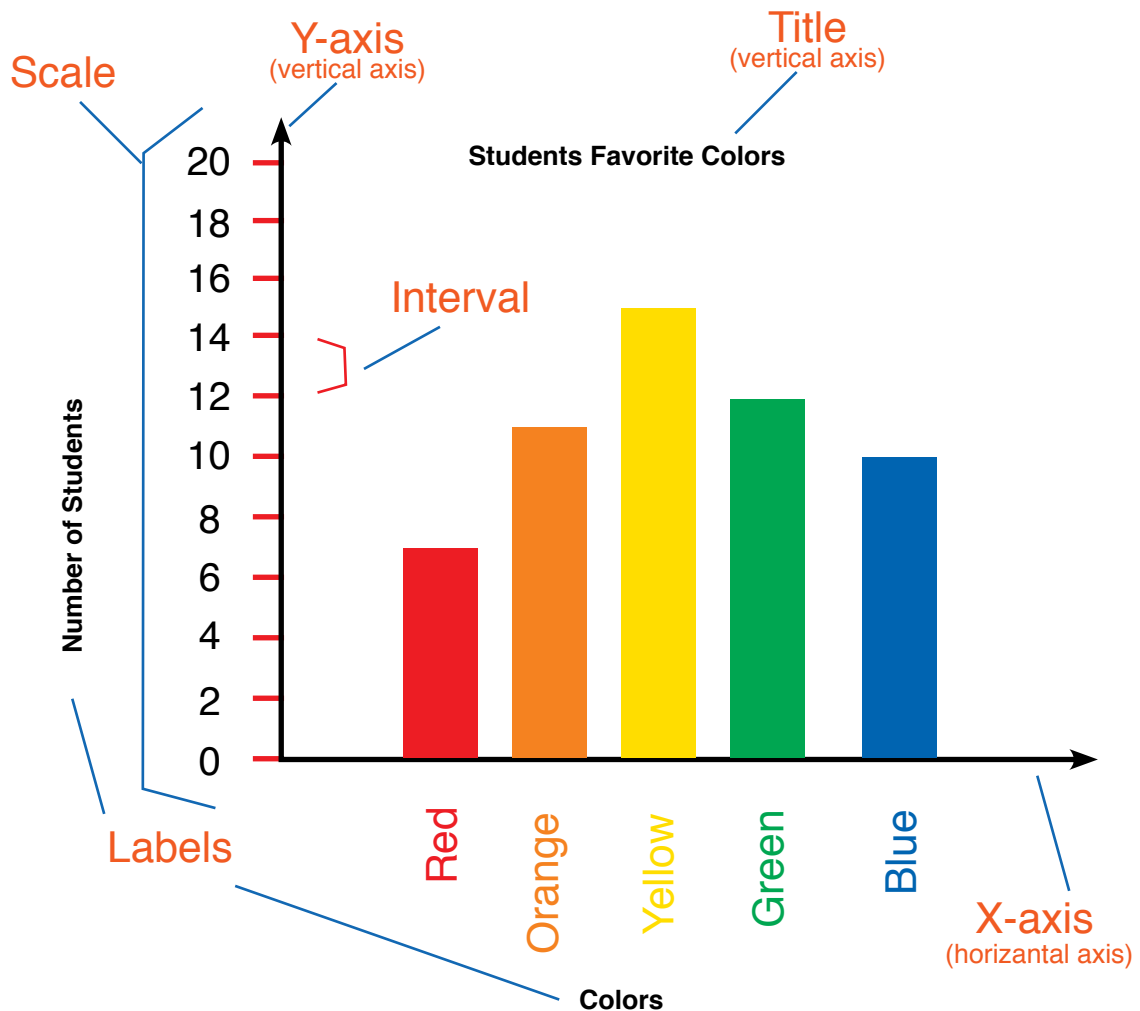


## (4-1) Bar Graphs.

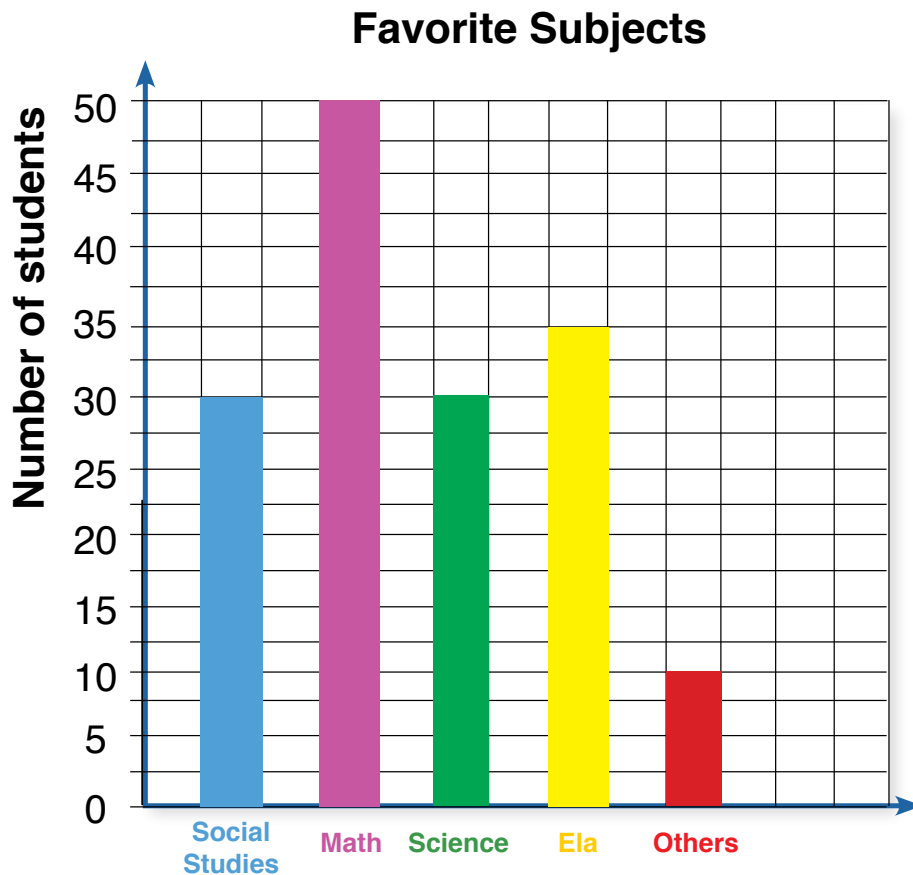
**Bar graphs** are visual representations that help us organize information easily. The information is drawn into rectangular bars with heights or lengths proportional to the values that they represent. Bar graphs are also called bar charts.

Bar graphs have 2 axis, one is vertical and the other is horizontal.

### Parts of a Graph







- Miss Sara, recorded the favorite subjects of her students in a bar graph. Use the graph to answer the questions.

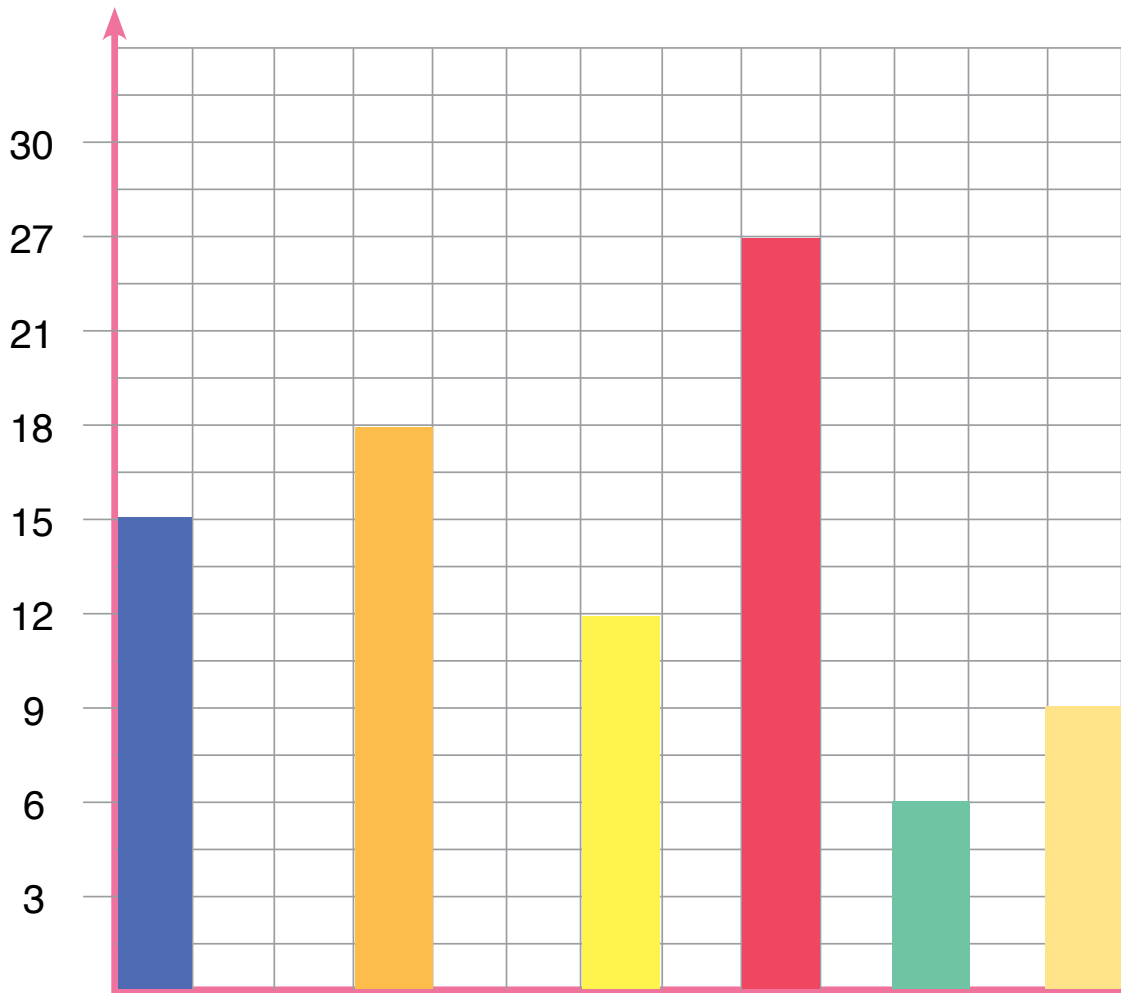


- What unit scale is used to display the popularity of subjects among the students? Number of students by 5
- Which subject is the second most popular? Ela
- Which subject is less popular, science or ELA? science
- Which subject is the most favorite? Math
- Which subjects have the same number of votes? Social studies, science
- What number of students favor Math and science? 80



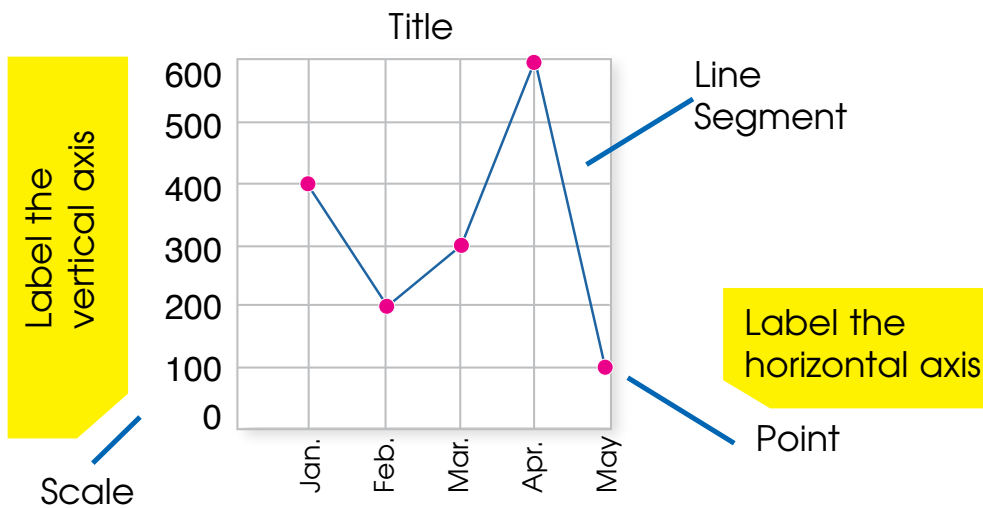
Help Mr. Omar count his crops by creating a bar graph. Color in the correct number of boxes for each crop. The first crop has been done for you.

 15 Radishes	 18 Carrots	 12 Corn
 27 Tomatoes	 6 Cauliflowers	 10 Onions





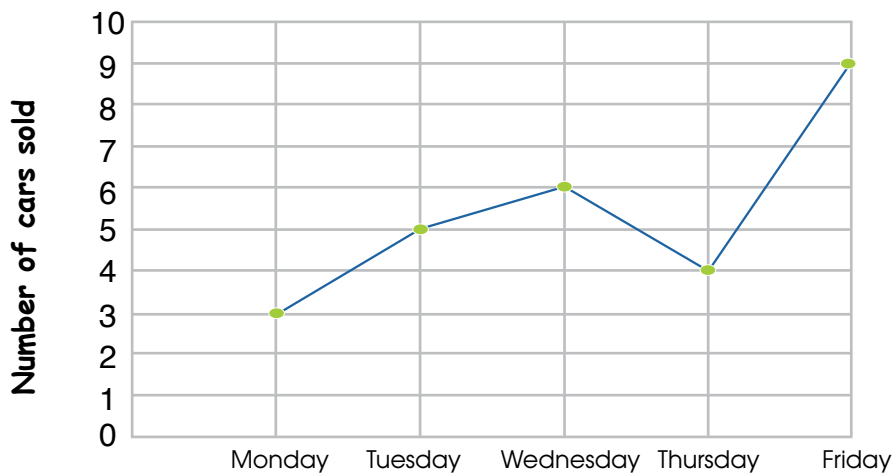
## (4-2) Line Graphs.



### Line graph - car sales



Karam works as a sales man in an authorized car showroom. He recorded the number of cars sold in five days (Monday to Friday) on a line graph. Study the graph and answer the questions.



The day with the maximum number of cars sold was Friday.

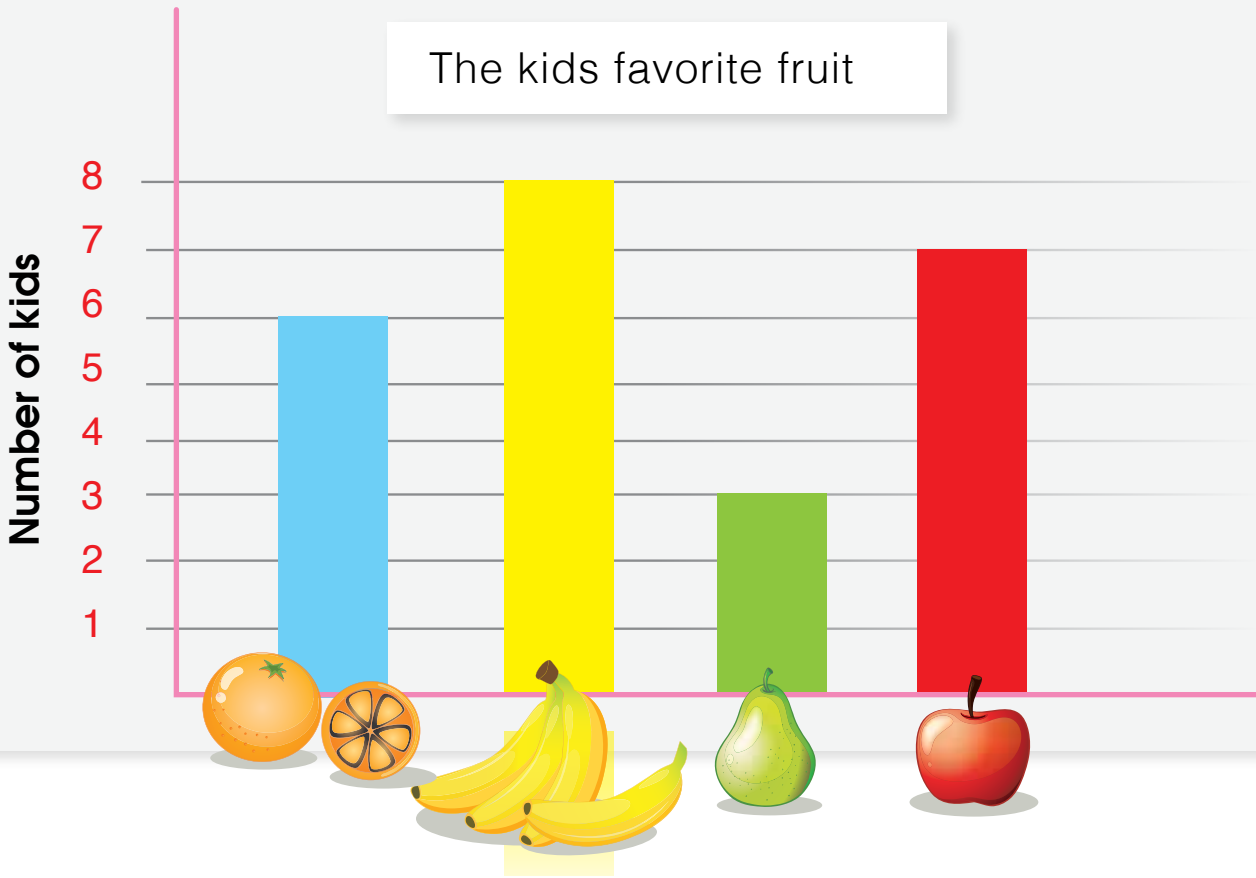
The number of cars sold on Wednesday was 6.

The difference between cars sold on Tuesday and cars sold on Monday was 2.

The number of cars sold in all 5 days was 27.



Study the bar graph and answer the questions.



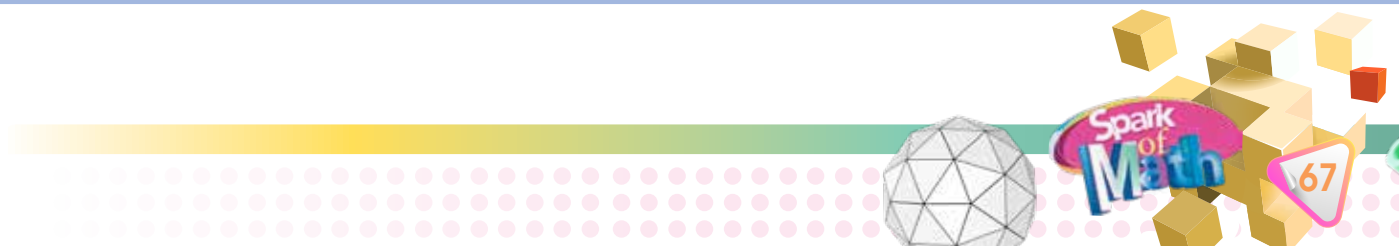
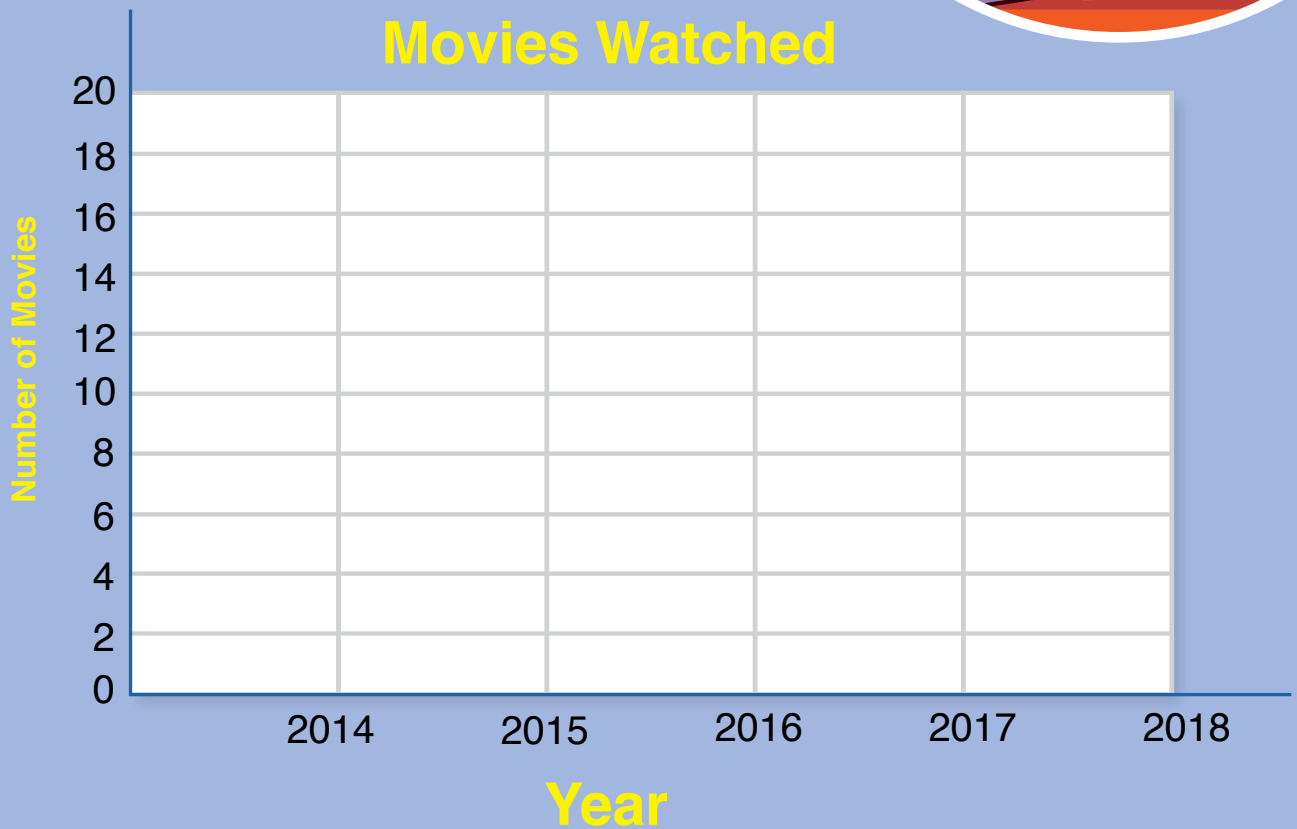
- How many kids like apples? ..... 7 .....
- Which fruit did the kids like the most? ..... bananas .....
- Which fruit did the kids like the least? ..... Pears .....
- How many kids like bananas? ..... 8 .....
- How many kids like pears and bananas? ..... 11 .....
- How many kids like oranges and apples? ..... 13 .....



## 🕒 Movies Watched.

Ghada and her family often watch movies at home. The data shows the number of movies watched by them from 2014 to 2018. Draw a line graph to represent the data.

Year	Number of movies
2014	8
2015	12
2016	10
2017	14
2018	18

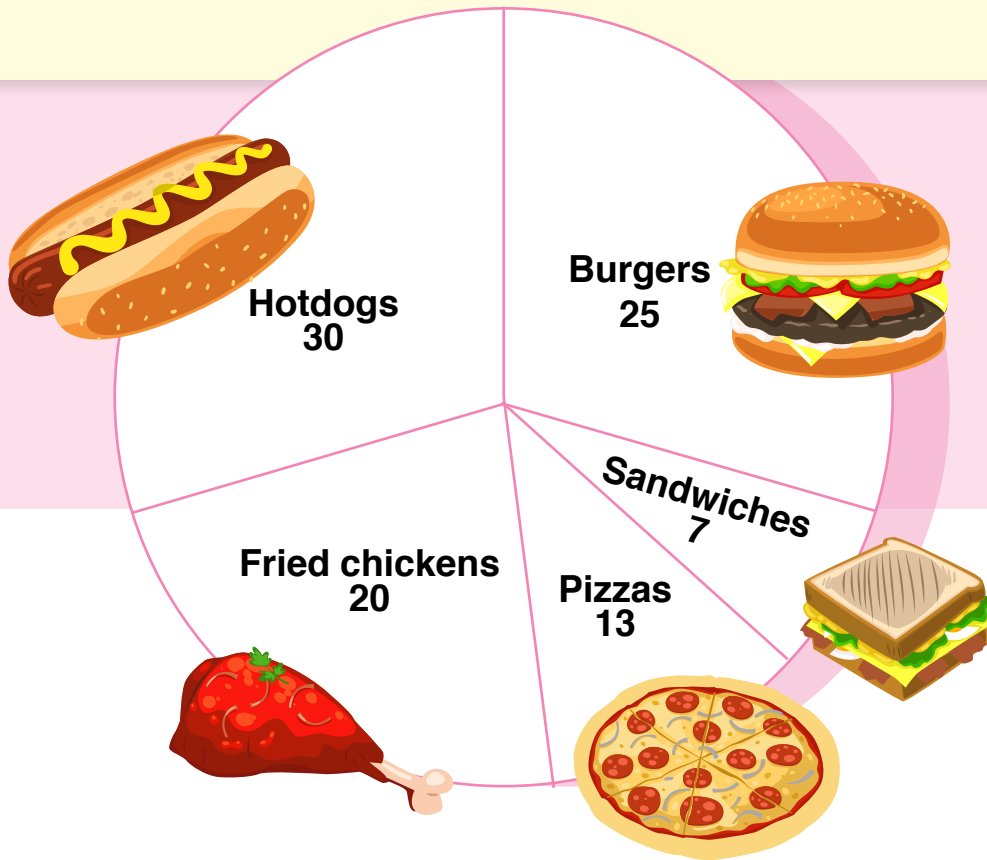




### (4-3) Circle Graph.

Answer the following questions.

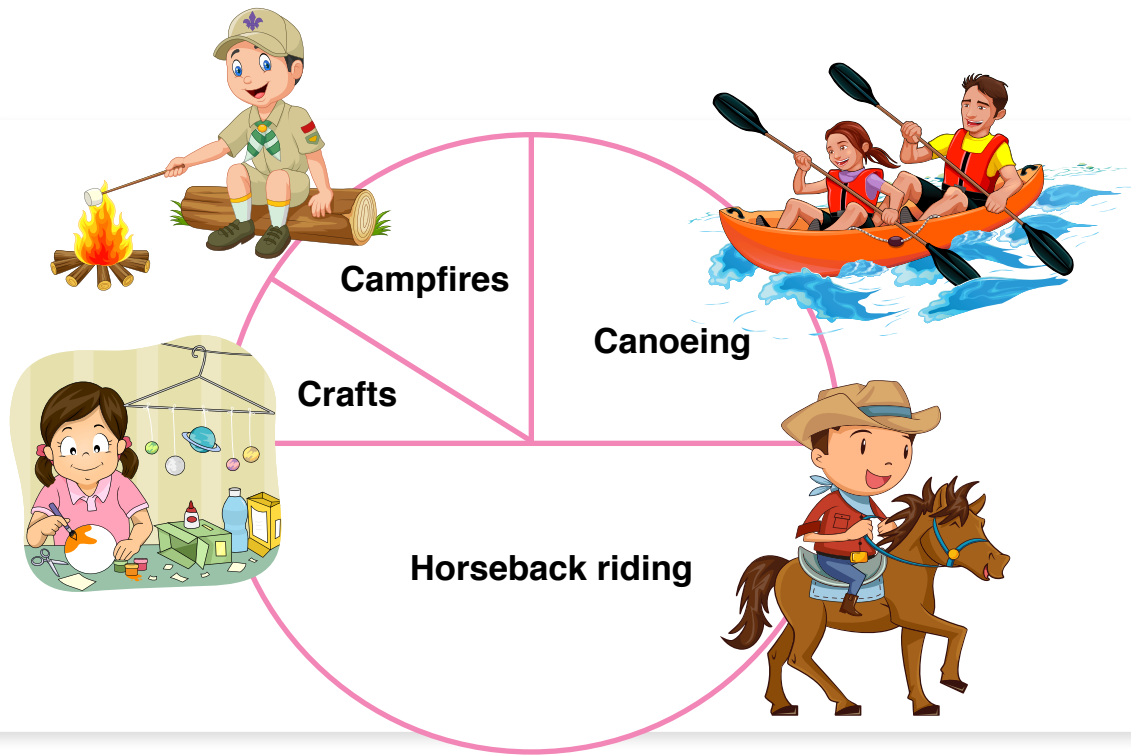
Hala's restaurant surveyed a sample of customers about their favorite food. They made a pie graph with the survey results. Read the pie graph and answer the questions.



- What is the most favorite food among the customers? Hotdogs
- How many customers like fried chicken? 20
- Which is the least favorite food? Sandwiches
- How many customers voted for burgers as their favorite? 25
- How many customers participated in the survey? 95



A group of kids spent a week at big tree summer camp. At the end of the week.....



- What activity did campers enjoy the most?

Horseback riding

- What fraction of the campers did canoeing as their favourite activity?

$\frac{1}{4}$

- Which activity was more popular with the campers?

Canoeing



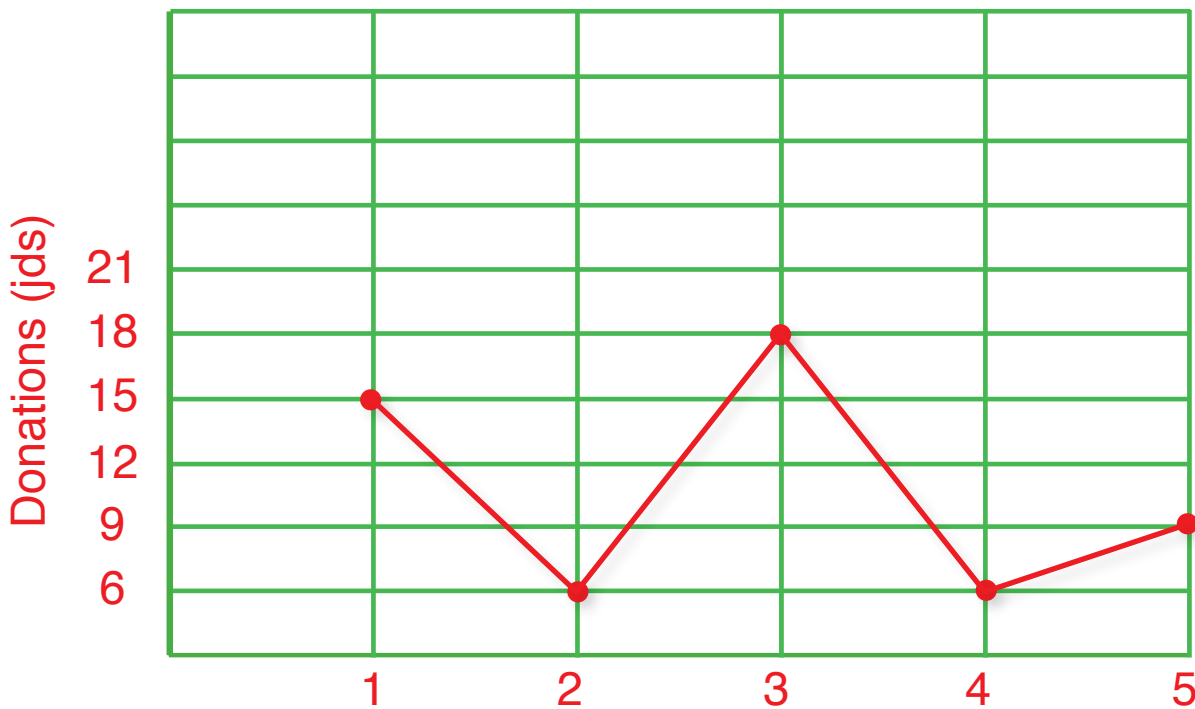
## Show Your Turn

- 🕒 The number of donations in JDs from grade 1 to grade 5 at a school in a day are given below. Make an appropriate scale and draw a line graph. Also label the axes and write a title for the graph.

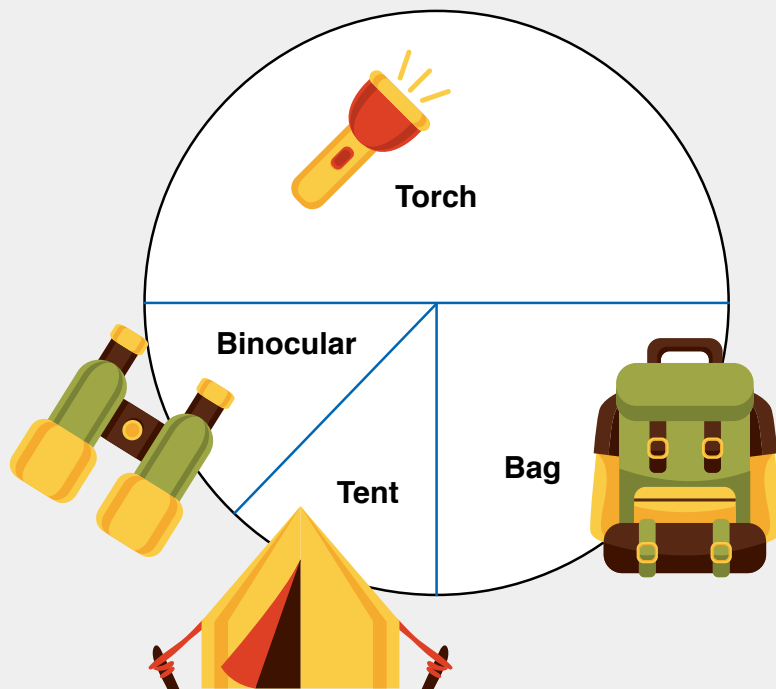
Grade 1	15
Grade 2	6
Grade 3	18
Grade 4	6
Grade 5	9



Charity



- Richards camping store is the best for camping gear supplies. They made a pie graph of the sales for certain items during the month of July. Use the graph to answer the questions.



- Which item sold the most in Richards camping store?

Torch

- What is the fraction expressing the number of torches sold?

$\frac{1}{2}$

- Did the store sell fewer bags or torches?

bags

- Are the sales of bags more than the sales of tents?

yes

