

# Maths

Sixth Grade

3

4

U

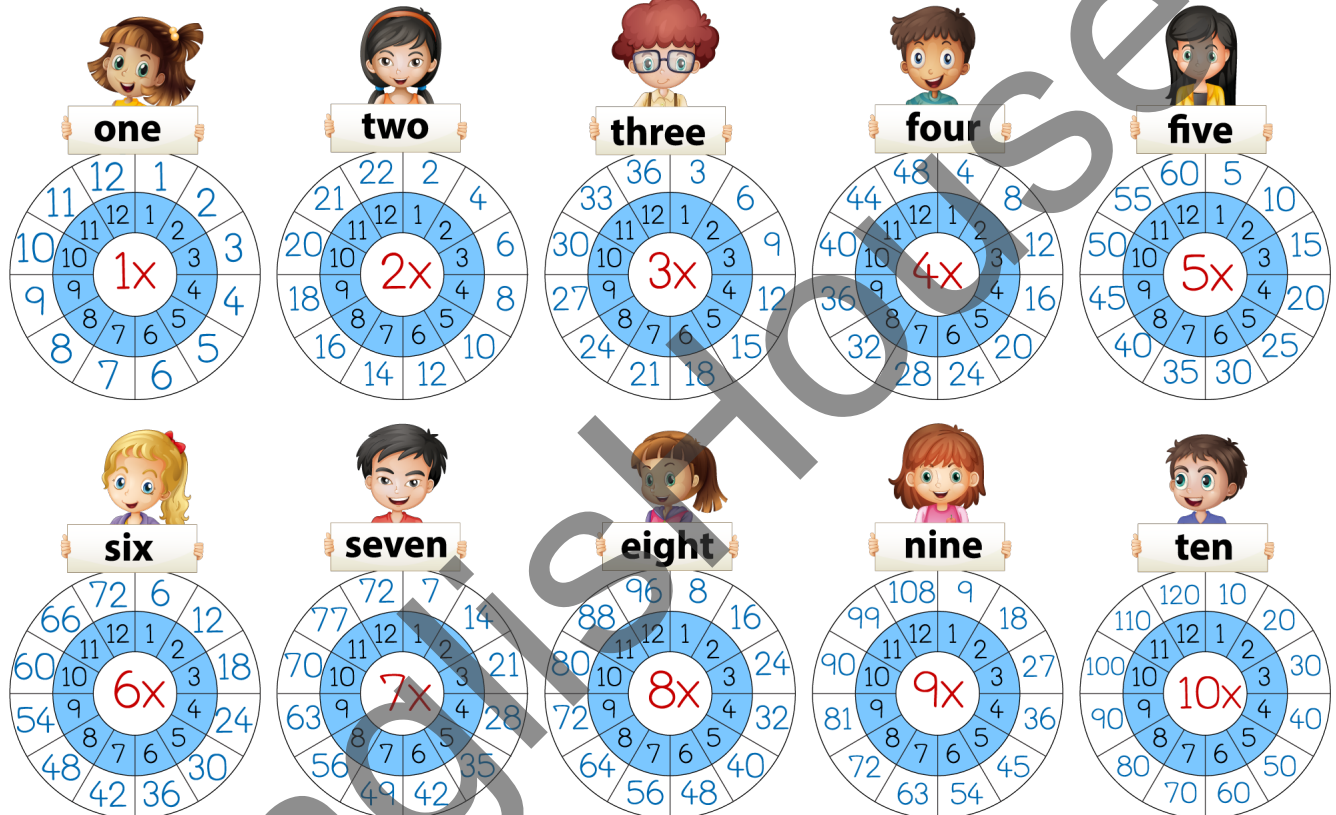
4

6

5



# Multiplication Circles to 10





# Contents

## Unit 1

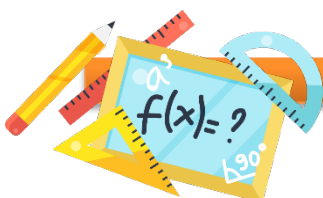
Multiples.....	Page 5
Factors.....	Page 8
Squares, roots and powers.....	Page 12
Calculating square roots.....	Page 14

## Unit 2

Mixed operations.....	Page 17
Multiplication.....	Page 21
Multiplying decimals.....	Page 21
Multiplying fractions.....	Page 22
Division.....	Page 25
Dividing decimals.....	Page 26
Dividing fractions.....	Page 28
Fractions.....	Page 30
Equivalent fractions.....	Page 30
Multiplying to find equivalent fractions.....	Page 31
Comparing fractions.....	Page 32

## Unit 3

Polyhedra.....	Page 36
Euler's formula.....	Page 37
Net and solid.....	Page 38
Graphs and what they say.....	Page 40
Conversion graph.....	Page 42
Understanding more about graphs.....	Page 43
Average.....	Page 43
Mean.....	Page 43
Median.....	Page 44
Mode.....	Page 44





Range.....	Page 45
Converting fractions to decimals and decimals to fractions..	Page 47
Method 2 .....	Page 49
Convert a decimal to a fraction .....	Page 50

### Unit 4

Volume of cubes, prisms and pyramids.....	Page 54
The volume of a pyramid.....	Page 56
Pyramid with a rectangular base.....	Page 56
Pyramid with a triangular base.....	Page 56
Calculate the volume of rectangular prisms.....	Page 57
Proportions.....	Page 60
Percent.....	Page 64
Sequences and series.....	Page 67
Arithmetic sequences .....	Page 68
Geometric sequences .....	Page 69
Special sequences – triangular numbers.....	Page 70
Special sequences – square numbers.....	Page 71
Special sequences – cube numbers .....	Page 72





# UNIT 1 Multiples



## TAKE THE CHALLENGE



Read, colour and write.

Multiples of 2 end in .....

Multiples of 5 end in .....

Multiples of 10 end in .....

Multiples of 2 blue.

6	11	4
10	5	8
3	7	1
2	9	12

Multiples of 5 green.

2	11	65
10	5	8
3	7	1
2	9	35

Multiples of 10 orange.

60	11	40
10	5	80
3	7	1
2	9	120

Read and complete.

A multiple is a number made by multiplying together two other numbers.  $6 \times 8 = \underline{\hspace{2cm}}$ , so 48 is a common multiple of     and    .

The lowest or least common multiple (LCM) of 6 is 24.

Find two common multiples in each set.

a) 5 .....

4 .....

b) 6 .....

8 .....

c) 3 .....

2 .....

d) 7 .....

4 .....

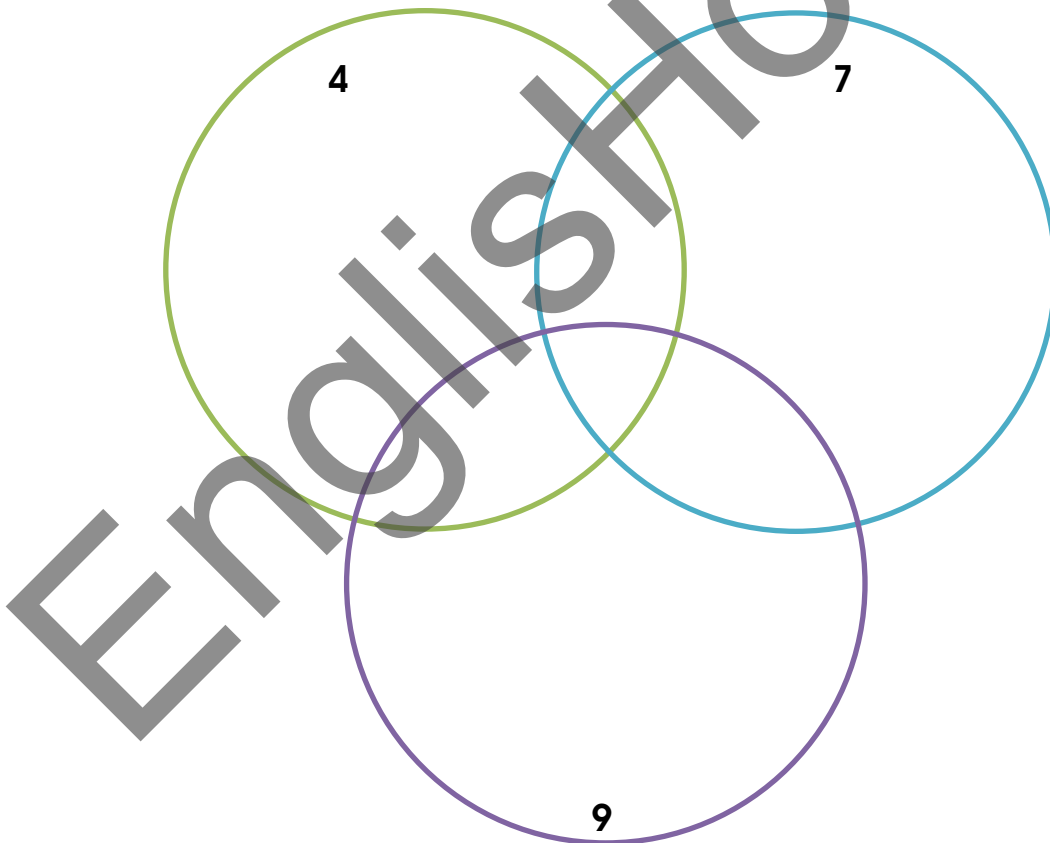




Find three common multiples in each set of numbers. Then circle the lowest common multiple (LCM).

- a) 3 .....  
4 .....  
8 .....
- b) 5 .....  
6 .....  
9 .....
- c) 6 .....  
7 .....  
4 .....

Write all the multiples of the numbers up to 100. Then answer the question.



Did you find any common multiple for the three numbers? \_\_\_\_\_





# You're up!

Look and put a tick if the number is a multiple of 3 or 5. If it is not a multiple, put a cross.

Number	Multiple of 3	Multiple of 5
21	✓	✗
12		
8		
15		
6		
10		
30		

Read and answer the questions.

1. What are the multiples of 4 between 10 and 25?

.....

2. Which numbers are multiples of 6?

32      12      18      15      9      24      40

a) I am a multiple of 4

c) I am even.

b) I am between 20 and 30.

d) I am 2 less than a multiple of 10.

What number am I? .....



# Factors



## TAKE THE CHALLENGE



Look and write the missing factors. Then write, in your own words, what a factor is.

Factor: It .....

.....

.....

$10 = \_ \times 5$

$18 = \_ \times \_$

$36 = 2 \times 2 \times 3 \times \dots$

$24 = \_ \times \_$

$30 = \_ \times \_$

$60 = 2 \times 3 \times 2 \times \dots$

$32 = \_ \times \_$

$39 = \_ \times \_$

$75 = 5 \times 3 \times \dots$

### Read and complete.

Factors are whole numbers that will divide exactly into other whole numbers. A number which is a factor of two or more given numbers is called "The common factor of the given numbers."

#### Ex. 1.

Find the common factors of 60, 15 and 45

The factors of 60 are 1, 2, 3, 4, 5, 10, 12, 15, 20, 30 and 60.

The factors of 15 are 1, 3, 5, and 15.

The factors of 45 are 1, 3, 5, 9, 15 and 45.

The common factors of 60, 15 and 45 are \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_.

The highest common factor (HCF) is \_\_\_\_\_.

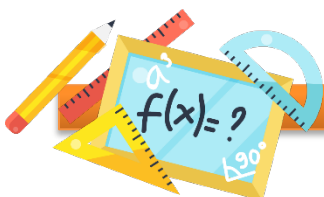


If a number only has two factors, itself and 1, then it is a "Prime number."

The prime factors of a number are all those factors of the number which are themselves prime numbers.

#### Ex. 2.

All the factors of 12 are 1, 2, 3, 4 and 12, but its only prime factors are \_\_\_\_\_ and \_\_\_\_\_.







Find the common factors for each of these numbers. Then circle the highest common factor (HCF) for each set of numbers.

a) 40 .....  
56 .....

b) 35 .....  
80 .....

c) 24 .....  
64 .....

d) 90 .....  
115 .....

One way to work out prime factors is to use factor – trees.

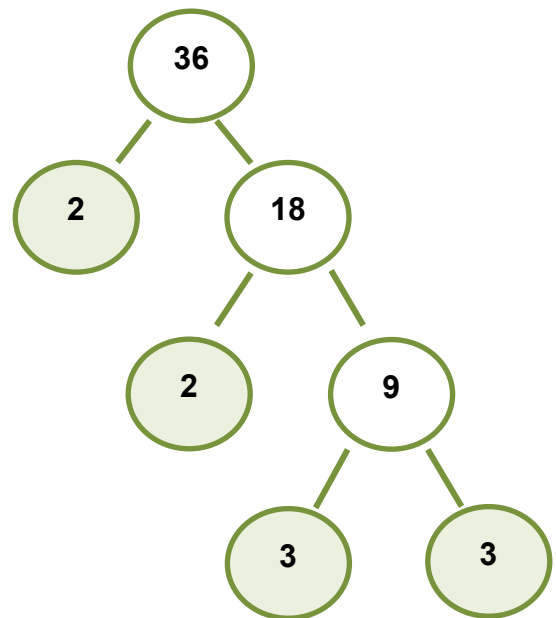
**Ex.** What are the prime factors of 36?  
Start with any pair of factors of 36 and factorize them.

Continue until you get prime factors.

$$2 \times 2 \times 3 \times 3 = \underline{\quad}$$

$$2^2 \times 3^2 = \underline{\quad}$$

2 and 3 are prime factors of  $\underline{\quad}$ .





Draw factor trees for the following numbers.

48

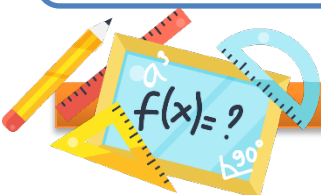
56

90

132

14

42





# You're up!

Look at write the factors of the numbers. Then read and complete the definition.

Number	Factors
1	1
2	2,1
3	
4	
5	
6	
7	
8	
9	
10	

Number	Factors
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

## Prime numbers:

They are numbers that have only 2 factors; 1 and themselves.

Now that you got the definition of Prime Numbers, go back to the table and colour all the boxes (from 1 to 20) that have prime numbers.





# Squares, roots and powers



## TAKE THE CHALLENGE



Read and match the operations with the answers in the first section, what are they called?

Read and solve the operations in the second section, what are they called?

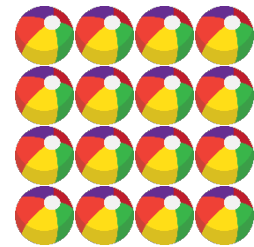
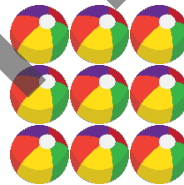
$$\begin{aligned} \sqrt{25} &= \\ \sqrt{81} &= \\ \sqrt{64} &= \\ \sqrt{49} &= \\ \sqrt{16} &= \end{aligned}$$

- 8
- 4
- 5
- 9
- 7

$$\begin{aligned} 1^2 &= \dots\dots\dots \\ 2^2 &= \dots\dots\dots \\ 3^2 &= \dots\dots\dots \\ 4^2 &= \dots\dots\dots \\ 5^2 &= \dots\dots\dots \end{aligned}$$

### Read and complete.

These are examples of squared numbers; when 2 identical whole numbers are multiplied together.



$1 \times 1 = \underline{\quad}$	$2 \times 2 = \underline{\quad}$	$3 \times 3 = \underline{\quad}$	$4 \times 4 = \underline{\quad}$
1 squared = $\underline{\quad}$	2 squared = $\underline{\quad}$	3 squared = $\underline{\quad}$	4 squared = $\underline{\quad}$
$1^2 = \underline{\quad}$	$2^2 = \underline{\quad}$	$3^2 = \underline{\quad}$	$4^2 = \underline{\quad}$

### Solve these.

- |                |                 |                 |
|----------------|-----------------|-----------------|
| a) $9^2$ ..... | b) $8^2$ .....  | c) $18^2$ ..... |
| d) $7^2$ ..... | e) $11^2$ ..... | f) $32^2$ ..... |
| g) $6^2$ ..... | h) $25^2$ ..... | i) $44^2$ ..... |





Look carefully and solve these.

a)  $5^2 + 2^2 =$  .....

d)  $11^2 + 10^2 =$  .....

b)  $4^2 + 9^2 =$  .....

e)  $110^2 + 31^2 =$  .....

c)  $18^2 + 13^2 =$  .....

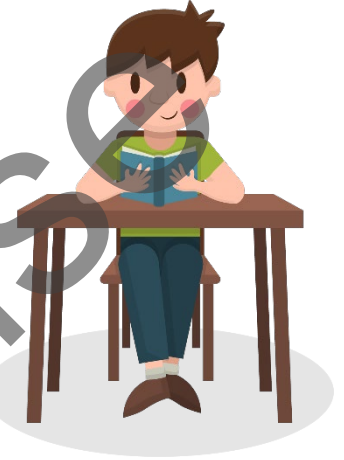
f)  $25^2 + 12^2 =$  .....

Read and find the value of the numbers.

Sometimes you need to multiply a number by itself several times.  $2 \times 2 \times 2 \times 2 =$  \_\_\_\_\_

A quick way to write this is  $2^4$  – 2 to the power of 4.

$2^4 =$  \_\_\_\_\_



**Extended form**

a)  $3^4 =$  \_\_\_\_\_  $=$  \_\_\_\_\_

b)  $2^3 =$  \_\_\_\_\_  $=$  \_\_\_\_\_

c)  $10^3 =$  \_\_\_\_\_  $=$  \_\_\_\_\_

d)  $4^5 =$  \_\_\_\_\_  $=$  \_\_\_\_\_

e)  $5^4 =$  \_\_\_\_\_  $=$  \_\_\_\_\_

Look and complete the chart.

Power	Base	Index	Meaning	Numeral
$4^2$	4	2	$4 \times 4$	16
$2^4$				
	6	3		
			$5 \times 5 \times 5 \times 5$	
$10^5$				
	3			81





## Calculating square roots

Read and answer the questions. Write complete math sentences.

a) What is  $19^2$ ?

.....

b) What is the next square number after 144?

.....

c) What is the square root of 361?

.....

d) What is  $11^4$ ?

.....

e) What is 14 squared?

.....

Read and write the square root of each of the numbers below.

On a calculator, there is a  $\sqrt{\quad}$  symbol. This is called a **square root key**. The square root of a particular number is the number that was multiplied by itself to reach that number.



a)  $\sqrt{64}$  \_\_\_\_\_

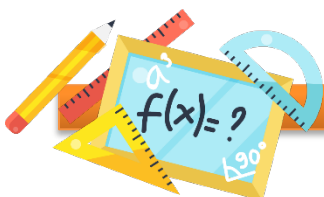
d)  $\sqrt{900}$  \_\_\_\_\_

b)  $\sqrt{25}$  \_\_\_\_\_

e)  $\sqrt{144}$  \_\_\_\_\_

c)  $\sqrt{81}$  \_\_\_\_\_

f)  $\sqrt{49}$  \_\_\_\_\_





## Read and calculate the square root.

A square root is the opposite of a square number. One way to calculate the square root is to divide the number by prime numbers until it is reduced to 1.

Ex.



$$\begin{aligned}\sqrt{484} &= 484 \div 2 \\ &242 \div 2 \\ &121 \div 11 \\ &11 \div 11 \\ &1\end{aligned}$$

$$\begin{aligned}\text{So, } 484 &= 2 \times 2 \times 11 \times 11 \\ &= (2 \times 11) \times (2 \times 11) \\ &= 22 \\ &= 22 \times 22 = 484\end{aligned}$$

$$\sqrt{484} = 22$$

a)  $\sqrt{576}$

b)  $\sqrt{676}$

c)  $\sqrt{961}$

d)  $\sqrt{1225}$





# You're up!

Look carefully and solve these.

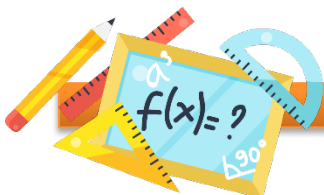
a)  $\sqrt{64} + \sqrt{100}$  .....

b)  $\sqrt{289} - \sqrt{121}$  .....

c)  $\sqrt{1521} - \sqrt{1296}$  .....

Estimate each of the following roots. Then use a calculator to check your estimates and, when the answer is not a whole number, round the number to the nearest tenth.

		Answer	Nearest tenth
a)	378	19.442222 ...	19.4
b)	162	_____	_____
c)	275	_____	_____
d)	730	_____	_____
e)	294	_____	_____
f)	502	_____	_____









If your answer was "I did the multiplication first!" then you were right! When it comes with working out mathematical statements of this type, you must follow a specific order that's been agreed upon. Remember, you have to go from left to right.

**Read and check if you have to do the operations or cross if you don't need them now.**

1) Parenthesis

2) Exponents

3) Multiplication or division

4) Addition or subtraction


$$9 + 7 \times 6 = \underline{\quad ? \quad}$$

=

So the answer is                     

**Read and check or cross. Then follow the order and complete.**

1) Parenthesis

2) Exponents

3) Multiplication or division

4) Addition or subtraction


$$(7 + 3) \times 5 \div 5 - 4 \times 2 = \underline{\quad ? \quad}$$

$$10 \times 5 \div 5 - 4 \times 2$$

$$50 \div 5 - 4 \times 2$$

$$10 - 8 = \underline{\hspace{2cm}}$$

What happens if you have a mathematical statement which has operations at the same level; this is multiplication and division or addition and subtraction, or an exponent?

- You just go from left to right!

$$2 + 3 - 2 + 5 - 1 = \underline{\quad ? \quad}$$

$$9 \times 2 \div 3 \times 2 = \underline{\quad ? \quad}$$

$$2 \times 3^2 = \underline{\quad ? \quad}$$

$$(2 \times 3)^2 = \underline{\quad ? \quad}$$

$$5 - 2 + 5 - 1 =$$

$$18 \div 3 \times 2 =$$

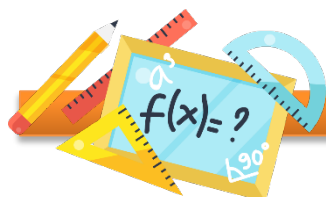
$$2 \times 9 =$$

$$6^2 =$$

$$3 + 5 - 1 =$$

$$6 \times 2 =$$

$$8 - 1 =$$





Look and solve these.

Remember:

- Follow the order of operations.
- Go from left to right.

**Set 1**

a)  $12 - 4 \times 2 = \underline{\quad}$

b)  $5 + 2^2 = \underline{\quad}$

c)  $10 \times 2 - 4 = \underline{\quad}$

**Set 2**

d)  $6 \times 4^2 = \underline{\quad}$

e)  $8^2 + 6 = \underline{\quad}$

f)  $4 + 2 \times 4 = \underline{\quad}$

**Set 3**

g)  $(6 + 4)^2 + 5 = \underline{\quad}$

h)  $4^2 + 2 - (2 + 3) = \underline{\quad}$

i)  $2^2 + 2 + (4^2 + 1 + 2) = \underline{\quad}$





# You're up!

Read and answer the questions. Then explain what you did to find the answer.

The sum of two numbers is seven and their difference is one.

What are the two numbers?

.....  
.....  
.....  
.....  
.....

A rectangular fence around a garden measures 28 meters. If the length of the fence is 6 meters, what is the width?

.....  
.....  
.....  
.....  
.....

Berta has a box of doughnuts that can be divided evenly among three and five friends.

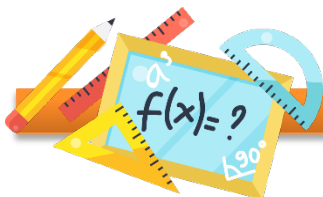
What is the number of doughnuts that can be in the box?

.....  
.....  
.....  
.....  
.....

Frank is five years older than Bruce who is six years younger than Brat.

If Brat is twelve years old, how old is Frank?

.....  
.....  
.....  
.....  
.....







$$\begin{array}{r}
 2. \textcircled{3} \\
 \times 4. \textcircled{1} \\
 \hline
 2 \quad 3 \\
 9 \quad 2 \quad 0 \\
 \hline
 9 \textcircled{0} 4 \quad 3
 \end{array}$$

Count the total number of digits to the right of the decimal points in the two numbers you are multiplying (the multiplicand and multiplier). Place the decimal point in your answer by counting those many digits from the right.

Solve these.

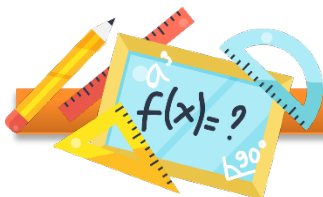
a)	2.	4	5		b)	6	5	5.	4	5	c)	2	3.	1	5
	X	4	7			X			4.	6		X			5
	<hr/>					<hr/>					<hr/>				
d)	3	5.	2	9	e)	4	8.	7	8	f)	3	1	4.	7	
	X			3		X			9		X			2	
	<hr/>					<hr/>					<hr/>				

## Multiplying fractions

Read and multiply the fractions.

There are 3 simple steps to multiply fractions:

1. Multiply the top numbers (the numerators).
2. Multiply the bottom numbers (the denominators).
3. Simplify the fraction, if needed.





Multiply the numerators.

$$\frac{2}{5} \times \frac{3}{4} = \frac{6}{20}$$

Multiply the denominators.

$$\frac{2}{5} \times \frac{3}{4} = \frac{6}{20}$$

Reduce the fraction, if necessary.

$$\frac{6}{20} = \frac{3}{10}$$

a)  $\frac{3}{10} \times \frac{2}{2} =$


b)  $\frac{2}{4} \times \frac{2}{3} =$


c)  $\frac{2}{4} \times \frac{1}{2} =$

d)  $\frac{1}{2} \times \frac{1}{4} =$

e)  $\frac{3}{10} \times \frac{2}{4} =$

f)  $\frac{1}{2} \times \frac{3}{5} =$

g)  $\frac{2}{5} \times \frac{2}{10} =$

h)  $\frac{7}{10} \times \frac{2}{5} =$





# You're up!

Look and complete the puzzle.

$$\begin{array}{r} 1 \\ \text{---} \\ 2 \end{array}$$

$$\begin{array}{r} 1 \\ \text{X ---} \\ 2 \end{array}$$

$$\begin{array}{r} \phantom{1} \\ \text{---} \\ \phantom{2} \end{array}$$

$$\begin{array}{r} 1 \\ \text{X ---} \\ 4 \end{array}$$

$$\begin{array}{r} \phantom{1} \\ \text{---} \\ \phantom{2} \end{array}$$

$$\begin{array}{r} 1 \\ \text{X ---} \\ 4 \end{array}$$

$$\begin{array}{r} 1 \\ \text{X ---} \\ 2 \end{array}$$

$$\begin{array}{r} 1 \\ \text{X ---} \\ 2 \end{array}$$

$$\begin{array}{r} \phantom{1} \\ \text{---} \\ \phantom{2} \end{array}$$

$$\begin{array}{r} \text{X 1} \end{array}$$

$$\begin{array}{r} \phantom{1} \\ \text{---} \\ \phantom{2} \end{array}$$

$$\begin{array}{r} 1 \\ \text{X ---} \\ 4 \end{array}$$

$$\begin{array}{r} \phantom{1} \\ \text{---} \\ \phantom{2} \end{array}$$

$$\begin{array}{r} 2 \\ \text{---} \\ 3 \end{array}$$

$$\begin{array}{r} 1 \\ \text{X ---} \\ 3 \end{array}$$

$$\begin{array}{r} \phantom{1} \\ \text{---} \\ \phantom{2} \end{array}$$

$$\begin{array}{r} 1 \\ \text{X ---} \\ 3 \end{array}$$

$$\begin{array}{r} \phantom{1} \\ \text{---} \\ \phantom{2} \end{array}$$

$$\begin{array}{r} 2 \\ \text{X ---} \\ 3 \end{array}$$

$$\begin{array}{r} 2 \\ \text{X ---} \\ 2 \end{array}$$

$$\begin{array}{r} 2 \\ \text{X ---} \\ 2 \end{array}$$

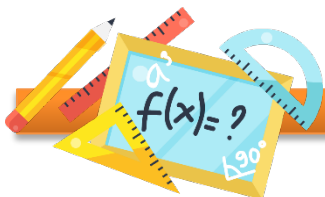
$$\begin{array}{r} \phantom{1} \\ \text{---} \\ \phantom{2} \end{array}$$

$$\begin{array}{r} 1 \\ \text{X ---} \\ 2 \end{array}$$

$$\begin{array}{r} \phantom{1} \\ \text{---} \\ \phantom{2} \end{array}$$

$$\begin{array}{r} 1 \\ \text{X ---} \\ 3 \end{array}$$

$$\begin{array}{r} \phantom{1} \\ \text{---} \\ \phantom{2} \end{array}$$













## Dividing fractions

Read and look. Then work out the divisions.

Invert the fraction that you are dividing by.

$$\frac{4}{5} \div \frac{2}{3} = \frac{4}{5} \times \frac{3}{2}$$

Multiply the numerators and denominators.

$$\frac{4}{5} \times \frac{3}{2} = \frac{12}{10}$$

Simplify the fraction, if necessary.

$$\frac{12}{10} = 1 \frac{1}{5}$$

a)

$$\frac{2}{4} \div \frac{3}{4} =$$


b)

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


c)

$$\frac{3}{9} \div \frac{1}{3} =$$

d)

$$\frac{1}{5} \div \frac{1}{3} =$$

e)

$$\frac{2}{3} \div \frac{6}{8} =$$

f)

$$\frac{1}{2} \div \frac{5}{8} =$$

g)

$$\frac{7}{8} \div \frac{1}{6} =$$

h)

$$\frac{1}{2} \div \frac{6}{9} =$$







## Fractions



**TAKE THE CHALLENGE**



**Read and answer the question.**

Ben has a recipe that calls for  $\frac{2}{4}$  of a cup of milk. He only has a  $\frac{1}{2}$  measuring cup.

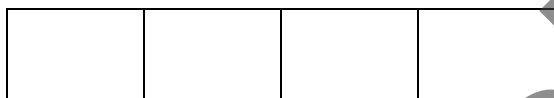
How many times should Ben fill his measuring cup to get the right amount? Explain what you did to find the answer.

.....  
.....  
.....

## Equivalent fractions

**Read and colour.**

We say two fractions are equivalent when they represent the same amount.



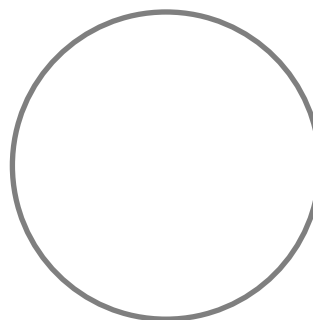
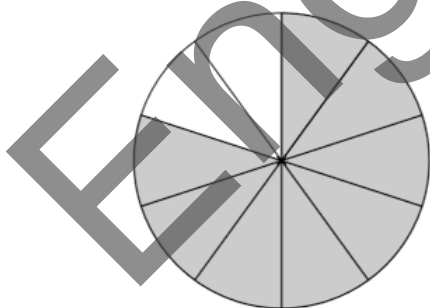
$$= \frac{2}{4}$$



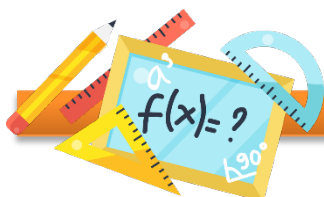
$$= \frac{1}{2}$$



**Look at the pictures and draw the representation of an equivalent fraction.**



\_\_\_\_\_ = \_\_\_\_\_



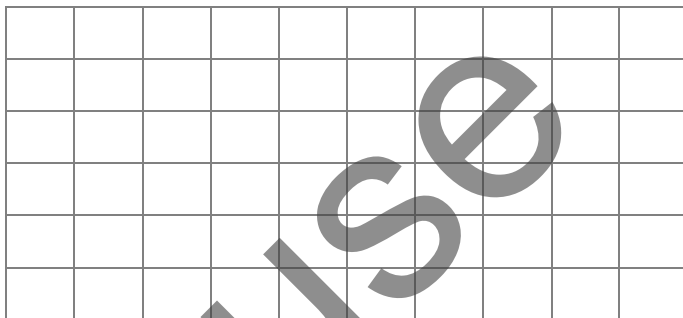


## Multiplying to find equivalent fractions

Read and answer the question.

Sam said  $\frac{3}{4}$  of the chocolates were eaten, but Sara thought  $\frac{9}{12}$  of them were eaten. Their mum said both kids were correct. Why were they both right?

.....  
.....  
.....  
.....



Read, look and write the missing numbers.

Equivalent fractions can be found by multiplying both numerator and denominator by the same non-zero number.



a)  $\frac{5}{6} \times \frac{\quad}{\quad} = \frac{20}{24}$       b)  $\frac{3}{15} \times \frac{\quad}{\quad} = \frac{15}{75}$       c)  $\frac{2}{7} \times \frac{\quad}{\quad} = \frac{6}{21}$

d)  $\frac{8}{2} \times \frac{\quad}{\quad} = \frac{32}{8}$       e)  $\frac{15}{7} \times \frac{\quad}{\quad} = \frac{75}{35}$       f)  $\frac{8}{16} \times \frac{\quad}{\quad} = \frac{16}{32}$

Look and write the equivalent fraction.

a)  $\frac{7}{8} \times \frac{\quad}{\quad} = \frac{\quad}{16}$       b)  $\frac{3}{5} \times \frac{\quad}{\quad} = \frac{\quad}{25}$       c)  $\frac{9}{16} \times \frac{\quad}{\quad} = \frac{\quad}{64}$

d)  $\frac{4}{5} \times \frac{\quad}{\quad} = \frac{\quad}{45}$       e)  $\frac{7}{15} \times \frac{\quad}{\quad} = \frac{\quad}{30}$       f)  $\frac{5}{12} \times \frac{\quad}{\quad} = \frac{\quad}{36}$





Read and order the fractions. Then answer the question.

Smallest fraction  $\rightarrow$

8/4 • 5/9 • 7/2 • 3/8 • 6/5

What did you do to find the correct ordering?

.....
.....
.....

Comparing fractions

Read and complete.

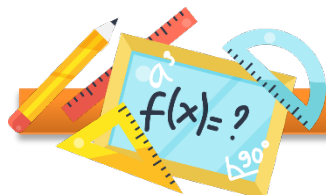
First you need to write the fractions as equivalent fractions with the same denominator. To compare 6/3 and 5/4, you have to multiply the fraction by the denominator of the other fraction.

6/3 x 4 = 24/12
5/4 x 3 = 15/12

Now you can compare: 24/12 is more than 15/12

Compare the fractions – write the complete procedure.

Grid for comparing 4/12 and 8/9





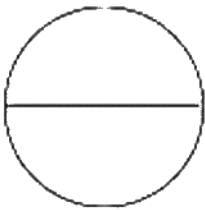
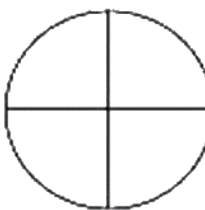



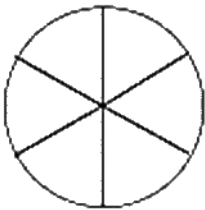

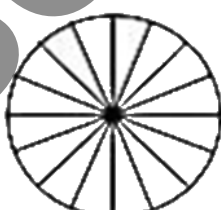



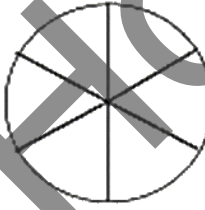




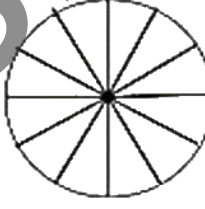

# You're up!

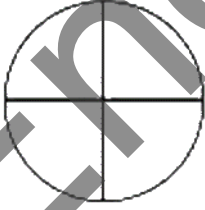
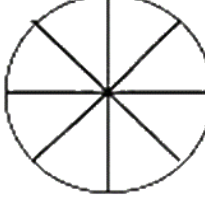
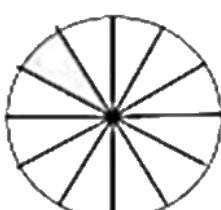
Look, colour and write equivalent fractions.

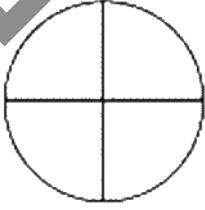
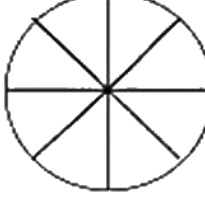

a)  $\frac{1}{2}$   =  $\frac{\quad}{\quad}$   =  $\frac{\quad}{\quad}$  

b)  $\frac{1}{2}$   =  $\frac{\quad}{\quad}$   =  $\frac{\quad}{\quad}$  

c)  $\frac{1}{3}$   =  $\frac{\quad}{\quad}$   =  $\frac{\quad}{\quad}$  

d)  $\frac{2}{3}$   =  $\frac{\quad}{\quad}$   =  $\frac{\quad}{\quad}$  

e)  $\frac{1}{4}$   =  $\frac{\quad}{\quad}$   =  $\frac{\quad}{\quad}$  

f)  $\frac{3}{4}$   =  $\frac{\quad}{\quad}$   =  $\frac{\quad}{\quad}$  



## UNIT 3 Polyhedra



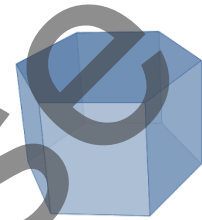
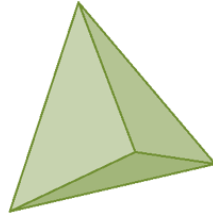
### TAKE THE CHALLENGE



Look and fill in the chart. Then walk around school. Find a shape of each type and explain why you think it is there and why it fits that place.

(If you cannot find them at school, just think of where you could.)

Shape



Name

Number of sides

Where at school

Why it fits there

.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....

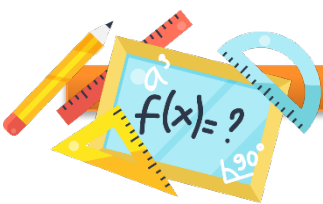
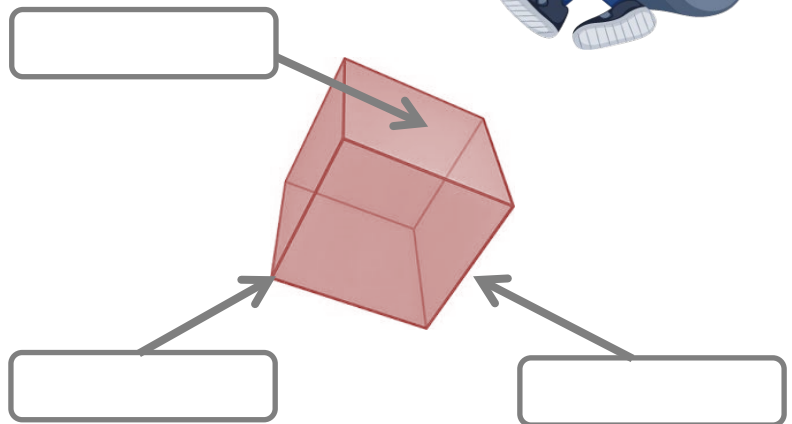
### Read and label the picture and complete.

A polyhedron is a solid shape with flat faces. The meaning of the word is "**many faces**." Each face is a **polygon (a flat shape with straight sides)**. These shapes are made up of faces, vertices and edges.

3D shapes can be described in three ways:

1. Faces – the sides of the shape.
2. Vertices – the corners.
3. Edges – where the faces meet.

- A cuboid has ..... faces.
- A cuboid has ..... vertices.
- A cuboid has ..... edges.





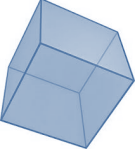
## Euler's Formula

Read and complete the chart. Then use the formula to check your answers.



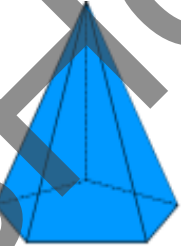
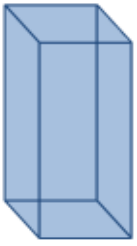
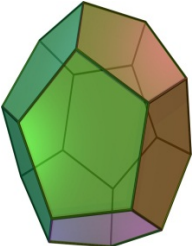
When we count the number of faces (the flat surfaces), vertices (corner points) and edges of a polyhedron, we discover an interesting thing:

$$\text{The number of faces} + \text{the number of vertices} - \text{the number of edges} = 2.$$

Example:

Shape	Number of faces	Number of vertices	Number of edges
	.....	.....	.....

$$F + V - E = 2 \quad \underline{\quad} + \underline{\quad} = \underline{\quad} \quad \underline{\quad} - \underline{\quad} = 2$$

Shape					
Name	.....	.....	.....	.....	.....
Faces	.....	.....	.....	.....	.....
Vertices	.....	.....	.....	.....	.....
Edges	.....	.....	.....	.....	.....
Formula (numbers)	.....	.....	.....	.....	.....



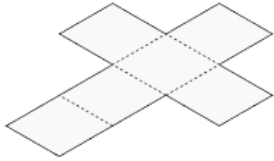


# Net and solid

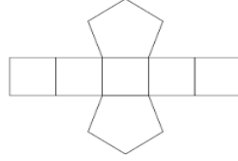
Read and write the name of the shape.

This is what a shape looks like when it is opened out flat.

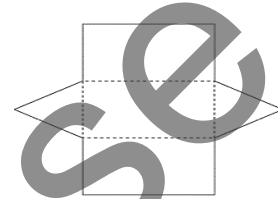
Triangular Prism Pentagonal Prism	Hexagonal Prism Cube	Tetrahedron Square Based Pyramid
--------------------------------------	-------------------------	-------------------------------------



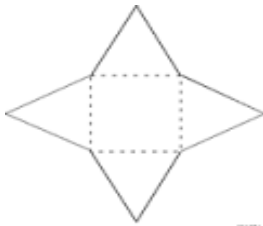
.....



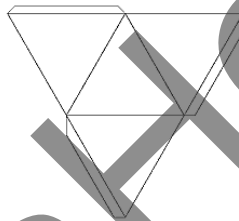
.....



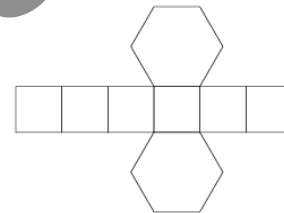
.....



.....






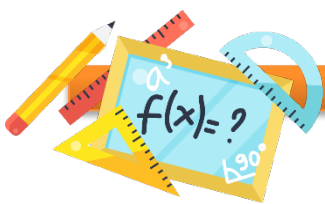
.....



.....

Find some of the shapes named before in the objects you use every day. Then glue pictures and write what they are and the shapes they are / have.

Item	Name	Shape
	.....	.....
	.....	.....
	.....	.....





# You're up!

Use toothpicks and clay to make shapes. Then take a picture of each and glue them in the boxes.



How many shapes did you make?

.....

.....

.....

.....









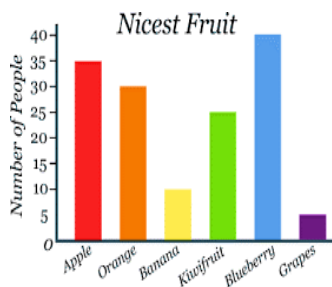
Look and match the pictures with the definitions. Then use the words in the box to label the graphs.

Pie chart

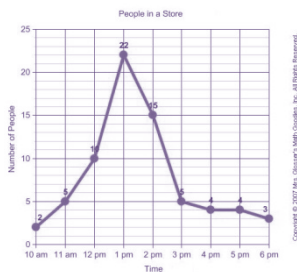
Bar graph

Pictograph

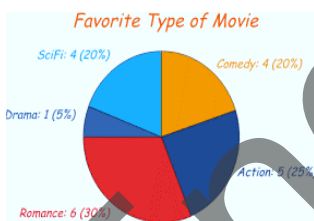
Line graph



Shows data with a circle which is divided from its centre into several parts to show how the total's divided.



Compares choices. It answers to the questions How much ...? How many...?



Shows data with rectangular bars with heights and lengths proportional to the values they represent.

Red Delicious	10 apples
Golden Delicious	5 apples
Red Rome	10 apples
McIntosh	5 apples
Jonathan	15 apples

= 10 apples   = 5 apples

Shows how a variable changes over time.



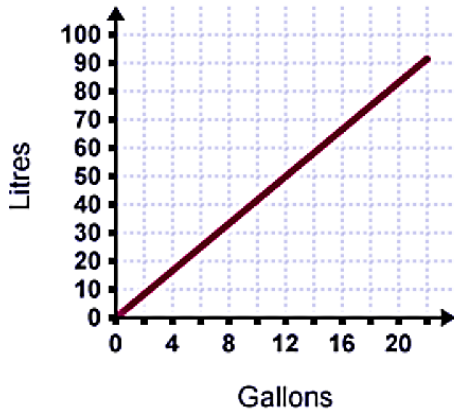


# Conversion graph

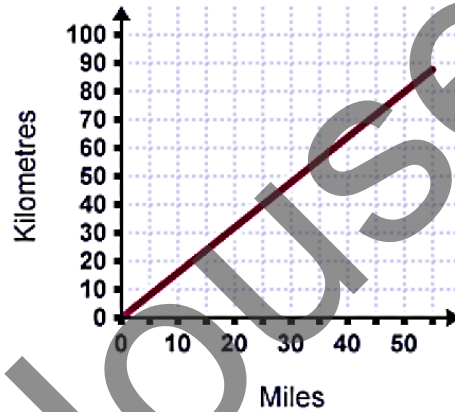
Read and use the graph to complete the statements.

It is a type of line graph that shows the relationship between two units of measurement.

Conversion graph: gallons – litres



Conversion graph: miles – km



- Convert 8 gallons to litres: \_\_\_\_\_ litres = 8 gallons.
- Convert 80 litres to gallons: \_\_\_\_\_
- Convert 14 gallons to litres: \_\_\_\_\_
- Convert 15 miles to kilometres: \_\_\_\_\_
- Convert 80 kilometres to miles: \_\_\_\_\_

Make your own conversion graph using the relation between US dollars and Mexican pesos.

Write down some important information you may need for the conversion.

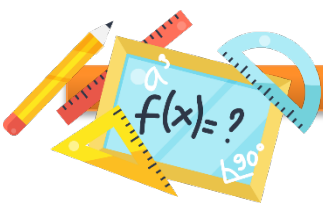
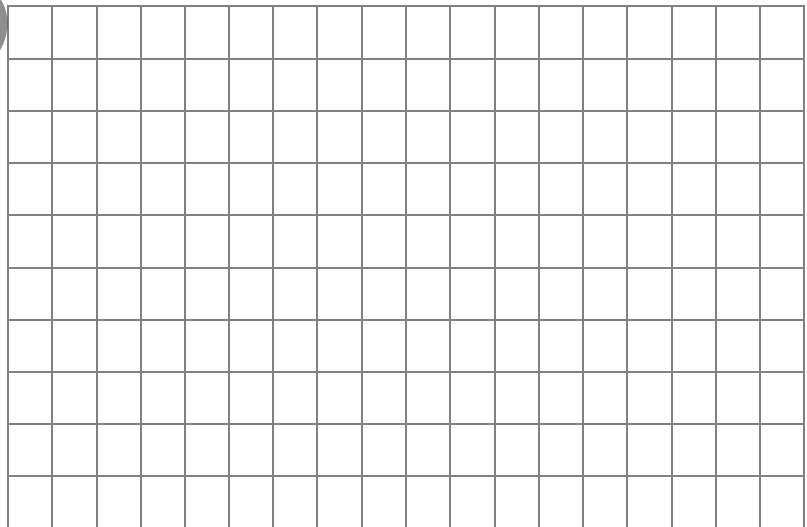
.....

.....

.....

.....

.....





# Understanding more about graphs

Read and answer the question.

Sandy has 4 candies, Nina has 5 candies and Gina has 3 candies.  
What is the mean number of candies each of them has?

Tip:

Students need to share to find the answer.

To understand the given data, it is really important to find the average.

## Average:

It is a number that tells you what most of the values, in the data set, are closer or similar to.  
There are three types of average: mean, median and mode.

## Mean:

It is the total number divided by the number of items.

Sandy - 4



Nina - 5



Gina - 3



$4 + 5 + 3 = 12$ . If the girls are going to share the candies and everybody has to have the same number, you add and then divide:  $12 \div 3 = 4$ .

Each girl will have 4 candies, so the mean number is 4.

Look and find the mean number for each set.



Mean number

\$ 22	\$ 36	\$ 51	\$ 45	\$ 96	
952 g	541 g	218 g	233 g	146 g	
56 km	75 km	83 km	23 km	63 km	
13 books	34 books	22 books	4 books	67 books	





## Median:

It is the middle value of a set of data arranged in order. When there is an **even number of values**, the median is the mean of the two middle values.

5, 7, 9, 11, 15 = the median is 9 because it is the number in the middle, but for **10, 12, 14** and **16**, you need to add  $12 + 14 = 26$  then  $26 \div 2 = 13$ , so **13 is the median**.

### Look and find the median.

a) Kilometres run by each participant. Median = \_\_\_\_\_

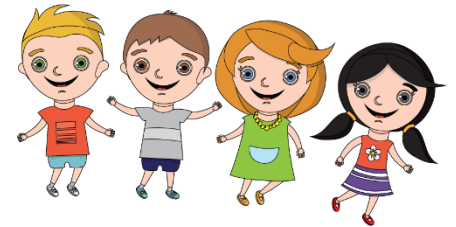
Joe	Ben	Tom	Frank	Dylan	Ron
5	7.5	6	3.4	8.1	9

b) Number of boxes in each room. Median = \_\_\_\_\_

Room 1	Room 2	Room 3	Room 4	Room 5	Room 6
15	11	17	13	18	13

c) Salaries. Median = \_\_\_\_\_

Person 1	Person 2	Person 3	Person 4	Person 5
\$ 4 000	\$ 5 000	\$ 3 000	\$ 6 000	\$ 2 000



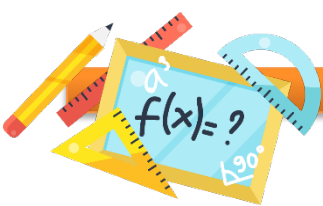
## Mode:

It is the value that appears the most often or has the highest frequency in the data set.

This is the number of toys that each students has in Mrs. Rosa's classroom.

Student 1	Student 2	Student 3	Student 4	Student 5	Student 6	Student 7	Student 8
3	2	2	3	6	5	3	1

Which (value) number appears the most? \_\_\_\_\_, so the mode for this set is \_\_\_\_\_.





This is the number of visitors that the City Zoo has per year.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
560	324	765	700	560	700	850	560	300	765	450	800

Which (value) number appears the most? \_\_\_\_\_, so the mode for this set is \_\_\_\_\_.

## Range:

It is the difference between the greatest value and the smallest value in each set of data.

The following chart shows the number of balls each player threw at the game.

Player 1	Player 2	Player 3	Player 4	Player 5
11	8	15	5	9

The greatest number is 15 and the smallest is 5 so:  $15 - 5 = 10$ . **The range is 10.**

**Look and find the mean, median and mode for each.**

<i>Basketball Points</i>				
6	22	12	36	19
a) mean: .....				
b) median: .....				
c) mode: .....				

<i>Golf Scores</i>					
93	70	90	90	68	75
a) mean: .....					
b) median: .....					
c) mode: .....					

<i>Data</i>	<i>Mean</i>	<i>Median</i>	<i>Mode</i>
a) 10, 17, 10, 14, 19			
b) 18, 19, 64, 19, 32, 60, 61			
c) 11, 38, 13, 38, 40			
d) 12, 15, 11, 15, 13, 10, 15			





# You're up!

Use the grid to draw a graph and give complete information (mean, median, mode and range).

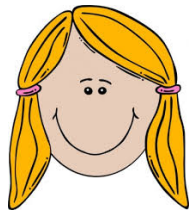
a) Students and number of books they have read.

**Adam**



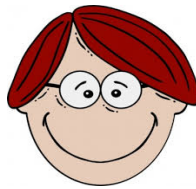
40

**Maria**



24

**Scott**



64

**Frank**

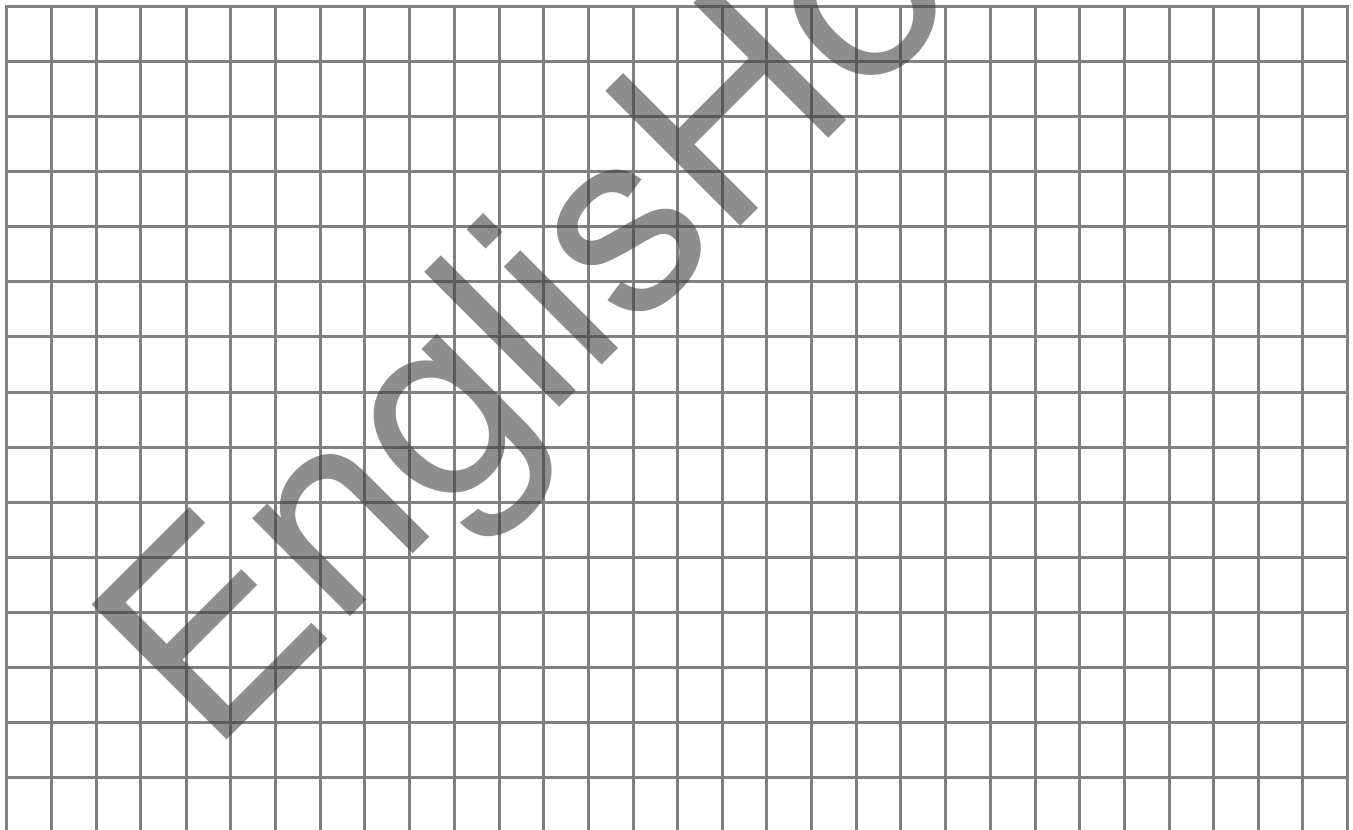


32

**Linda**



56

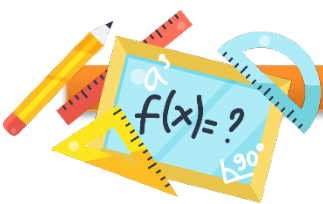


Mean: \_\_\_\_\_

Median: \_\_\_\_\_

Mode: \_\_\_\_\_

Range: \_\_\_\_\_





# Converting fractions to decimals and decimals to fractions



## TAKE THE CHALLENGE



Read and answer the question.

Marco used the following steps to form a number pattern.

- a) The first term is 3.
- b) The second term is 5.

c) Each term after the second is the sum of the two terms just before it. The list shows the first five terms in Marco's pattern.

**3, 5, 8, 13, 21, ...**

What are the next 3 terms?

- a) 27, 34, 42
- b) 29, 37, 45
- c) 34, 55, 89
- d) 34, 55, 99

Use the words to label the image below.

Fraction

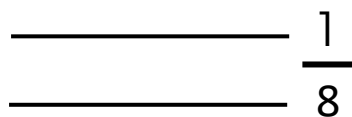
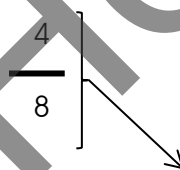
Numerator

Denominator

Whole



\_\_\_\_\_



Read and match.

Fractions consist of three parts:

- Numerator ● ● It goes between the numbers.
- Fraction bar ● ● It is the bottom part of the fraction.
- Denominator ● ● It is the top part of the fraction.

Read and complete the sentences.

A pizza might be cut into 8 pieces. In a fraction, the number 8 would be \_\_\_\_\_.

If you take four slices of that pizza, the number 4 would be \_\_\_\_\_.





### Read and choose the correct words for the explanation.

Decimals **do use** / **do not use** a slash to indicate what part of the whole they represent. Instead, the decimal point means that the numbers **are below** / **are not below** one.

**Without a decimal** / **With a decimal**, the whole is considered to be based on 10, 100, 1000, etc. It all depends on how many spaces to the right of the decimal the number goes.

Look at the example:

$$0.05 = \text{five-hundredths} = 5 / 100$$



### Converting fractions to decimals by using division - the "Simplest method."

The following fraction can be stated as:

$$2 / 3 \text{ is } 0.66$$

$$2 \text{ divided by } 3 \text{ is } 0.66$$

$$2 \div 3 = 0.66$$

Can you explain how this operation is done and how the result is read?

---

---

---

### Convert these to decimals.

a)  $\frac{8}{40} =$

$$\frac{8}{40} =$$

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

$$\frac{6}{10} =$$

c)  $\frac{18}{20} =$

$$\frac{18}{20} =$$

d)  $\frac{1}{6} =$

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

e)  $\frac{8}{10} =$

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

f)  $\frac{2}{4} =$

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

g)  $\frac{32}{50} =$

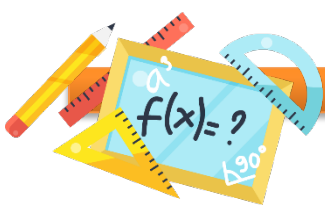
$$\frac{32}{50} =$$

h)  $\frac{32}{40} =$

$$\frac{32}{40} =$$

i)  $\frac{2}{20} =$

$$\frac{2}{20} =$$







## Method 2

### Convert a fraction to a decimal – the whole process.

- Find a number to multiply the denominator by so that it becomes 10, 100, etc.
- Multiply both numerator and denominator by the number you found.
- Write the top number with the decimal point.

$$\frac{3}{4} = \frac{3}{4} \times \frac{25}{25} = \frac{75}{100} \quad \text{so } \frac{3}{4} \text{ converted to decimals is } 0.75.$$

### Convert these fractions to decimals following the whole process.

3									
—	=	—	X	—	=	—	so	—	converted to decimals is _____.
5									

8									
—	=	—	X	—	=	—	so	—	converted to decimals is _____.
25									

17									
—	=	—	X	—	=	—	so	—	converted to decimals is _____.
20									

5									
—	=	—	X	—	=	—	so	—	converted to decimals is _____.
125									





## Convert a decimal to a fraction

### The whole process

- Write down the decimal divided by 1.
- Multiply both top and bottom by 10, 100, 1000, etc. (depending on the numbers that are after the decimal point).
- Simplify / reduce the fraction.

0.75		100	=	75	=	15	=	3
$\frac{\quad}{\quad}$	X	$\frac{\quad}{\quad}$	=	$\frac{\quad}{\quad}$	=	$\frac{\quad}{\quad}$	=	$\frac{\quad}{\quad}$
1		100		100		20		4

Convert these decimals to fractions following the whole process.

0.625


2.35


Below are the answers for the questions on the next page. Read and convert the decimals to fractions. Then write the letter for the correct answer.

A

$$\frac{16}{25}$$

B

$$\frac{17}{40}$$

C

$$\frac{79}{80}$$

D

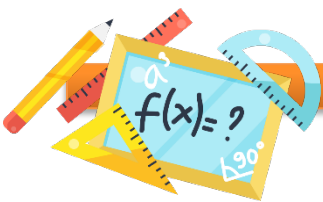
$$\frac{17}{20}$$

F

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

G

$$\frac{33}{40}$$











# UNIT 4 Volume of cubes, prisms and pyramids



## TAKE THE CHALLENGE



Look at the board below and add up numbers as you go.

Notice that you have to start at the bottom left (number 5 in green) and finish at the right top (number 4 in blue).

You can go one square at the time in any direction (up, down, left or right).

Can you find the way to make exactly 53?

What is it? \_\_\_\_\_

Can you find the way to make exactly 60?

What is it? \_\_\_\_\_

	4	9	7	7	4	→ Finish
	8	9	4	5	7	
	6	6	4	9	9	
	7	8	8	8	6	
Start →	5	5	6	5	5	

### What is a cube?

A cube is a three-dimensional shape that has equal width, height, and length measurements.

A cube has six square faces, all of which have sides of equal length and meet at right angles.

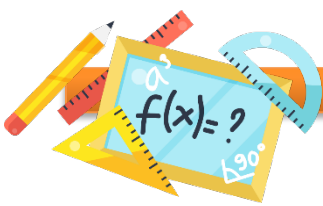
Finding the volume of a cube is a **snap** (something that can be done easily). All you need to do is:

- multiply the cube's length X width X height.



**Tip 1.** When you are asked to find the volume of a cube, you'll be given the length of one of the cube's sides. If you have this information, you have all you need.

**Tip 2.** If you are attempting to find the volume of a real-life object shaped like a cube, use a ruler or a tape measure to measure a side of the cube.





**Look, read and complete.**

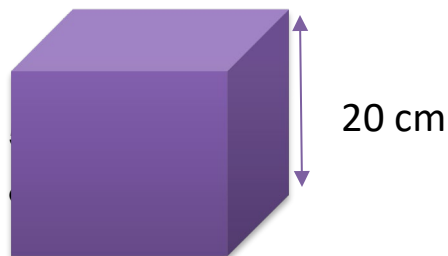
What is the height of the cube?  $S =$  \_\_\_\_\_

Now, cube this number by multiplying it by itself twice.

$S \times S \times S =$  or  $S^3 =$

This simple process gives you the volume of a cube!!!

So the volume of the cube is \_\_\_\_\_.

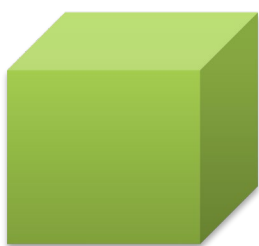


**Note!** Remember that it is really important to label the answer using the same measurement unit. For example:

- If the original measurement unit was inches, use in.
- If the original measurement unit was centimeters, use cm.
- If the original measurement unit was meters, use m.



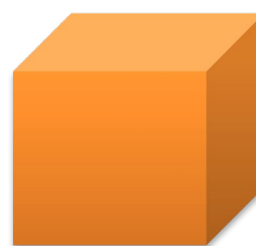
**Look and calculate the volume of the cubes.**



70 cm



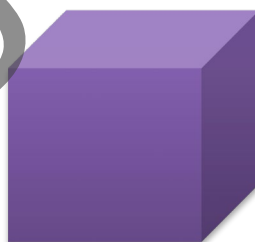
12 feet



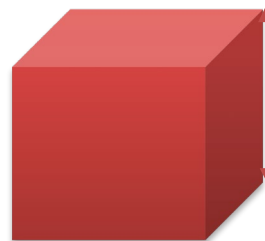
12.8 cm



16 feet



80 cm



8.06 cm





## The volume of a pyramid

When you are asked to find the volume of a pyramid, you have to:

- find the product of the area of the base and the height.
- then multiply the result by  $1/3$  or simply divide by 3.



Let's find out how to calculate the volume of a pyramid with a rectangular and a triangular base. Follow the steps.

### Pyramid with a rectangular base

What is the length of the base? \_\_\_\_\_

What is the width? \_\_\_\_\_

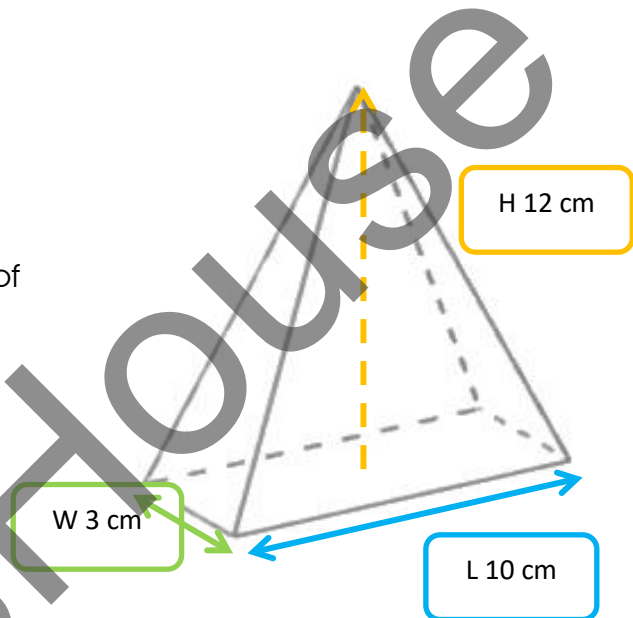
Multiply the length and width to find the area of the base.

The area of the base is \_\_\_\_\_

Multiply the area of the base by the height.

Divide the result by 3.

The result is  $120 \text{ cm}^3$ . Yes \_\_\_ / No \_\_\_



### Pyramid with a triangular base

Find the length and the width of the base.

What is the length of the base? \_\_\_\_\_

What is the width of the base? \_\_\_\_\_

Consider the values as the base and the height of the triangle.

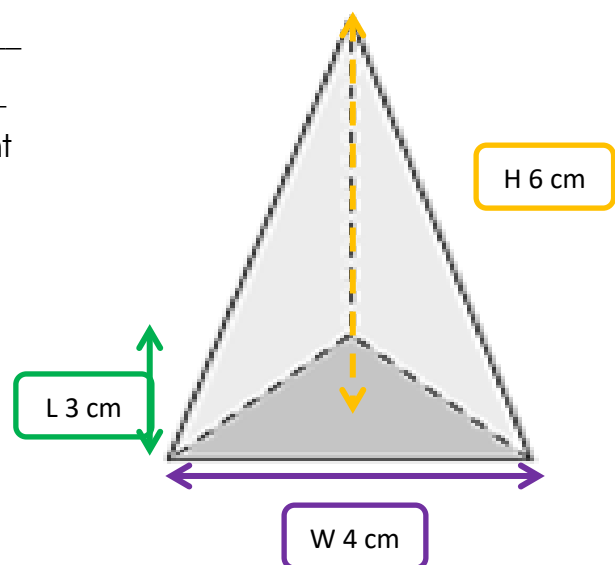
Calculate the area of the base like so:

$$A = \frac{1}{2} (b)(h)$$

$$A = \frac{1}{2} (4)(3)$$

$$A = \frac{1}{2} (12)$$

$$A = \text{_____ cm}^2$$







Now multiply the area of the base by the height of the pyramid.  
 The area of the base is \_\_\_\_\_  $\text{cm}^2$   
 The height is \_\_\_\_\_  $\text{cm}$ .

\_\_\_\_\_  $\text{cm}^2 \times 6 \text{ cm} =$  \_\_\_\_\_  $\text{cm}^3$ .

Divide the answer by 3.

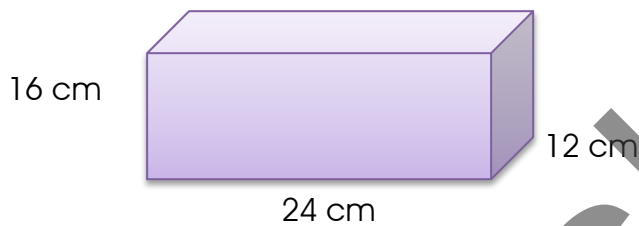
\_\_\_\_\_  $\text{cm}^3 / 3 = 12 \text{ cm}^3$ . Yes \_\_\_\_\_ / No \_\_\_\_\_



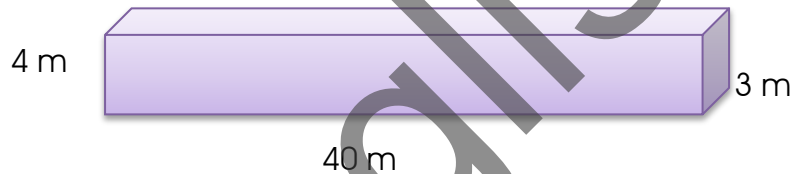
The process to calculate the volume of rectangular prisms is as easy as the ones for the cubes and pyramids. The only thing you have to do is follow the formula; it actually shows steps to follow.

**Calculate the volume of rectangular prisms. This is the formula:**

- **Volume = Length x Width x Height**



Answer: \_\_\_\_\_  $\text{cm}^3$

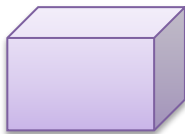


Answer: \_\_\_\_\_  $\text{m}^3$

**Time to do some research!!!**

Look around the classroom, walk around school or think of things which have the shapes. Use a tape measure or a ruler to get information and calculate the volume of each.

My classroom



\_\_\_\_\_

The process





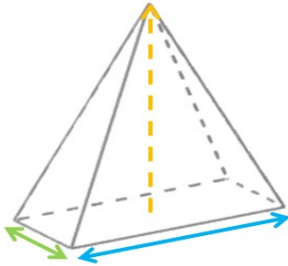
\_\_\_\_\_



\_\_\_\_\_

The process

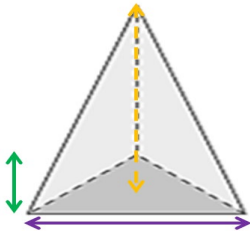
\_\_\_\_\_



\_\_\_\_\_

The process

\_\_\_\_\_



\_\_\_\_\_

The process

\_\_\_\_\_



\_\_\_\_\_

The process



\_\_\_\_\_

The process





# You're up!

Talk to a friend and write the formulas to calculate the volume of all the shapes – this formula card is for you to study so make it simple and easy to remember.

## Formulas to calculate the volume of shapes

Name	Formula	Shape and example
A cube by length of a side		
A pyramid with a rectangular base		
A pyramid with a triangular base		

Tips:

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_





# Proportions

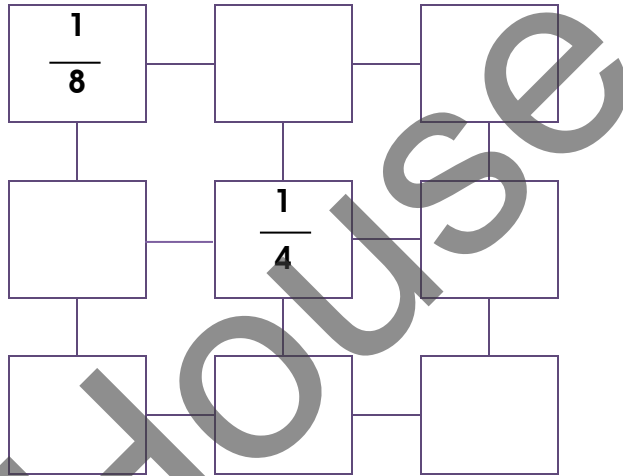


## TAKE THE CHALLENGE



Look at the chart and the fractions below. Place the fractions in the squares so that each row and column has a sum of 1. Two of the fractions have been added to get you started.

$\frac{3}{8}$	$\frac{5}{16}$	$\frac{9}{16}$	$\frac{2}{8}$
$\frac{1}{2}$	$\frac{7}{16}$	$\frac{3}{16}$	



Amazing math puzzles and mazes by Cindi Mitchell

What is proportion?

It is the number, amount or level of one thing when compared to another.

A proportion, on the other hand, is a true statement – it shows that two **ratios** are equal.

What is a ratio?

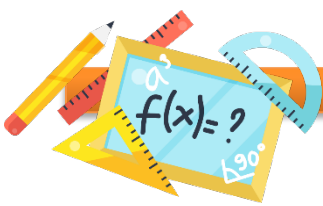
A ratio is a comparison of two numbers by division.

- Look at an example of a proportion. Then write two more examples.

$\frac{6}{8} = \frac{12}{16}$       "Six is to eight as twelve is to sixteen."

\_\_\_\_\_ = \_\_\_\_\_      "\_\_\_\_\_"

\_\_\_\_\_ = \_\_\_\_\_      "\_\_\_\_\_"











## Percent

What does **Percent** mean? \_\_\_\_\_

How can you express the following percents as fractions?



25 % = \_\_\_\_\_      83 % = \_\_\_\_\_      60 % = \_\_\_\_\_      95 % = \_\_\_\_\_

A percent can also be regarded as ratio in which 100 represents the total number in the group. Look at the following example:

Thirty percent of the kids who participated in a festival were 10 years old. If 12 kids are 10 years old, how many kids were in the festival in all?

Create a ratio box – analyze how the information was organized.

	Percent	Actual Count
10 years old	30	12
Other ages	o	
Total	100	t



What percent do you have to find? \_\_\_\_\_

What does the letter o stand for? \_\_\_\_\_

What does the letter t stand for? \_\_\_\_\_

$$\begin{array}{ccccccc} \text{Step 1} & & \text{Step 2} & & \text{Step 3} & & \text{Step 4} \\ \frac{30}{100} = \frac{12}{t} & & 30t = 12 \times 100 & & t = \frac{12 \times 100}{30} & & t = \frac{1200}{30} = 40 \end{array}$$

t = 40

A total of 40 kids were in the festival.







### Example 2

In the Charleston Primary school there is an amazing orchestra. Last week, there was a national contest. Only 40 % of the orchestra members played in the event. If 24 members did not play, then how many did play?

	Percent	Actual Count
Played	40	p
Did not play	60	24
Total	100	t



$$\begin{array}{l} \text{Step 1} \\ \frac{40}{60} = \frac{p}{24} \end{array} \quad \begin{array}{l} \text{Step 2} \\ 60p = 40 \times 24 \end{array} \quad \begin{array}{l} \text{Step 3} \\ p = \frac{40 \times 24}{60} \end{array} \quad \begin{array}{l} \text{Step 4} \\ p = \frac{960}{60} = 16 \end{array}$$

$$p = 16$$

A total of 16 members played in the event.

**Read and organize the information in the table. Then follow the whole process to find the answer.**

### Example 3

Sonia is going to give a speech for her literature class. She is a little bit concerned because her formal shoes are pretty old. Her mum noticed that and they have decided to go shopping for a new pair of shoes. They went to the Bright Plaza. Sonia's mum paid 60 % instead of 100%, so she saved 40% of the full price. You are given what Sonia's mum paid and you are asked what the full price was, which is the 100% price.

	Percent	Actual Count
Paid	60	\$ 45.60
Saved	40	s
Full price	100	t



$$\begin{array}{l} \text{Step 1} \\ \frac{60}{100} = \frac{45.60}{t} \end{array} \quad \begin{array}{l} \text{Step 2} \\ 60t = 45.60 \times \underline{\hspace{1cm}} = 4560 \end{array} \quad \begin{array}{l} \text{Step 3} \\ t = \frac{4560}{60} = 76 \end{array}$$

$$t = 76$$

The full price for the new pair of shoes was \$76.







# Sequences and series



## TAKE THE CHALLENGE



Can you read people's minds?  
Try this process with several friends.  
Ask a friend to think of a number  
between 1 and 20 and write it on the  
line.

Friend 1. \_\_\_\_\_ Friend 4. \_\_\_\_\_

Friend 2. \_\_\_\_\_ Friend 5. \_\_\_\_\_

Friend 3. \_\_\_\_\_ Friend 6. \_\_\_\_\_

Then add 5 to it.

Next, multiply the result by 3.

After that, subtract 15 from the result.

Finally, divide the result by 3.

Did you get the same number?

Can you explain why you get the same number?

.....  
.....  
.....

## Read the definitions and decide on which concept is being described.

Do you know what patterns and sequences are?

a) ..... - It is a series of related things or events, or the order in which they follow each other.

b) ..... - It is any regularly repeated arrangement, especially a design made from repeated lines, shapes or colours on a surface.



## Look and explain the pattern sequences.







## Geometric sequences

Geometric sequences are built by multiplying the last factor by the same number each time.

### Example 1

2, 4, 8, 16, 32, 64, 128, 256, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, ...

The pattern is "multiply the last factor by \_\_\_\_\_ each time."

### Example 2

3, 9, 27, 81, 243, 729, 2187, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, ...

The pattern is "multiply the last factor by \_\_\_\_\_ each time."

Read and write numbers.

### Pattern 3

5, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, ...

4, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, ...

6, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, ...

Multiply by 2, then subtract 3.

5, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, ...

Multiply by 5, then subtract 9.

3, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, ...

Multiply by 3, then add 8.

6, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, ...

Multiply by 4, then add 11.

7, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, ...

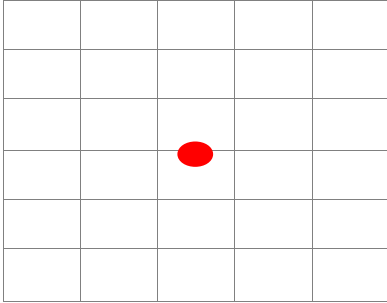




## Special sequences - Triangular numbers

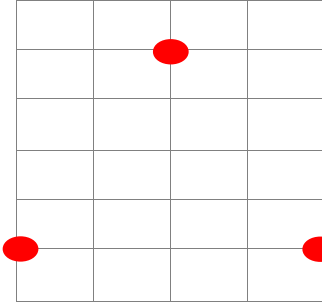
This sequence can be formed by using a pattern of dots which forms triangles. Look, read and think. Then draw dots and lines to show all the triangles in it.

**1**  
**Dot**



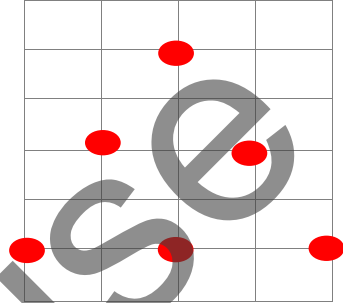
**1**

**3**  
**Dots**



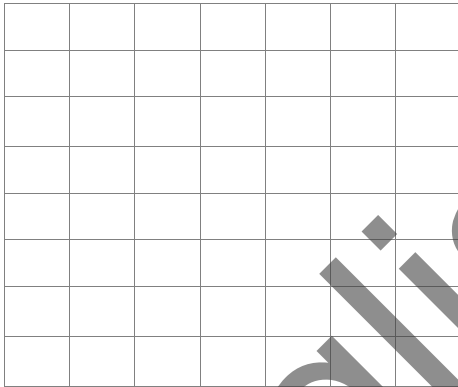
**1 + 2 = 3**

**6**  
**Dots**

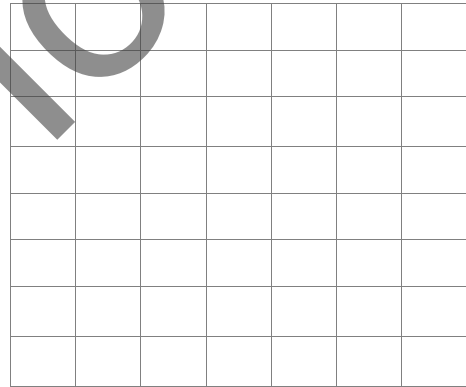


**1 + 2 + 3 = .....**

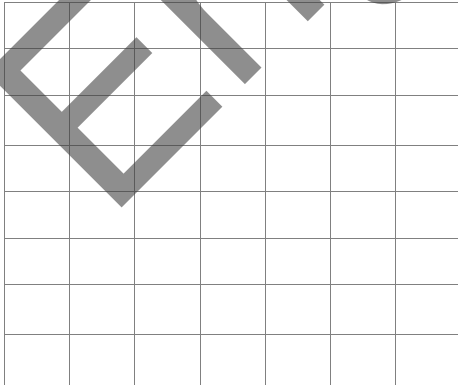
**10**  
**Dots**



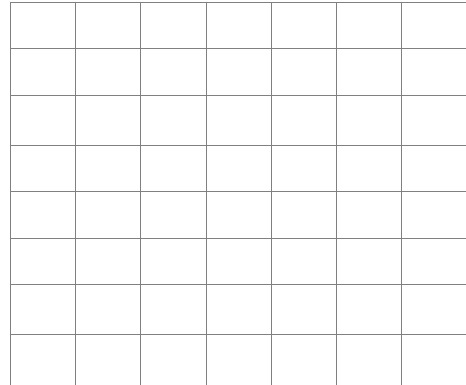
**15**  
**Dots**



**Dots**



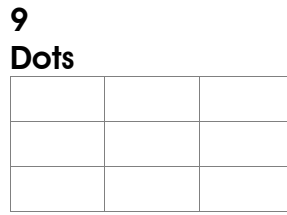
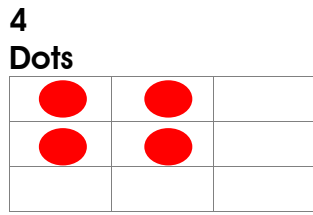
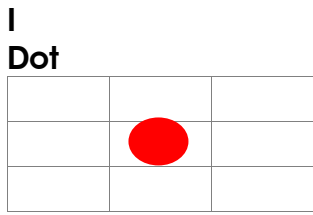
**Dots**





# Special sequences - Square numbers

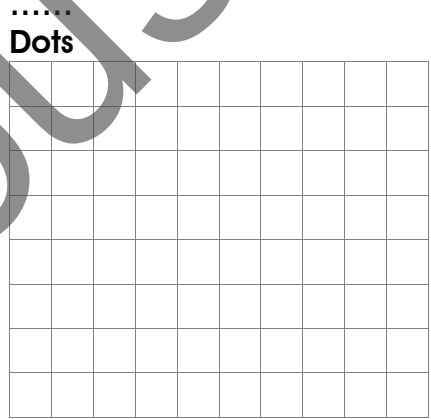
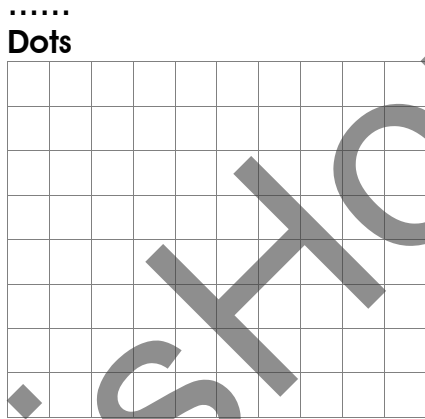
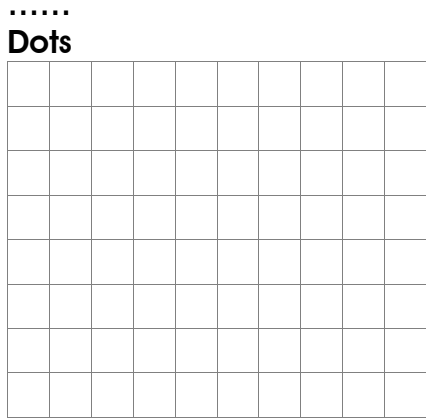
This sequence can be formed by multiplying a number by itself.



$1^2 = 1 \times 1 = 1$

$2^2 = 2 \times 2 = 4$

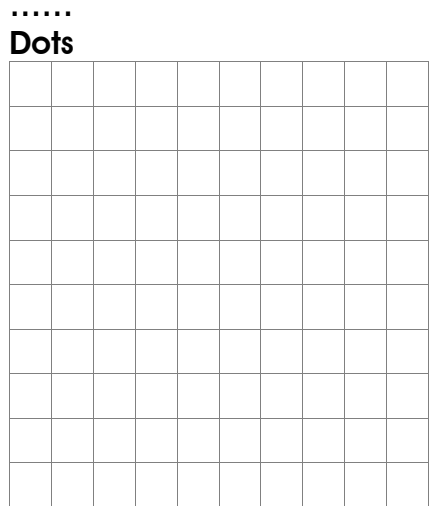
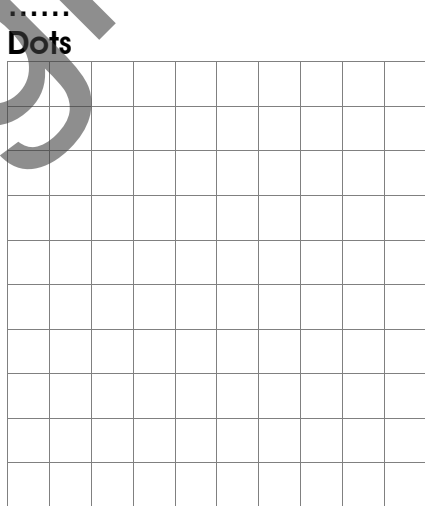
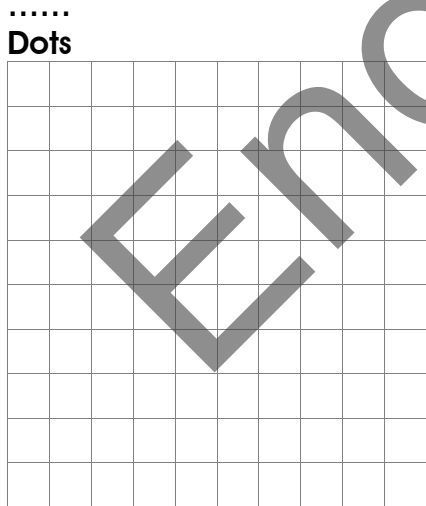
.... = \_ X \_ = \_



.... = \_ X \_ = \_

.... = \_ X \_ = \_

.... = \_ X \_ = \_



.... = \_ X \_ = \_

.... = \_ X \_ = \_

.... = \_ X \_ = \_

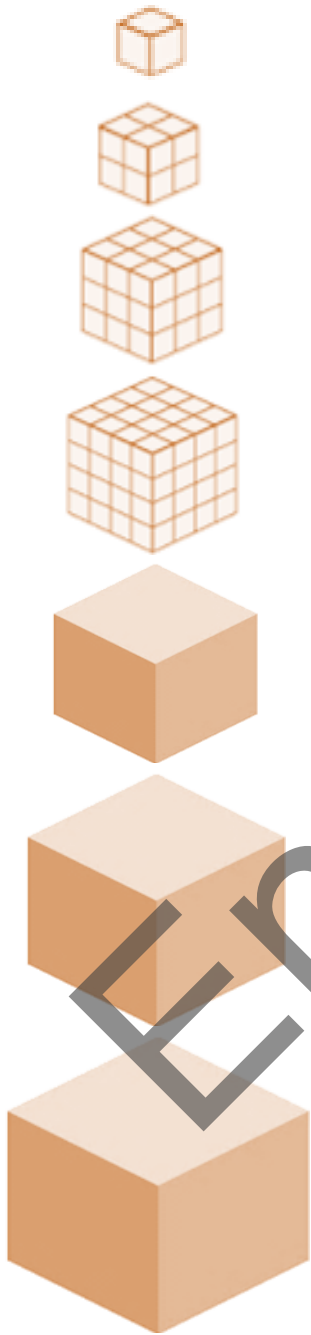




# Special sequences - Cube numbers

This sequence can be formed by cubing a number. It means that you must multiply a number by itself twice.

**Look and draw lines to show that the numbers have been cubed.**  
"Notice how the rows get arranged."



1 is the first cube number because  $1 \times 1 \times 1 = 1$

8 is the second cube number because  $2 \times 2 \times 2 = 8$

.....  $\underline{\hspace{2cm}}$   $\times$   $\underline{\hspace{2cm}}$   $\times$   $\underline{\hspace{2cm}}$  =  $\underline{\hspace{2cm}}$

.....  $\underline{\hspace{2cm}}$   $\times$   $\underline{\hspace{2cm}}$   $\times$   $\underline{\hspace{2cm}}$  =  $\underline{\hspace{2cm}}$

.....  $\underline{\hspace{2cm}}$   $\times$   $\underline{\hspace{2cm}}$   $\times$   $\underline{\hspace{2cm}}$  =  $\underline{\hspace{2cm}}$

.....  $\underline{\hspace{2cm}}$   $\times$   $\underline{\hspace{2cm}}$   $\times$   $\underline{\hspace{2cm}}$  =  $\underline{\hspace{2cm}}$

.....  $\underline{\hspace{2cm}}$   $\times$   $\underline{\hspace{2cm}}$   $\times$   $\underline{\hspace{2cm}}$  =  $\underline{\hspace{2cm}}$



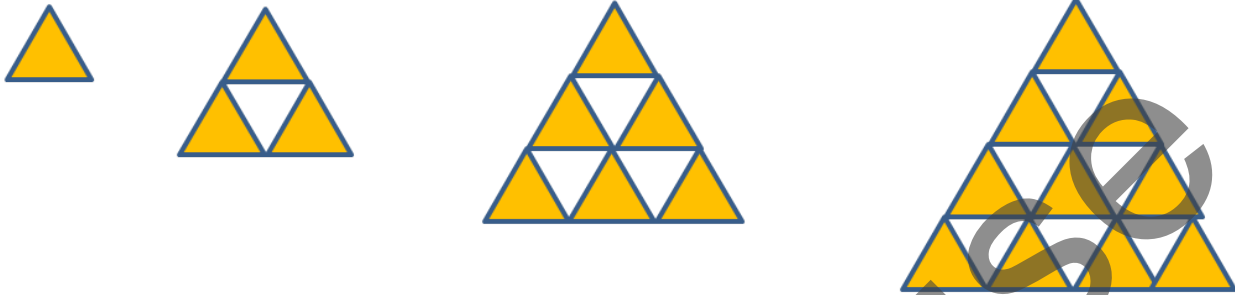




You're up!

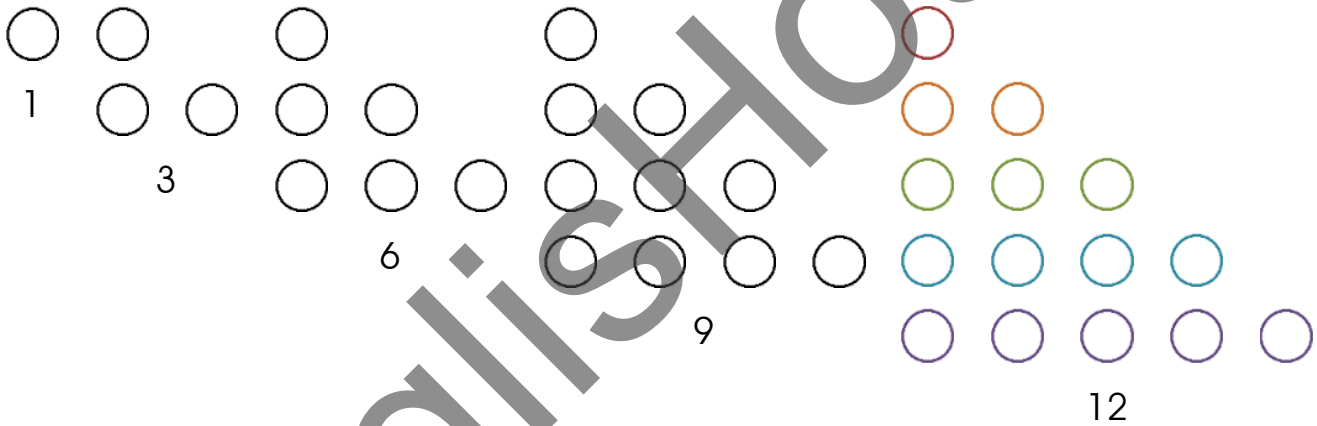
Look and think. How would you complete the boards?

What are the operations?



..... + ..... = ..... + ..... + ..... = ..... + ..... + ..... + ..... =

How would you colour the balls in sections 1, 3, 6 and 9?



How would you complete this number board?

1	1	1	1	1	1	1	1	1	1	1
1	2		4	5		7		9	10	
1	3	6		15	21		36	45		
1	4		20			84	120			
1	5			70		210				
1		21			252					
1			84	210						
1	8	36	120							
1		45								
1	10									
1										

