Explore number patterns

Example

a Describe how to find each term in the pattern 5, 8, 11, 14, 17.

b What is the tenth term?

Method:

a Term

1st	2nd	3rd	4th	5th
5	8	11	14	17

Find the difference

3	3	3	3

The difference is 3. This is what you multiply by:

1st term is	(3) x 1 = 3	What do you have to do to find the answer? Add 2	3 + 2 = 5
2nd term is	(3) x 2 = 6		6 + 2 = 8
3rd term is	(3) x 3 = 9		9 + 2 = 11

The rule is multiply the term by 3, then add 2.

b The tenth term is 3 x 10 + 2 = 32

Question

a Find the rule to produce this pattern: 2, 9, 16, 23, 30

b What is the 20th term?

c What is the 362nd term?

Answer

a Term

1st	2nd	3rd	4th	5th
2	4	16	23	30

Find the difference

7	7	7	7

Multiply each term by 7.

1st term is	(7) x 1 = 3	What do you have to do to find the answer? Subtract 5	7 - 5 = 2
2nd term is	(7) x 2 = 6		14 - 5 = 9
3rd term is	(7) x 3 = 9		21 - 5 = 16

The rule is multiply the term by 7, then subtract 5

b The 20th term is 7 x 20 - 5 = 135

c The 362nd term is 7 x 362 - 5 = 2529

The Quadrilateral Game

Rules: This is a game for two players. You need two dice. Each player starts with six rhombus, five kites, four trapeziums, three parallelograms, two rectangles and one square.

Cut out the shapes at the bottom of the page.

Choose one different number from 2 to 12 for each shape. Suppose you choose 8 for the kite. Each time you throw an 8 you can get rid of one kite. The first player to get rid of all of their shapes wins. Use a pencil to complete the table, then you can change your numbers for the next game.

Example

Quadrilateral	Dice total
Rhombus	5
Kite	8
Trapezium	3
Parallelogram	11
Rectangle	9
Square	7

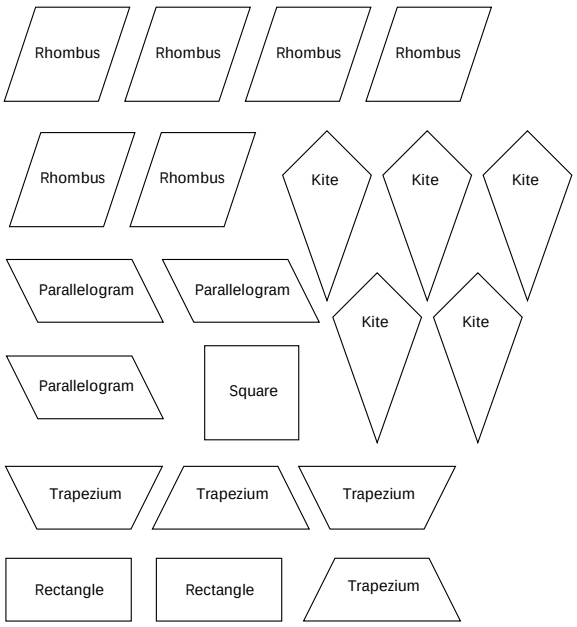
Player A

Quadrilateral	Dice total
Rhombus	
Kite	
Trapezium	
Parallelogram	
Rectangle	
Square	

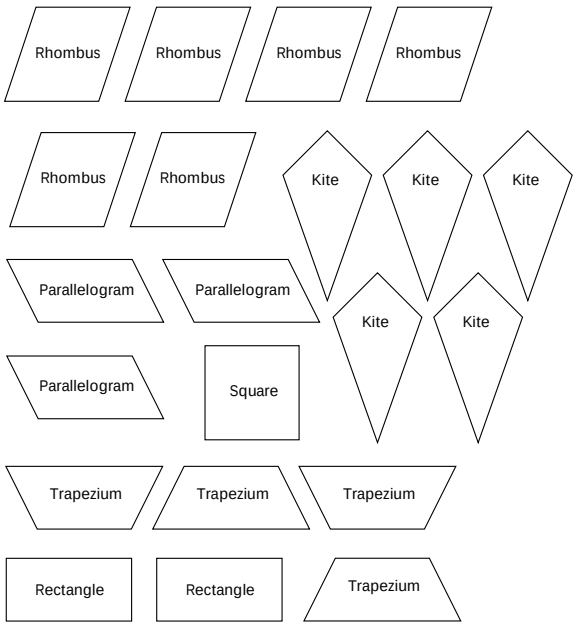
Player B

Quadrilateral	Dice total
Rhombus	
Kite	
Trapezium	
Parallelogram	
Rectangle	
Square	

Player A

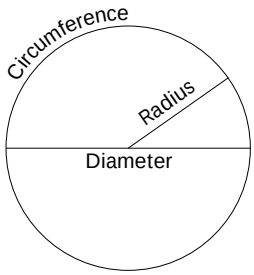


Player B



Circumference and area of a circle, areas and volumes

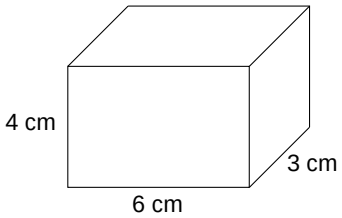
You **must** learn these formulae.



Circumference of a circle = 2 x π x radius
= π x diameter

Area of a circle = π x radius x radius

Volume of a cuboid = length x width x height



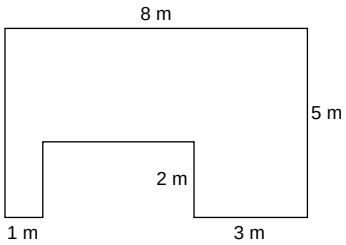
Volume of a cuboid = 6 cm x 3 cm x 4 cm
= 72 cm^3

Note: Area is in units^2 eg cm^2, m^2
Volume is in units^3 eg cm^3, m^3

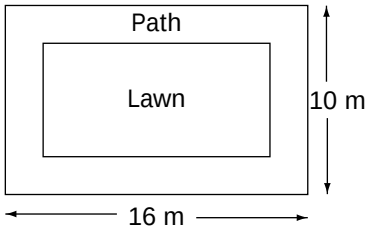
Questions

1 Find the circumference and area of a circle radius 8 cm.

2 Find the area.



3 This is a diagram of a garden with a lawn and a path around the edge.
The path is 2 m wide.

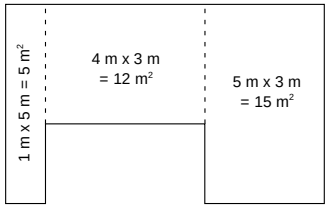


Answers

1 Circumference = 2 x π x r
= 2 x 3.14 x 8
= 50.24 cm

Area = π x r x r
= 3.14 x 8 x 8
= 200.96 cm^2

2 Split the shape into three parts.



Area = 32 m^2

3 Find the area of the large rectangle = 10 x 16 = 160 m^2
Find the area of the small rectangle = 6 x 12 = 72 m^2
Take away = **88 m^2**

Probability

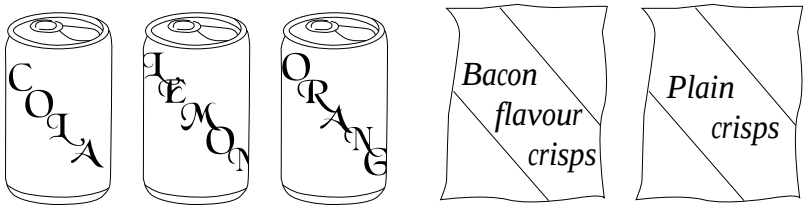
Exercises

1 In Scotland a jury can find a defendant not guilty, not proven or guilty. Two cases are held. Draw a tree diagram to show all of the possible outcomes.

2 Traffic lights can show red or green. Each day Mrs Sims drives through two sets of traffic lights. Draw a tree diagram to show the outcome.

3 A drawing pin can land point up or point down. Two drawing pins are dropped onto the floor. List all of the possible outcomes.

4 David can afford to buy one can of drink and one bag of crisps. List all of his possible choices.



5 Andrea has two dice. One is six sided and one is four sided.

a Complete this table to show all of the possible totals.

b How many different ways can the dice land?

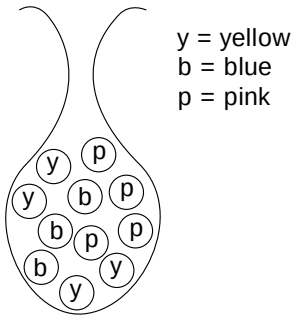
c What is the probability of scoring i 6, ii 7?

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

6 This is a bag of counters.

a What is the probability of choosing a blue counter?

b What is the probability of not choosing a blue counter?



7 The probability of a car breaking down is 0.02. What is the probability of it not breaking down? Explain how you worked out the answer.