EMG Education

Your **Bridge** to International **Success**

REVIEW PACK
GRADE 9 MATHS

CIRCLES
AREA AND VOLUME
SEQUENCES
PROBABILITY

CIRCLES

- **LEARNING OBJECTIVES:**

1. Review the concept of identifying and drawing the different parts of a circle - diameter, radius, circumference, arcs and sectors.
2. Calculate the area and the circumference of a circle.
3. Solve problems involving circles.

- **RESOURCES**

1. https://www.youtube.com/watch?v=Oba0iqbzqX0
2. https://www.youtube.com/watch?v=O-cawByg2aA
3. https://www.mathsisfun.com/geometry/circle.html
4. Exploring Maths Book pages 84-87

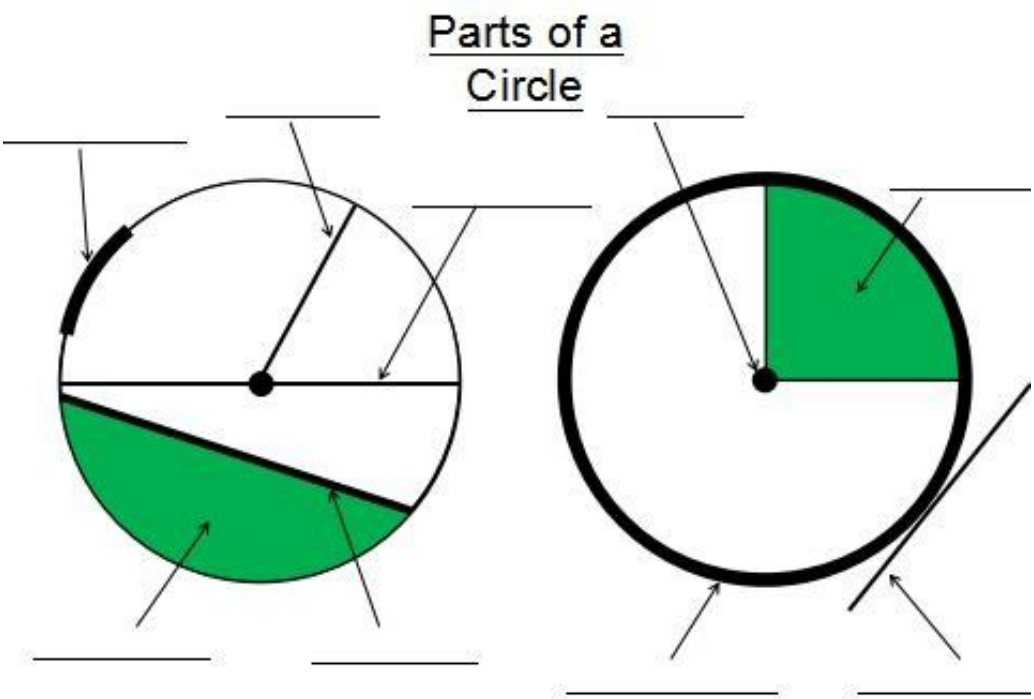
- **VOCABULARY**

Area of a Circle - is the number of square units inside that the given circle.

Circumference is the length of the circle if it were opened up and straightened out to a line segment.

WORKSHEET ON CIRCLES

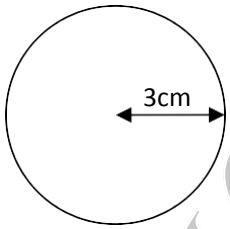
1. Name the parts of the circle below.



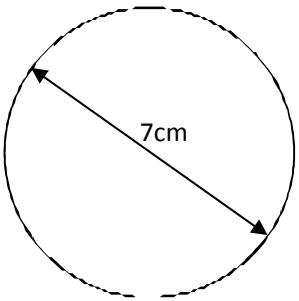
(9 marks)

2. Find the **area** and **circumference** of these circles.

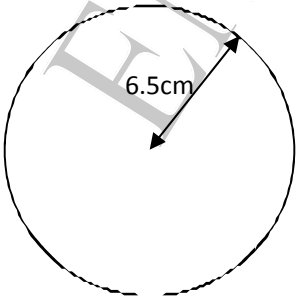
a)



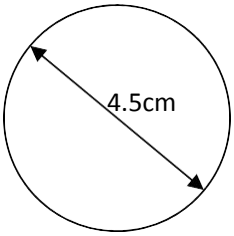
b)



c)



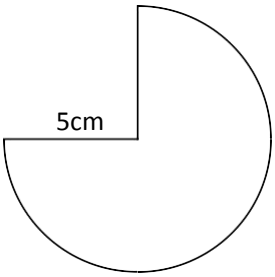
d)



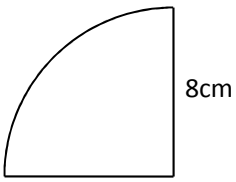
(8 marks)

3. Find the **area** and **perimeter** of these shapes made from fractions of circles.

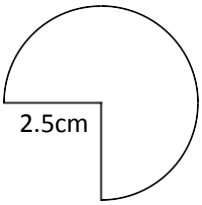
a)



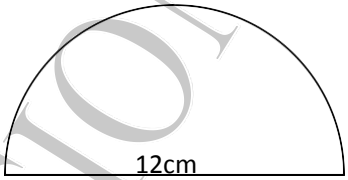
b)



c)



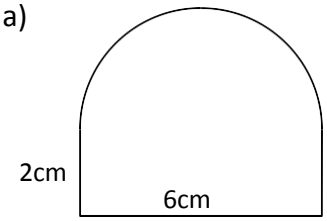
d)



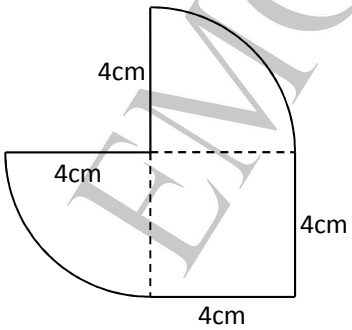
(12 marks)

4. Work out the **area** of these shapes made from circles and rectangles.

a)



b)



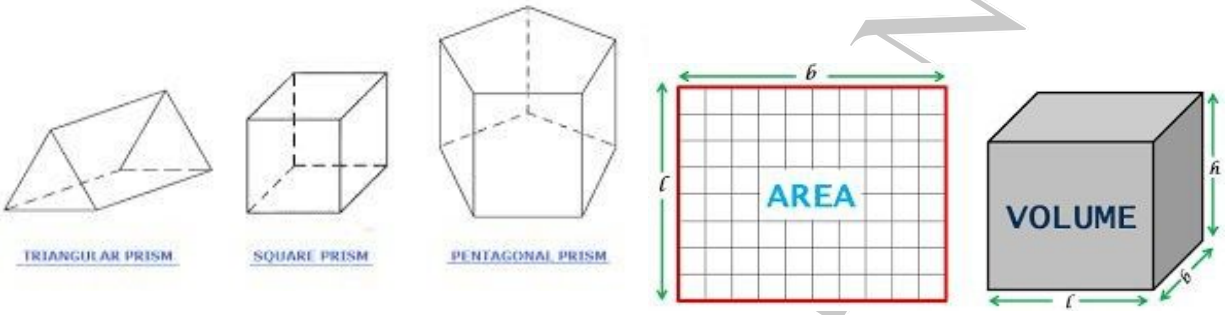
(10 marks)

2cm

AREA AND VOLUME

- **LEARNING OBJECTIVES:**

1. Identify different types of right prism.
2. Calculate the volume and the surface area of a right prism.
3. Solve problems involving right prisms.



- **RESOURCES**

1. https://www.youtube.com/watch?v=wxDTrgnyu28
2. https://www.youtube.com/watch?v=7_ZNR2s3JJc
3. https://www.mathsisfun.com/geometry/prisms.html
4. Exploring Maths Book pages 223-228

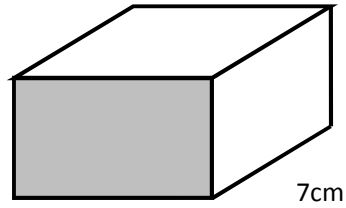
- **VOCABULARY**

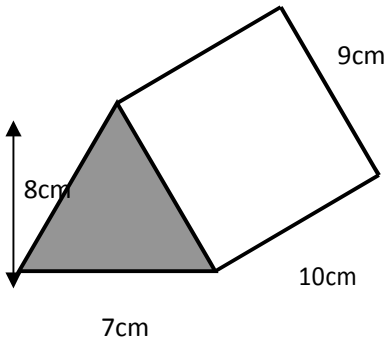
Prism is a solid object with:

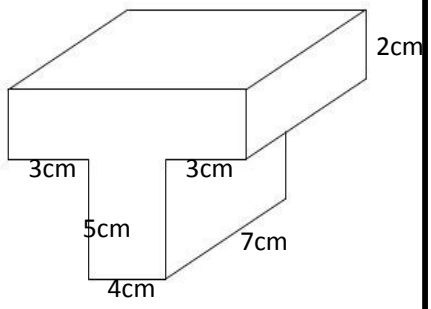
Identical ends
Flat faces
Cross-section

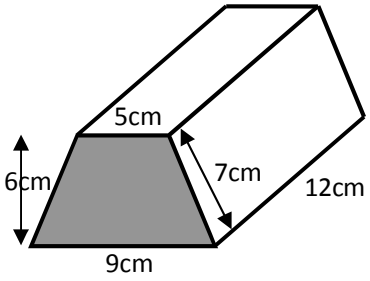
Cross Section is the shape made by cutting straight across an object.

WORKSHEET ON AREA AND VOLUME

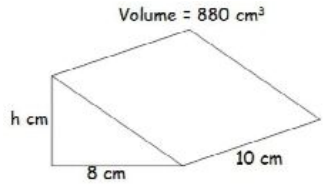
Prism	Volume [area of cross section x length]	Surface Area
 [area of a rectangle = length x width]		

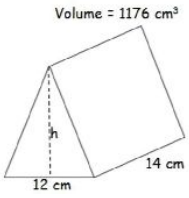
Prism	Volume [area of cross section x length]	Surface Area
 [area of a triangle = ½ x base x height]		

Prism	Volume [area of cross section x length]	Surface Area
 [remember to split into rectangles]		

Prism	Volume [area of cross section x length]	Surface Area
 [area of a trapezium = ½(a+b)h]		

Calculate the missing heights of the triangular prisms.

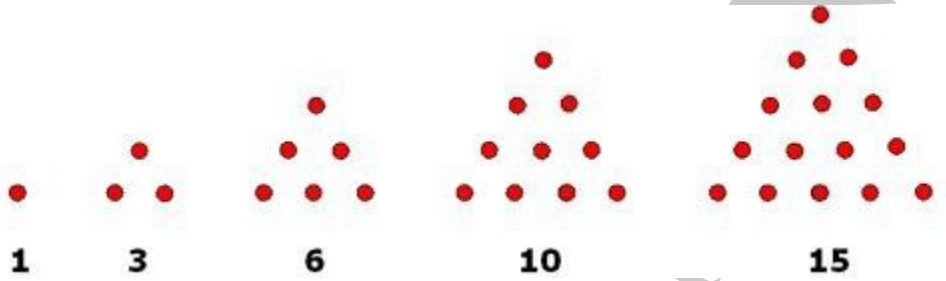




SEQUENCES

● LEARNING OBJECTIVES:

1. Use the nth term to generate a linear or quadratic sequence.
2. Recognise more complex geometric sequences.
3. Introduce harmonic and fibonacci sequences.
4. Solve problems involving sequences.



● RESOURCES

1. https://www.youtube.com/watch?v=qGn1lBnp8wg
2. https://www.youtube.com/watch?v=nNOIAFEDdLs
3. https://www.mathsisfun.com/algebra/sequences-series.html

● VOCABULARY

Arithmetic sequence is a sequence of numbers which increases or decreases by a constant amount each term.

Geometric sequence is a sequence made by multiplying by the same value each time.

WORKSHEET ON SEQUENCES

Arithmetic Sequence

1. The first term of an arithmetic sequence is -8 and the common difference is 3.
   (a) Find the seventh term of the sequence.
   (b) The last term is 100. How many terms are there?

2. There are 20 terms in an arithmetic sequence. The first term is -5 and the last term is 90.
   (a) Find the common difference.
   (b) Find the sum of the terms in the sequence.

3. An arithmetic sequence is 120, 114, ……. , 36
   (a) How many terms are there in the sequence?
   (b) What is the sum of the terms in the sequence?

4. Matt Berry has a set of 12 stamps in his collection; the denominations increase in steps of 2p starting with 1p.
   (a) What is the highest denomination of stamp in the set?
   (b) What is the total cost of the complete set?

5. Find the sum of all ODD numbers between 50 and 150.

6. The first term of an arithmetic sequence is 3000 and the tenth term is 1200.
   (a) Find the sum of the first 20 terms of the sequence.
   (b) After how many terms does the sum of the sequence become negative?

7. Paul's starting salary in a company is £14000 (because he did Maths!) and during the time he stays with the company it increases by £500 per year.
   (a) What is his salary in the sixth year?
   (b) How many years has Paul been working for the company when his total earnings for all his years there are £126,000?

8. The first three terms of an arithmetic series are $(4x - 5)$, $3x$ and $(x + 13)$.
   (a) Find the value of x.
   (b) Find the sum of the first 40 terms of the sequence.

9. A jogger is training for a 10km charity run. He starts with a run of 400m, then he increases the distance he runs by 200m per day.
   (a) How many days does it take the jogger to reach a distance of 10km?
   (b) What total distance will he have run in training by then?

EXTENSION

10. The fifth term in an arithmetic sequence is 28 and the tenth term is 58.
    (a) Find the first term and the common difference.
    (b) The sum of all the terms is 444. How many terms are there?

Geometric Sequences

1) Which of the following sequences are **geometric**? (Tick those which are)

- ☐ 1, 3, 9, 27, ...
- ☐ 9, 90, 900, 9000, ...
- ☐ 1, 2, 3, 5, ...
- ☐ 2, 4, 8, 16, ...
- ☐ -3, -9, -27, -81, ...
- ☐ 2, 16, 324, 106276, ...
- ☐ 81, 27, 9, 3, ...
- ☐ 7, 77, 777, 7777, ...
- ☐ 2, 7, 12, 17, ...
- ☐ 1, 0.3, 0.09, 0.027, ...

2) Continue the following geometric sequences:

a) 1, 2, 4, 8, ……. , …….. b) 5, 50, 500, 5000, …… , ……

c) 3, 9, 27, 81, …… , …… d) 4, 20, 100, …… , ……

e) 4, 16, 64, …… , …… f) 64, 32, 16, 8, 4, …… , ……

3) Generate the first four terms of the sequences described below;

a) Start with 1 and multiply by 10 every time

N	1	2	3	4
Term	1	10		1000

b) Start with 3 and multiply by 5 every time

N	1	2	3	4
Term	3	15		

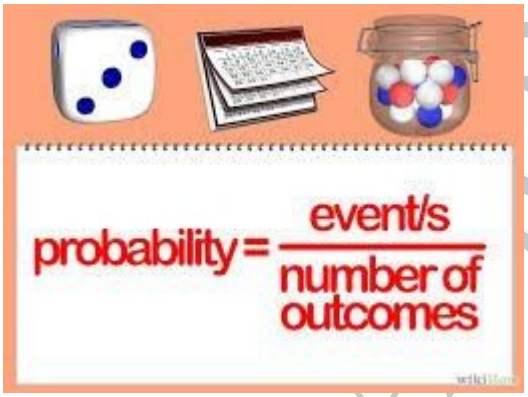
c) Start with 48 and multiply by 0.5 every time

N	1	2	3	4
Term				

PROBABILITY

● **LEARNING OBJECTIVES:**

1. Review basic concepts of probability.
2. Calculate the probability of two independent events;.
3. Solve advance probability problems.



● **RESOURCES**

1. https://www.youtube.com/watch?v=KzfWUEJjG18
2. https://www.youtube.com/watch?v=LS-_ihDKr2M
3. https://www.mathsisfun.com/data/probability.html
4. https://www.mathsisfun.com/data/probability-events-independent.html

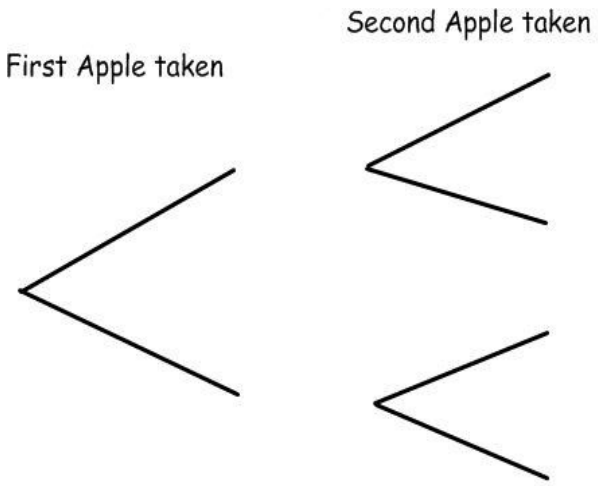
● **VOCABULARY**

Dependent Events where what happens **depends on** what happened before, such as taking cards from a deck makes less cards each time

Independent Events are events **not affected** by previous events.

WORKSHEET ON PROBABILITY

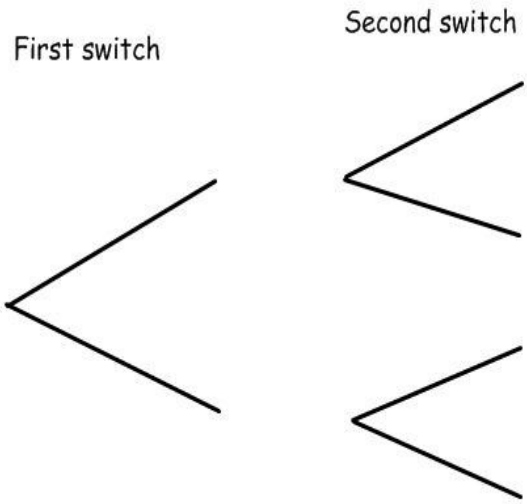
1. A basket contains 7 red apples and 5 green apples.
An apple is taken at random from the basket and then replaced.
Another apple is taken from the basket.
Complete the tree diagram to show all possible outcomes and their probabilities.



a) Find the probability that at least one green apple ispicked.
P(at least one green) =

b) Find the probability that exactly one green apple is picked.
P(exactly one green)

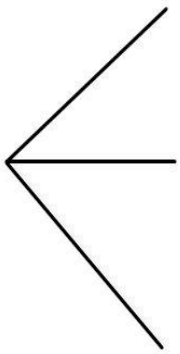
2. A manufacturer fits 2 switches to a circuit board.
The probability that a switch is faulty is 0.1.
Complete the tree diagram to show all possible outcomes and their probabilities.



a) What is the probability that circuit board works?

b) Calculate the probability that the circuit board does not work.

3. Bag A contains 3 blue rings, 5 red rings, and 2 white rings.
Bag B contains 2 blue rings and 3 red rings.
A ring is taken at random from bag A.
A ring is also taken at random from bag B.
Complete drawing the probability tree, and fill in all the possible outcomes and their probabilities.



a) Calculate the probability of picking at least one red.

b) Calculate the probability of picking both rings the same colour.