

Name.....

Teacher.....

## 4<sup>th</sup> Year Summer Assessment

Paper 1

1 Hour

Give all answers to 3sf where necessary.  
Show your full working.

Calculators Allowed

**(Total 60 marks)**

1) Circle the  $n$ th term of the linear sequence 3 7 11 .....

$$n + 4$$

$$3n + 4$$

$$4n - 1$$

$$4n + 3$$

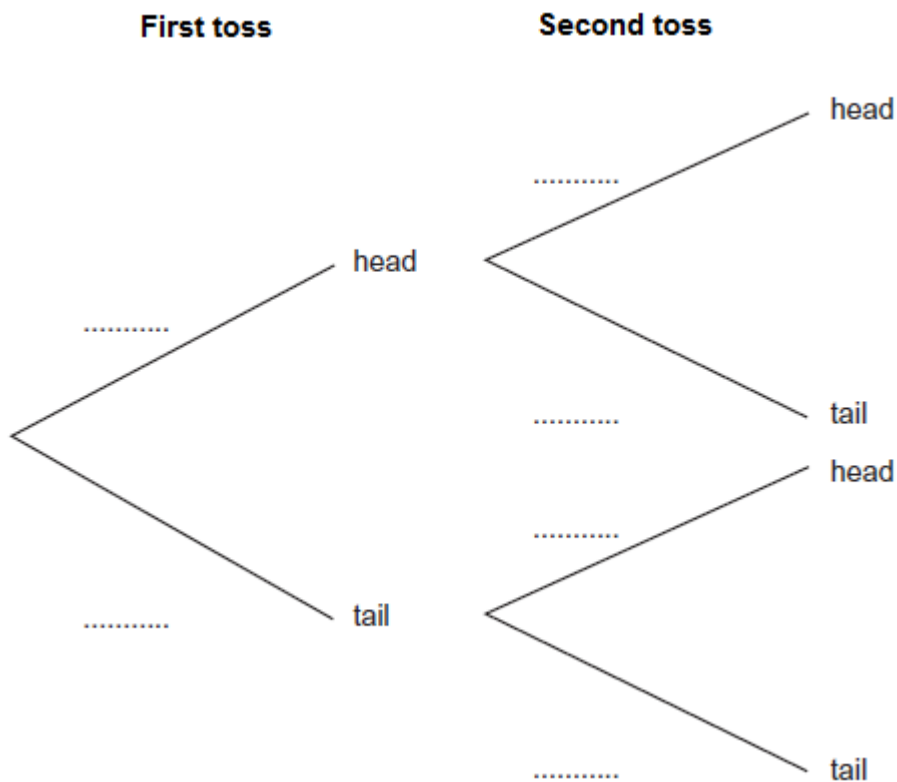
(Total 1 mark)

2) The probability of a biased coin landing on heads is  $\frac{2}{5}$

The coin is tossed twice.

(a) Complete the tree diagram.

(2)



(b) Find the probability that the coin gets the same result on both tosses

Answer \_\_\_\_\_

(3)

(Total 5 marks)

**3)** Dev invests £1500 for 2 years. The compound interest rate is 1.6% per year.

(a) Which calculation works out the total value after 2 years?

Circle your answer.

$£1500 \times 1.6 \times 2$

$1500 \times 1.6^2$

$1500 \times 1.016 \times 2$

$1500 \times 1.016^2$

**(1)**

(b) Emma invests £1500 for 2 years.

The interest rate is

1.8% for the first year

1.3% for the second year.

Whose investment is worth more after 2 years?

You **must** show your working.

**(4)**

**(Total 5 marks)**

**4)** The sizes of the interior angles of a pentagon are in the ratio 1:2:5:5:7

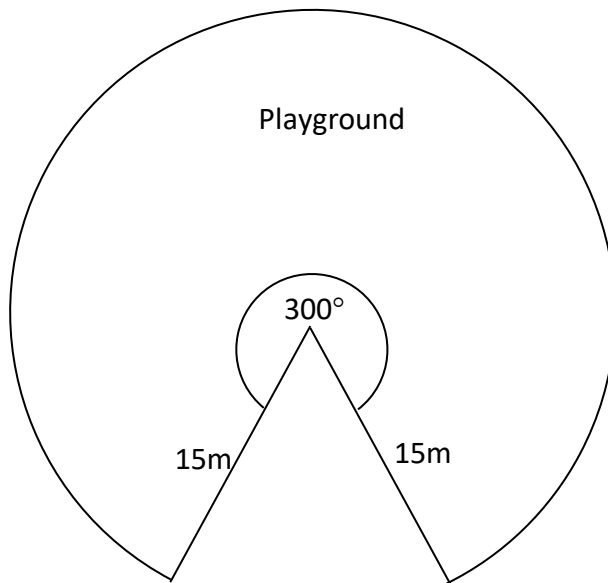
Calculate the size of the largest angle

Answer \_\_\_\_\_°

**(Total 3 marks)**

- 5) A playground is in the shape of a major sector of a circle of radius 15 metres.

Not drawn accurately



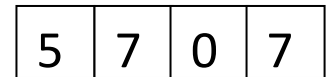
Work out the **total** perimeter of the playground.

Answer \_\_\_\_\_ cm  
(Total 3 marks)

6) Pavel has a combination lock

Pavel has to set each part of the lock to a digit between 0 and 9 inclusive.

One possible way to do this is shown on the diagram.



(a) How many different ways can Pavel do this?

Answer \_\_\_\_\_  
(2)

Pavel decides that the 1<sup>st</sup> and 3<sup>rd</sup> digits will be odd numbers and that the 2<sup>nd</sup> and 4<sup>th</sup> number will be an even digit greater than 0.

(bi) i) How many different ways are possible now?

Answer \_\_\_\_\_  
(2)

(b) ii) Calculate the probability that Pavel chooses a combination such that the 1<sup>st</sup> and 3<sup>rd</sup> digits will be odd numbers and that the 2<sup>nd</sup> and 4<sup>th</sup> number will be an even digit greater than 0 **given that** his original combination is greater than 5000.

Answer \_\_\_\_\_  
(1)  
(Total 5 marks)

7) Find the  $n^{\text{th}}$  term of

5, 10, 19, 32, 49, ...

Answer \_\_\_\_\_  
(Total 4 marks)

8) (a) Factorise fully  $9a^2 - 6a$

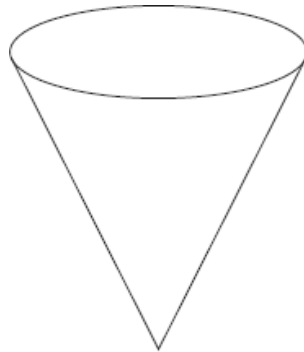
Answer \_\_\_\_\_  
(2)

(b) Solve  $x^2 - 12x + 20 = 0$

Answer \_\_\_\_\_  
(3)

**(Total 5 marks)**

9) The diagram shows an empty cone of radius 1.5 metres and height 4 metres.

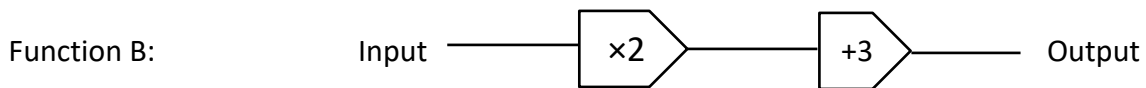
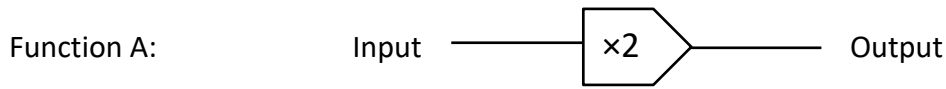


Sand is poured into the cone at a rate of  $0.2 \text{ m}^3$  per minute.

Work out the number of minutes it takes to fill the cone.

Answer \_\_\_\_\_ mins  
(Total 3 marks)

10) Two functions A and B are represented by these function machines.



The output from function A is then put into function B.

(a) Calculate the output from function B if the input into function A is 5

Answer \_\_\_\_\_ [2]

(b) Calculate the value of  $x$  to be put into function A to get an output of 14 in function B.

Answer \_\_\_\_\_ [2]

**(Total 4 marks)**

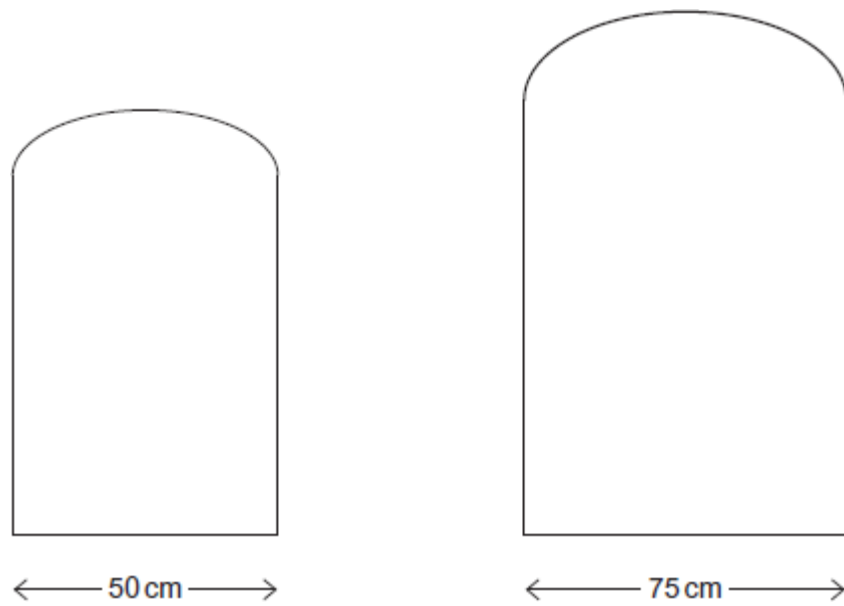
11) In a game you collect gold tickets which give you £10 each and silver tickets that lose you £3 each  
At the end of the game I won £431 and collect 60 tickets.  
How many tickets of each colour did I collect?

Answer \_\_\_\_\_

**(Total 5 marks)**

12) The diagram shows two pieces of glass.

Not drawn accurately



The pieces are similar.

The area of the small piece is  $6000 \text{ cm}^2$

Glass costs £80 per square metre.

Work out the cost of the large piece.

Answer \_\_\_\_\_

**(Total 5 marks)**



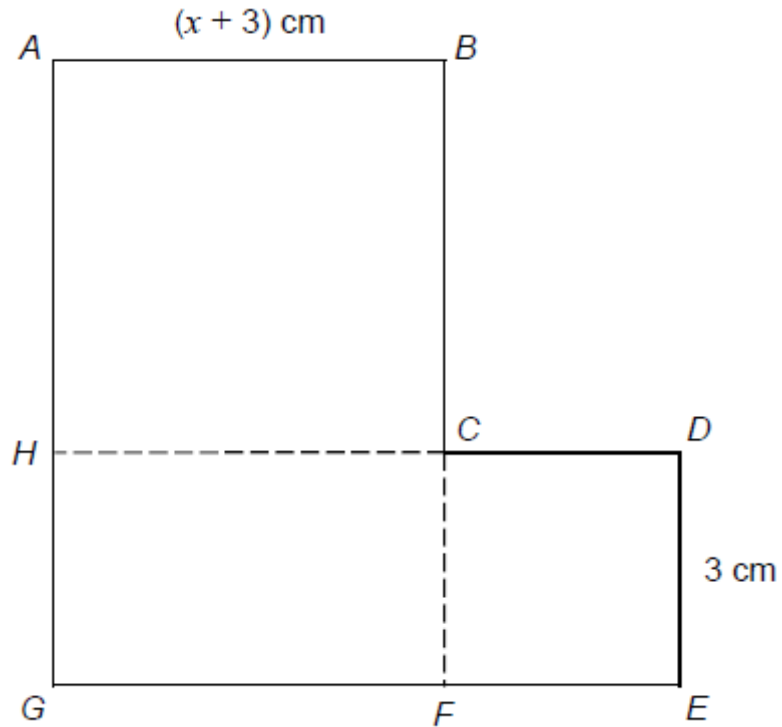
13)  $ABCH$  is a square.

$HCFG$  is a rectangle.

$CDEF$  is a square.

They are joined to make an L-shape.

Not drawn accurately



a) Show that the total area of the L-shape, in  $\text{cm}^2$ , is  $x^2 + 9x + 27$

(4)

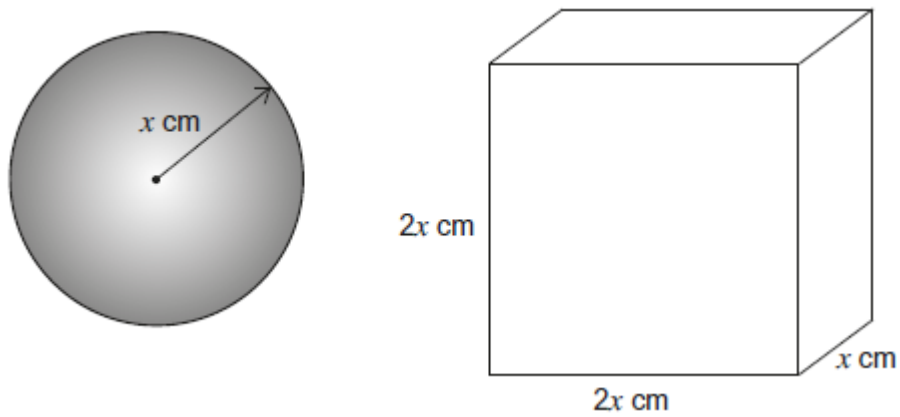
b) If the area of the L-shape is  $79\text{cm}^2$ , find the value of  $x$

(3)

(Total 7 marks)

14) A sphere has a radius of  $x$  cm

A cuboid has edges of length  $x$  cm, width  $2x$  cm and height  $2x$  cm



a) Show clearly that the sphere has the larger volume.

You may use the fact that the volume of a sphere  $= \frac{4}{3}\pi r^3$

b) By what scale factor should I increase the side lengths of the cuboid so that it has the same volume as the sphere? (2)