THE GRAMMAR SCHOOL
AT LEEDS
Be Inspired

MATHEMATICS ENTRANCE EXAMINATION
ENTRY TO YEAR 7

Time Allowed: 60 minutes

Write down all your working and put your answers in the spaces provided.

Calculators are not allowed.

Try to answer all the questions.

Some of the questions may seem unfamiliar. Do not spend too much time on these at first, but move on to questions you like more. You can always return to the unusual ones later.

Your full name:_____

Your current school:_____

1.

Show all of your working in this question.

a. Work out $794 + 647$

Answer: _____ [1 Mark]

b. Work out $3005 - 438$

Answer: _____ [1 Mark]

c. Work out 428×8

Answer: _____ [1 Mark]

d. Work out $4368 \div 7$

Answer: _____ [1 Mark]

2.

Write a number in the box to make each calculation correct.

a. $12 + \square = 21$

b. $94 - \square = 17$

c. $\square \times 3 = 96$

d. $17 + 15 = \square + 9$

[4 Marks]

3. Find the value of the following:

a. 9.34×10

Answer: _____ [1 Mark]

b. 9.34×1000

Answer: _____ [1 Mark]

c. $9.34 \div 100$

Answer: _____ [1 Mark]

d. 0.9×0.3

Answer: _____ [1 Mark]

e. $9.34 + 0.934$

Answer: _____ [1 Mark]

4.

For each of these equivalent fractions, write the value of the question mark in the box provided.

a. $\frac{2}{3} = \frac{?}{18}$

b. $\frac{5}{?} = \frac{15}{24}$

c. $\frac{4}{6} = \frac{?}{9}$

d. $\frac{2}{5} = \frac{7+3}{37+\ ?}$

[4 Marks]

5.

Write the next 3 terms in this Fibonacci sequence

1 1 2 ___ ___ ___

[1 Mark]

6.

I have four sides.
I have no lines of symmetry.
I have two pairs of equal angles.
What am I?

Answer: _____ [2 Marks]

7.

a. List the factors of 28

[2 Marks]

b. A prime number is a number with exactly two factors.
List the primes from 0 to 20.

[2 Marks]

To find the DIGITAL ROOT of a number add the digits.

- If the answer is a single digit, you have found the digital root.
- If the answer is not a single digit, continue the process until you have a single digit.

For example, to find the digital root of 32789:
3+2+7+8+9 = 29
2+9 = 11
1+1=2
So the digital root of 32789 is 2.

c. Find the digital root of 982305

[2 Marks]

If the digital root of a number is a multiple of 3, the number is also a multiple of 3.

d. *Without using division*, determine whether 34729 is a multiple of 3.

[2 Marks]

8.

In this diagram, AC, BD and EDC are straight lines.

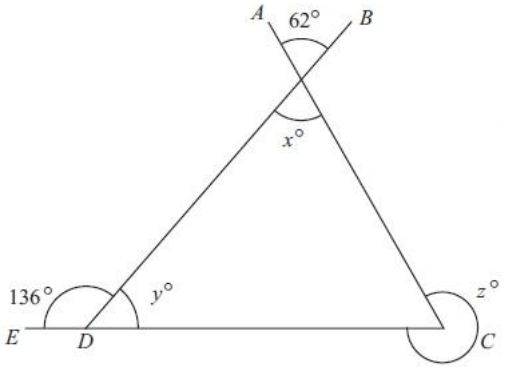


Diagram **NOT** accurately drawn

Find the values of x, y and z

$x =$ _____

[1 Mark]

$y =$ _____

[1 Mark]

$z =$ _____

[2 Marks]

9.

I need 60g of glitter to make 3 t-shirts.
How much glitter do I need to make 8 t-shirts?

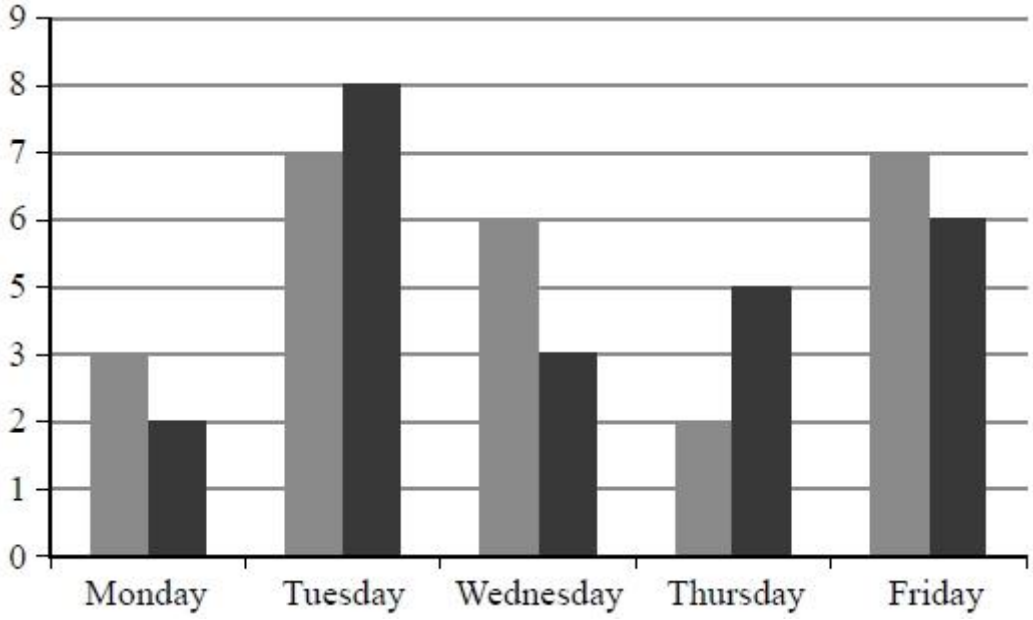
Answer = _____g

[2 Marks]

10.

Sam and Max work in a shop from Monday to Friday.

Sam draws a graph to show the number of TVs they each sell.



Write down **three** things that are wrong with this graph.

1

.....

.....

2

.....

.....

3

.....

.....

[3 Marks]

11.

Here is part of a train timetable for trains from Milton Keynes to Huddersfield.

	Milton Keynes	Milton Keynes	Milton Keynes
Depart	10:50	11:50	12:50
	Huddersfield	Huddersfield	Huddersfield
Arrive	13:12	14:12	15:12

a. How long does a train take to travel from Milton Keynes to Huddersfield? Give your answer in hours and minutes.

_____hours and _____minutes

[1 Mark]

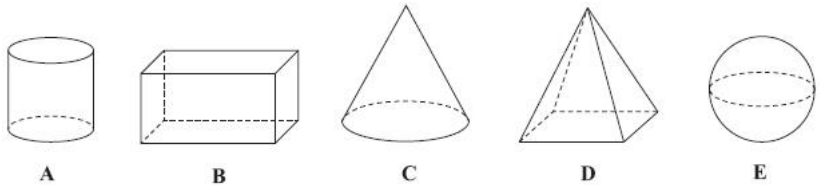
b. A faster train from Milton Keynes to Huddersfield takes 1 hour and 34 minutes.
It arrives in Huddersfield at 10:15
What time did it leave Milton Keynes?

Answer = _____

[1 Mark]

12.

Here are some solid 3-D shapes.



a. Write down the letter of the shape that is a sphere.

.....

[1 Mark]

b. Write down the mathematical name of shape **A**.

.....

[1 Mark]

c. How many faces does shape **B** have?

.....

[1 Mark]

13.

At 7 am the temperature was −4 °C
By 3 pm the temperature had gone up by 10 °C.

a. Write down the temperature at 3 pm.

.....°C

[1 Mark]

At 9 pm the temperature was −2°C.
By midnight the temperature had gone down by 7 °C.

b. Write down the temperature at midnight.

.....°C

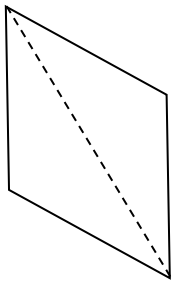
[1 Mark]

14.

The angles inside any triangle add up to 180^{o}.

A quadrilateral is a shape with four sides.

Any quadrilateral can be split into 2 triangles.



a. Explain how you know that the angles inside a quadrilateral add up to 360^{o}.

[1 Mark]

b. A pentagon is a shape with 5 sides.
What do the angles inside a pentagon add up to?

[1 Mark]

c. What do the angles inside an octagon add up to?

[2 Marks]

15.

a. Work out $15 \div 5 + 7$

.....

[1 Mark]

b. Work out $2 + 7 \times 2$

.....

[1 Mark]

c. Work out $-5 + -6$

.....

[1 Mark]

d. Work out $14 - -3$

.....

[1 Mark]

16.

The diagram shows the plan of a small field.

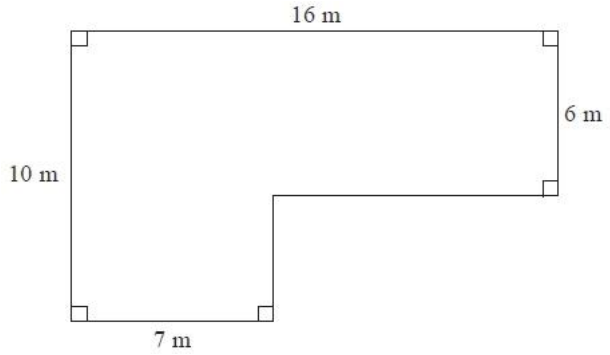


Diagram **NOT** accurately drawn

Find the area of the field.
State the units of your answer.

[4 Marks]

17.

It takes 60 minutes for 6 robots to dig a hole.
How long does it take for 4 robots to dig a hole the same size?

Answer = _____

[2 Marks]

18.

James has some square paving stones and some rectangular paving stones.

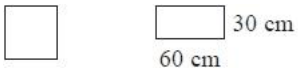
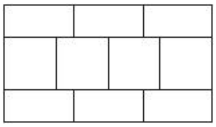


Diagram **NOT** accurately drawn

He uses four square paving stones and six rectangular paving stones to make this pattern in the shape of a rectangle.



Each rectangular paving stone is 60 cm by 30 cm.

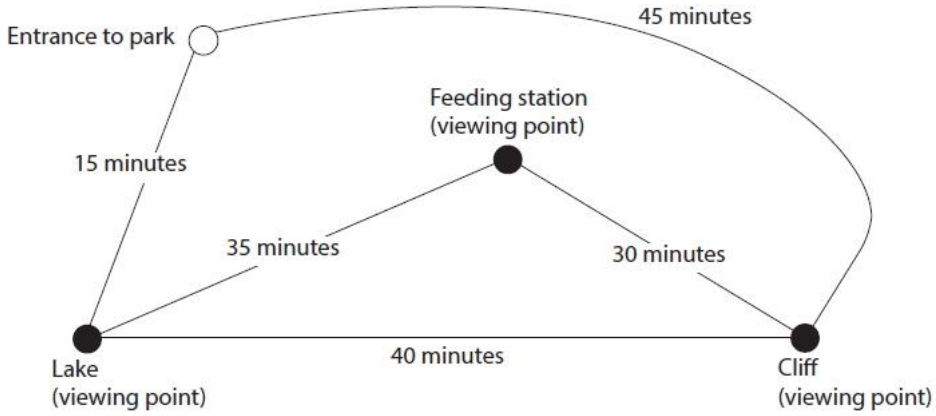
Work out the length of one side of a square paving stone.

..... cm

[2 Marks]

19.

Liz is going to spend the day birdwatching at a park.
She has this plan of the paths in the park.
The plan shows the time it takes to walk along each path.



Liz arrives at the entrance to the park at 9 am.

She will walk in the park without going back along a path she has already used.

She will spend 1 hour at each of the viewing points.

Liz thinks she will be back at the entrance by 2 pm.

Is Liz correct?
Show why you think this.

Use the space below to show clearly how you get your answer.

[3 Marks]

END OF PAPER