Lower School Entrance 2021

MATHEMATICS

14+

1 Hour

Full Name:	…………………………………………..……….………
Current School:	…………………………….…………….……………
Date:	………………………………..………….………

Equipment required: pen, pencil, ruler, protractor, compasses, eraser.

Instructions to Candidates:

1   Attempt all questions. Do not worry if you don't manage to do them all
2   Calculators may not be used
3   Show ALL working
4   Check your answers for accuracy
5   Total points for the test: 100

1. If $e = -5$, $f = 7$ and $g = 8$, find the value of:

    (a) $fg - e$

    .... (3)

    (b) $e^2 + g$

    .... (2)

2. Work out:

    (a) $2\frac{1}{7} - \frac{5}{8}$

    .... (4)

    (b) $\frac{5}{9} \times 8\frac{1}{10}$

    .... (3)

3. (a) Mimi and Lindi each bought a dress in a sale.
Mimi's cost £65.45 and Lindi's cost £52.65.
Their mother had given them each two £50 notes and they were asked to give
all the change back to their mother.

What was the total amount of money their mother received?

………………………………… (3)

(b) Ben and Martin took their families and some friends to the theme park.
Ben bought 8 tickets for a roller-coaster ride, at £5.60 each.
Martin paid for 14 children to go on the Dodgem Cars and he paid exactly the
same total amount as Ben did.

What was the price of each Dodgem Car ticket?

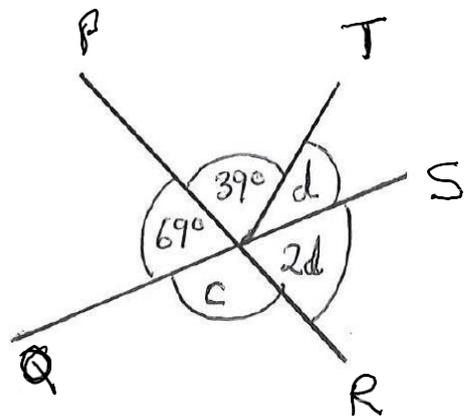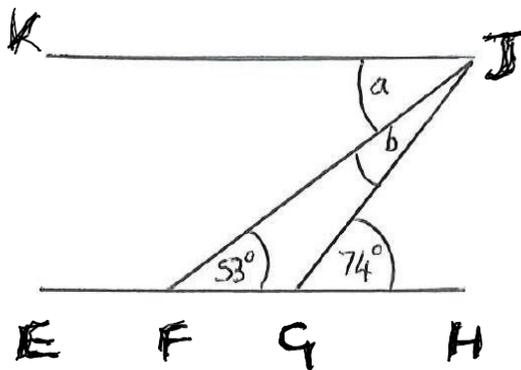……………………………….. (3)

4. Arrange the following in order of size, **largest to smallest**:

$$0.9 \qquad 9\% \qquad 0.109 \qquad \frac{91}{1000} \qquad 9.1$$

………………..……………………………………………….….. (2)

___

5. Write down the values of angles *a, b, c* and *d* in the following diagrams.
    EFGH, PR and QS are all straight lines

    (The diagrams are not drawn to scale)

a = …………...   *b* = …………...   *c* = …………….   *d* = …………….   (5)

___

6. Solve these equations:

   (a) $5(2y - 1) - 3y = 19 - y$

   ……………………………………………………….   (3)

   (b) $\frac{3}{2}(p + 1) = -6$

   …………………………………………………….   (3)

7.

   | 4 | 5 | 7 | 9 | 10 | 15 | 24 | 36 |
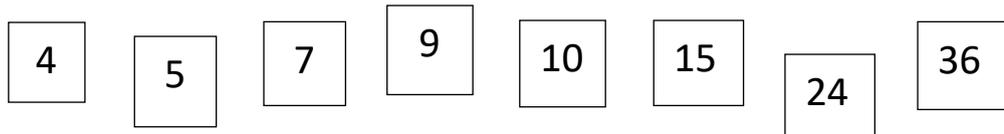
   Aisha has eight numbered cards which she turns over so that the numbers cannot be seen.
   She asks Sally to select one at random.
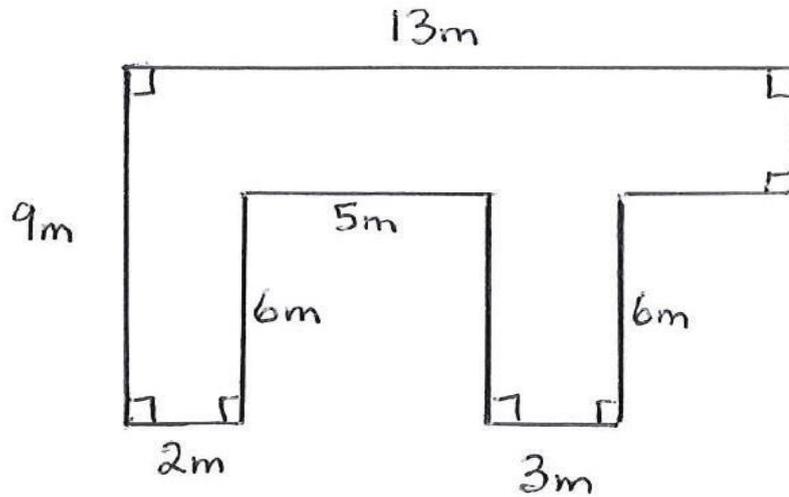
   Write down the probability that Sally takes:

   (a) A square number   ………………………..   (1)

   (b) **Not** a prime number   ………………………..   (1)

   (c) A factor of 72   ………………………..   (1)

   (d) A multiple of 5   ………………………..   (1)

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8. Teri is designing a vegetable garden.
The diagram shows the shape and dimensions of the garden.
(The diagram is not drawn to scale)

(a) Teri wants to put a lattice border around the garden.

How many metres of the lattice bordering material does she need to buy?

……………………………………….. (3)

(b) Fertilser costs £2. 50 per bag. Each bag covers 6 square metres of ground.

What will Teri have to pay if she buys the number of bags she needs, so that her whole vegetable plot is fertilised?

……………………………………….. (5)

9. Annabel and Jack have a competition. They record the number of apples they can pick in ten minutes, on seven separate occasions.

These are the results:

Annabel :   27   35   57   42   39   41   53

Jack :   36   41   38   50   46   32   44

Work out:

(a)   the mean number of apples for each child

Annabel :   …………………………………..   (3)

Jack :   ………………………………….   (3)

(b)   the median for each

Annabel :   ………………………………….   (2)

Jack :   ………………………………….   (2)

(c)   the range for each

Annabel :   ………………………………..   (1)

Jack :   ………………………………….   (1)

(d)   Who do you think won the competition? Give a reason for your answer.

………………………………………………………………………………   (2)

10. Farmer Brown had 4 500 sheep in 2017.

    (a) He increased his herd by 15% in 2018.

        How many sheep did he have in 2018?

        ……………………………………………….. (3)

    (b) By 2020 there were 8 000 sheep on Farmer Brown's herd.

        Write down the ratio, in its simplest form:

        the number of sheep in 2018 : the number of sheep in 2020.

        …………………………………………. (2)

    (c) Farmer Brown wants to divide up his sheep into three areas of his farm, in the ratio

        4 : 5 : 7

        How many sheep would be moved into each region?

        …………………………………………. (3)

11. Simplify:

(a) $3a^2 bc \times 16ab^4$

.... (3)

(b) $(4d^3)^2$

.... (2)

(c) $e(9f - 7) - 2e(8 - 11f)$

.... (3)

12. Round the following, as indicated:

(a) 99.67 to the nearest whole number

.... (1)

(b) 5.4673 to 2 decimal places

.... (1)

(c) 0.0517 to 1 significant figure

.... (1)

(d) 792 pence to the nearest pound

.... (1)

(e) 6542 metres to the nearest kilometre

.... (1)

13. Riki buys some bananas and some apples.
He buys twice as many bananas as apples.
Each banana costs £0.25
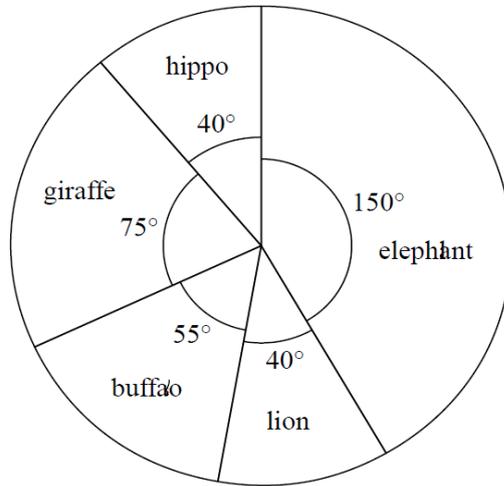Each apple costs £0.35

Riki has £5 to spend.

What is the greatest number of bananas he can buy?

………………………………   (4)

14. Find the Highest Common Factor (HCF) of 96 and 120

………………………………   (3)

15. The pie chart gives information about the different animals Thandi saw on her safari holiday.

hippo
40°

giraffe
75°

150°
elephant

55°

40°

buffalo

lion

Thandi saw 8 hippos.

(a) How many buffalo did she see?

…………………………….   (3)

(b) Write the number of lions she saw as a fraction of the total number of animals.
    Give your answer in its simplest form.
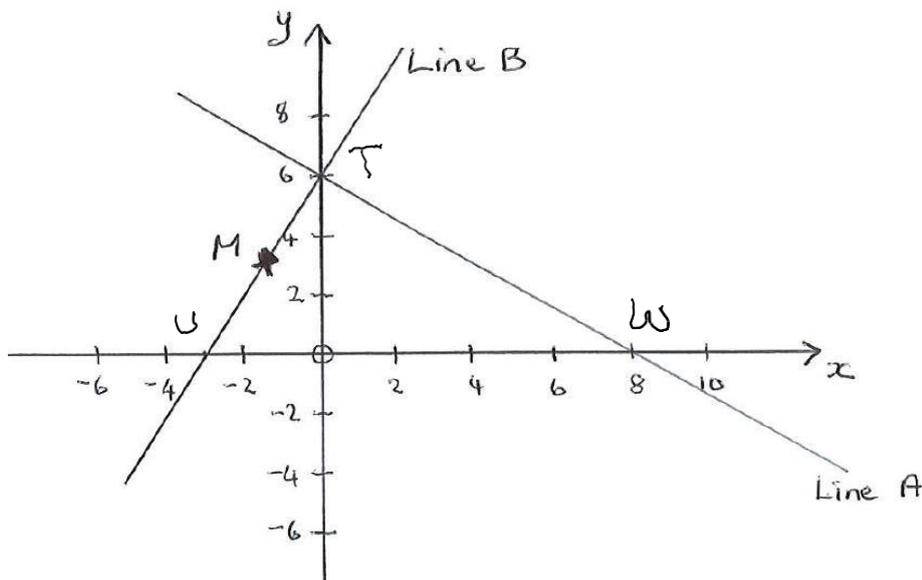
…………………………….   (2)

Jenny went to the same game park and drew a similar pie chart to give information about the animals she saw.
In her diagram, the angle representing the giraffes was 85^0.

(c) Did Jenny see more giraffes than Thandi? Explain your answer.

………………………………………………………………………………

………………………………………………………………………………

………………………………………………………………………………   (2)

16. The graph below shows two straight lines, Line A and Line B:

(a) Write down the equations of the two lines

        Line A :   ………………………………   (2)

        Line B :   ………………………………   (2)

(b) Write down the co-ordinates of M, the midpoint of TU on Line B

        ………………………………   (2)

(c) Work out the area of triangle TUW

        ………………………………   (2)

END OF TEST

1. Solve this crossword puzzle:

CLUES
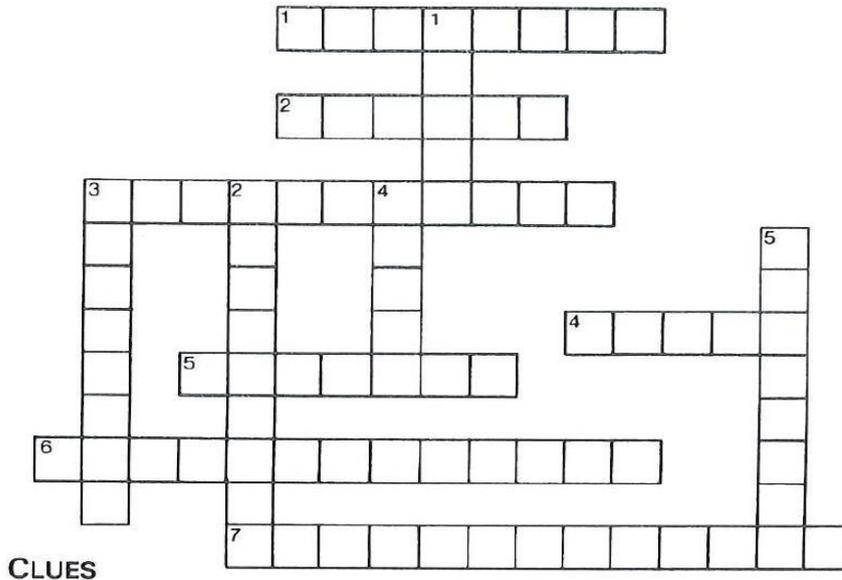
Across

1. The name of a geometrical shape completely surrounded by 3 straight lines.

2. An angle bigger than 90°, but smaller than 180°.

3. A triangle with all three sides of equal length.

4. Another name for an angle of 90°.

5. One triangle with all three sides of different lengths.

6. Two angles which add up to 90° are called . . . . . .

7. 50° is . . . . . . to 130°.

Down

1. An angle greater than 0°, but less than 90°.

2. The name of a triangle with two sides equal in length.

3. The . . . . . . angle of a triangle is equal to the sum of the two interior opposite angles.

4. How many angles are equal in an equilateral triangle?

5. The angles inside a triangle are called . . . . . angles.

2. (a) What is the smallest number which, when doubled and then two is added to the result, has its digits reversed?

    (d) Find a four-digit number which has its digits reversed when it is multiplied by 4.

3. Four jugs contain 2 litres, 3 litres, 4 litres and 5 litres respectively.

    The 5 litre and 3 litre jugs are full of water.

    Using only 5 pourings, ensure that each jug contains 2 litres.