FOREST SCHOOL

13+

ENTRANCE AND SCHOLARSHIP

SAMPLE PAPERS

Candidate Number: _____

Forest School

13+ Mathematics

Non-Calculator

TIME ALLOWED = 1 hour

INSTRUCTIONS

- **Calculators are NOT allowed.**
- **You are advised to show all working.**
- **You have 1 hour to complete all the questions.**
- **Write all your answers and working in the space provided on this question paper.**
- **Check your working carefully.**

1. Calculate the following:

(a) $1987 + 9876$

Answer: .....

(b) 543×72

Answer: .....

(c) $56782 \div 11$

Answer: .....

(d) 5.7×0.012

Answer: .....

(e) $23.45 - 1.894$

Answer: .....

(f) $0.04 \div 0.002$

Answer: .....

2. Calculate the following:

(a) $14 - (-5) =$ .....

(b) $(-6)^2 =$ .....

(c) $-73 - 56 =$ .....

(d) $-12 \div -4 =$ .....

3. If x = -2, y = -3 and z = 10 calculate the following:

(a) $xy - z$

Answer: .....

(b) $3y^2$

Answer: .....

(c) $\dfrac{x+y}{z-11}$

Answer: .....

(d) y^4

Answer: .....

4. (a) By suitable rounding estimate the value of $\dfrac{4.178 \times 12.456}{5.678 + 3.753}$

Answer: .....

(b) Is your answer bigger or smaller than the actual value? Explain clearly your reasoning.

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5. In this question consider the sequence of numbers: 14, 17, 20,...

(a) What are the next three terms of the sequence? Answer.....

(b) What is a formula for the nth term of this sequence? Answer.....

(c) What is the 200^{th} term of this sequence? Answer.....

6. Work out the following

(a) $\frac{5}{7}+\frac{1}{10}$

(b) $\frac{7}{8}\times 3\frac{5}{9}$

Answer: .....

Answer: .....

7. A third of Thulasi's age is 2 years larger than a quarter of Sophia's age. Sophia is 16.

How old is Thulasi?

Answer:.....

8. Fill in the missing values in the table, the first row has been done for you.

Percentage	Decimal
75%	0.75
	0.4
5%	
	0.225

9. Solve these equations:

(a) $9x - 5 = 58$

x=.....

(b) $39 - 4x = 27$

x=.....

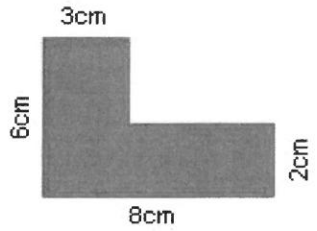
(c) $19 - 7x = 5 - 3x$

x=.....

(d) $\dfrac{10x}{x+2} = 5$

x=.....

10. (a) Calculate the area and perimeter of this L-shape.



Area..... Perimeter.....

(b) Daniel says that "if you increase the perimeter of a shape then you also increase its area"

Is he right? **Justify your answer carefully, using diagrams if you wish.**

11. (a) Brandon invests £200 in a bank account paying interest of 5% every year.
How much does he have in total after 1 year?

Answer:.....

(b) A house goes up in value from £150000 to £180000.
What is the percentage increase?

Answer: .....

12. A bag contains 3 red balls and 4 green balls.

(a) A ball is drawn out of the bag. What is the probability that it is red?

Answer:.....

(b) The red ball above is not replaced. What is the probability that the next ball drawn out is green?

Answer:.....

(c) The balls are replaced and a number of blue balls are added. The probability that a blue ball is drawn from the bag now is 0.65. How many blue balls were added?

Answer:.....

13. A magician has two coins. One is ordinary and the other is "double headed". This means it has heads on both sides. He picks a coin at random and tosses it.

(a) What is the probability the side showing is heads?

Answer:.....

(Question 13 is continued on the next page)

(b) We see that the side showing is heads. What is the probability it is the double-headed coin?

Answer:.....

14. (a) How many different pairs of letters can be picked from the letters A, B, C?

Answer:.....

(b) How many different groups of three can be picked from the letters H, H, K, K, L?
(Note the order does not make a difference – so (H H K) is the same group as (K H H))

Answer:.....

15. Remove the brackets and simplify these expressions fully:

(a) $3(r + 2s) + 6(r - 5s)$ = ...

=.....

(b) $3(x + 8) - 5(x - 6)$ = ...

=.....

(c) $2xy(4x + 5y) - 3(3x - 4y)$ = ...

= .....

16. Factorise the following expressions fully

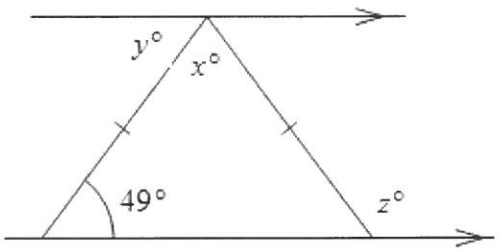
(a) $12y + 8x$

Answer: .....

(b) $36x^3y^2 + 48x^2y^4$

Answer: .....

17. Find the three missing angles in the diagram below, you must give the **full** reasoning for each answer. ABC is an isosceles triangle, the lines with arrows are parallel.



x = ...

Reasons:.....

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y = ...

Reason:.....

z = ...

Reason(s):.....

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18. (a) Calculate the mean and the range of this set of data:

3, 4, 5, 5, 6, 6, 7, 8, 10, 17

Mean = ... Range = ...

(b) A set of data containing 9 numbers has a mean of 16.
The number 20 is added to this set of data.
What is the new mean?

Answer.....

19. Given that:

A Some teenagers don't eat sweets.

B All the students in Year 9 at Forest School are teenagers

Monisha says: "Some year 9 students at Forest School don't eat sweets."

Is she correct to make this conclusion? Justify your answer carefully.

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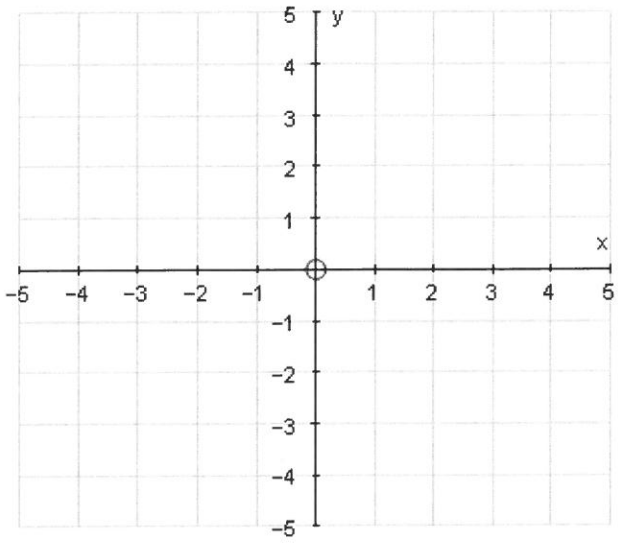
20. (i) Draw the lines y = 4 and y = x on the axes below and label them.



(ii) The triangle A has its corners at the points (-2, 1), (-1,1) and (-1,3).
Draw triangle A on the axes.
Triangle A is reflected in the y-axis to form triangle B.
Triangle B is reflected in the line y = x to form triangle C.
Draw and label triangles B and C on the axes.

21. A solid 10 cm cube is coated with green paint on all 6 sides.

Then the cube is cut into smaller cubes with side length 2 cm.

These new 2 cm cubes will either have 3 green sides, 2 green sides, 1 green sides, or no green sides.

How many of each will there be?

Answer: 3 green sides:.....2 green sides:.....

1 green side:.....no green sides:.....

22. The letters A, B, C, D, and E represent different digits in this multiplication. What are they?

A B C D E 4

X 4

4 A B C D E

Answer A =.....B = ...C = ...D = ...E = ...

END OF EXAMINATION

CHECK THROUGH ALL YOUR ANSWERS CAREFULLY