



FOREST SCHOOL

13+

ENTRANCE AND SCHOLARSHIP

SAMPLE PAPERS

Sample Paper 2

**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) $9876 + 6789$

(b) 987×14

Answer:

Answer:

(c) $30485 \div 13$

(d) 1.7×2.1

Answer:

Answer:

(e) $7.45 - 2.61$

(f) $0.4 \div 0.002$

Answer:

Answer:

2. Calculate the following:

(a) $22 - (-67) = \dots\dots\dots$

(b) $(-3)^4 = \dots\dots\dots$

(c) $-8 - 17 = \dots\dots\dots$

(d) $27 \div -3 = \dots\dots\dots$

3. If $x = -5$, $y = -10$ and $z = -15$ calculate the following:

(a) $x - y + z$

(b) $2x^2$

Answer:

Answer:

4. (a) Round the following to 2 decimal places:

(i) 1.2468

Answer.....

(ii) 1.8989

Answer.....

(b) Sana says that $x = 7.3$ to 1 decimal place.

(i) What is the least possible value of x ?

Answer.....

(ii) What is the largest possible value of $\frac{29}{x}$?

Answer.....

(iii) Charlie says that the largest x can be is 7.34.
Is he right?
Explain clearly your reasoning.

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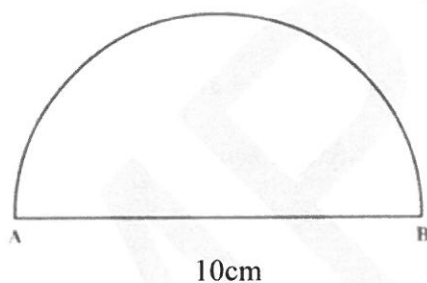
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5. Molly draws 5 straight lines.
What is the most number of different intersection points she can make?

Answer.....

6. The area of a circle is πr^2 and the circumference (perimeter) is $2\pi r$ where $\pi \approx 3.1415$
Estimate the area and the perimeter of this semicircle, where $AB = 10\text{cm}$.



Area:

Perimeter:

7. What fraction is halfway between one third and one quarter?
You should show your working clearly.

Answer:.....

8. Fill in the gaps. Put your fractions in their lowest terms.

Percentage	Fraction
55%	
	$\frac{1}{8}$
2%	
	$\frac{3}{20}$

9. A rectangle has width x cm and its length is 4 cm longer than its width.
Its perimeter is $50 + x$ cm.
Find an equation which x must satisfy and hence find the length of the rectangle.

Length =

10. In a farmyard the ratio of peacocks to ducks is 2:3 and the ratio of ducks to hens is 4:5.
What is the ratio of peacocks to hens?

Answer:.....

11. (a) Faizan buys a car for £2000.
Its value depreciates (goes down) by 2% each year.
How much is it worth after 1 year?

Answer:.....

- (b) How much is it worth after 2 years?

Answer:

12. Liverchester United are playing 2 matches against their arch rivals, Manpool City.
They have won 6 out of their last 10 matches against Manpool City.

- (a) Based on these results, what is the probability that Liverchester beat Manpool in the first match?

Answer:.....

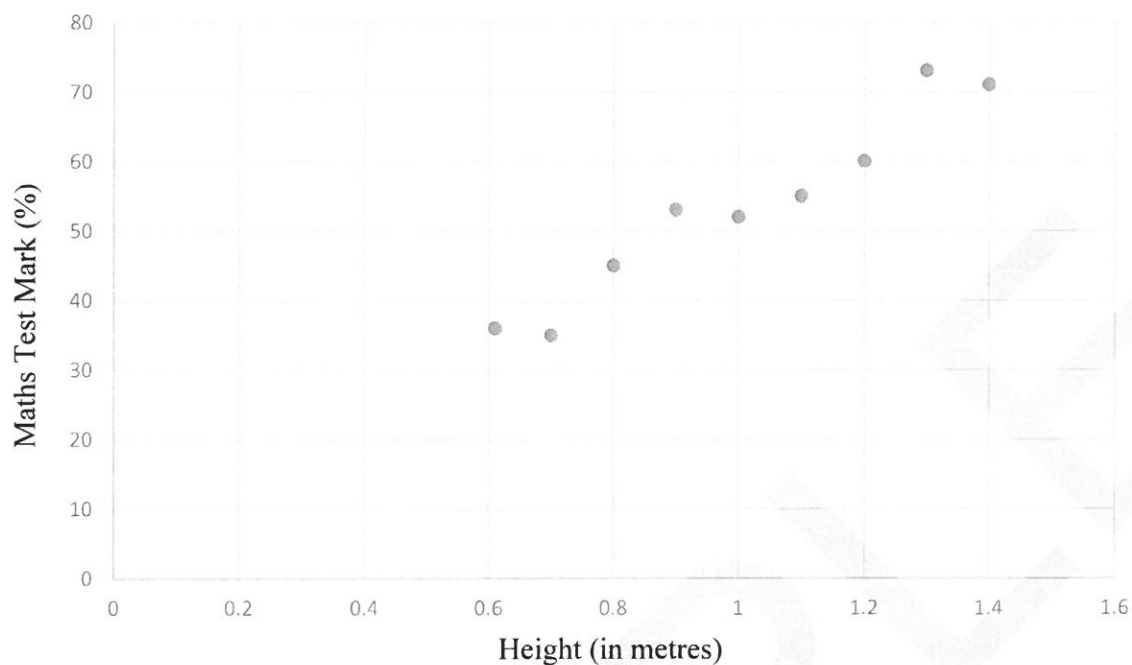
- (b) What is the probability they win both matches?

Answer:.....

- (c) Having won the last 6 out of 10 matches, how many games would Liverchester then have to win in a row so that their probability of winning is $\frac{3}{4}$?

Answer:.....

13. The scattergram shows how some pupils at Forest did in a maths test against their height.



Hibban says “Being tall makes a pupil better at maths”

Do you agree?.....

Explain your reasoning clearly:

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14. Andreas wants to estimate how many fish there are in a lake.
One day he catches 20 fish, marks them, and returns them to the lake.
The next day he catches 10 fish, of which 4 are marked.
Use this information to estimate the number of fish in the lake.

Answer:.....

15. Remove the brackets and simplify these expressions fully:

(a) $4(f - g) + 5(2f + g) = \dots\dots\dots$
 $= \dots\dots\dots$

(b) $7(2e + 8) - 3(3e - 5) = \dots\dots\dots$
 $= \dots\dots\dots$

(c) $w(2w + 5v) - 3v(5w - 2v) = \dots\dots\dots$
 $= \dots\dots\dots$

16. Factorise the following expressions fully:

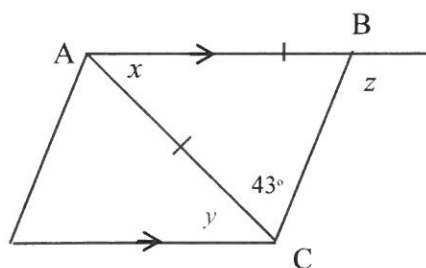
(a) $15a + 27b$

(b) $27c^2d^2 - 36c^5d$

Answer:

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.



$x = \dots\dots\dots$

Reasons:.....

$y = \dots\dots\dots$

Reason:.....

$z = \dots\dots\dots$

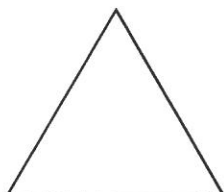
Reason...:.....

18. Class A has 10 pupils and achieved a mean of 40% in a maths test.
 Class B has 15 pupils and achieved a mean of 80% in the same test.
 What is the overall mean for both classes?

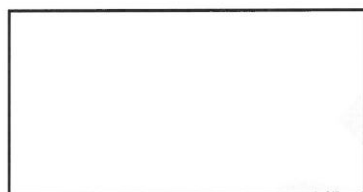
Answer.....

19. Draw all the lines of symmetry on these shapes:

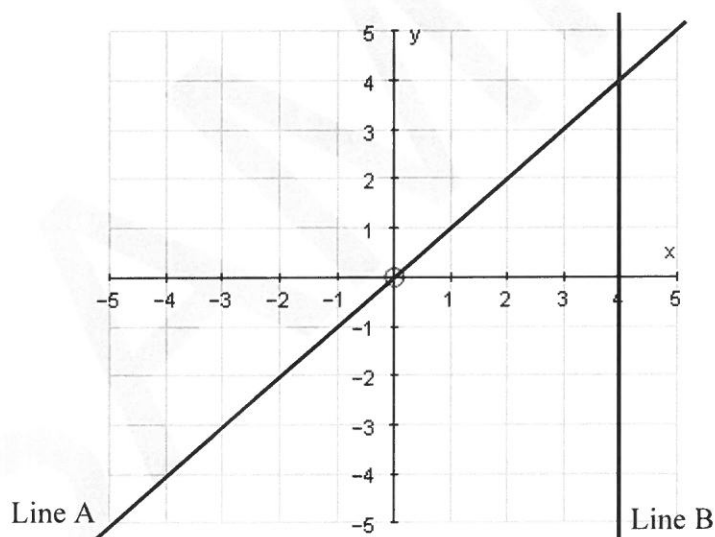
(a) An equilateral triangle



(b) A rectangle



20. (i) Label the lines with their equations.



Line A:.....

Line B:.....

(ii) A triangle has its vertices (corners) at $(-2, -2)$, $(-2, 1)$ and $(-3, 1)$. Plot these points, and draw the triangle on the diagram. Reflect the triangle in Line A.

21. The Fibonacci sequence is formed by adding the previous two numbers to get the next:

1, 1, 2, 3, 5, 8, 13,...

What are the next three numbers in this sequence?

The Lucas Sequence has the same rule but starts with 1 and 3.

(i) Write out the first 7 terms of the Lucas sequence.

(ii) Write down the first 7 terms, in terms of x and y , for the sequence with the same rule whose first terms are x and y .

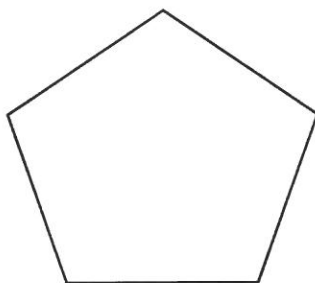
(iii) Mia says: "If x is a multiple of 5 then the 6th term of the sequence is also a multiple of 5 whatever y is".

Do you agree? Explain your reasoning carefully.

(iv) Steph says: "Every 5th term of the Fibonacci sequence is a multiple of 5".

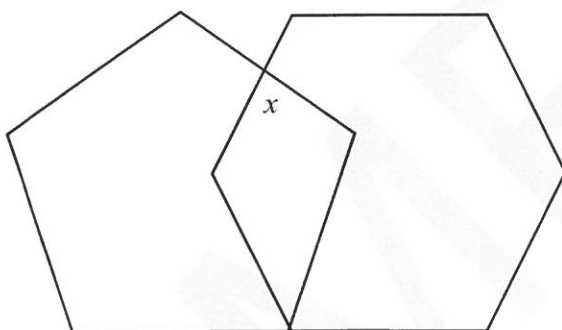
Do you agree? Explain your reasoning carefully.

22. (i) Show that the interior angle of a regular pentagon is 108 degrees.



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- (ii) A regular pentagon and a regular hexagon overlap as shown. Find the angle x . Show your reasoning clearly.



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END OF EXAMINATION

CHECK THROUGH ALL YOUR ANSWERS CAREFULLY