This is a Class 1 exam

Lebanon Evangelical School for Boys and Girls

Lebanon Evangelical School

for Boys and Girls Loueizeh - Baabda

Stage Exam 01

17FEB2025

Do NOT write in this box. Your MARK will be placed here.

Subject :	Maths
Class :	10A
Teacher :	Mrs.Claudine Eid
Duration :	1 hour

Calculators are allowed

You are to answer the questions to this exam on : This exam paper

Your name :		*Time taken to complete exam*
Your Class :		
Exam Room :		
How many sheets, including cover sheet :		

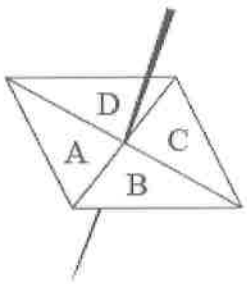
- Do not open this paper until the teacher in charge instructs you to do so.
- The most important thing to remember in taking an exam is NEVER PANIC.
- If you are caught cheating in this exam, you will be awarded zero for ALL exams that are taken on this day.

Answer ALL questions.

Write your answers in the space provided

You must write down all the stages in your working.

1. Here is a biased spinner.



The table shows the probabilities that when the spinner is spun it will land on A, on B, on C and on D.

Letter	A	B	C	D
Probability	0.4	0.21	0.32	0.07

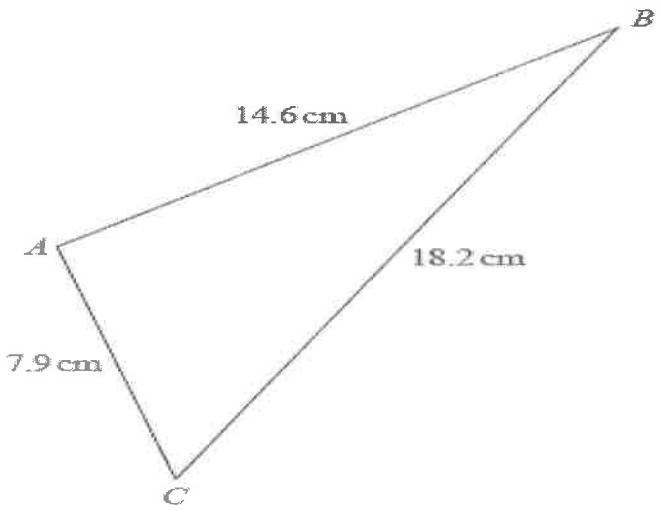
Luka will spin the spinner 200 times.

Work out an estimate for the number of times the spinner will land on A.

.....

(Total for Question 1 is 2 marks)

2.Here is triangle *ABC*.



Work out the area of triangle *ABC*.

Give your answer correct to 3 significant figures.

..... cm^2

(Total for Question 2 is 4 marks)

3. Solve the simultaneous equations

$$y^2 = 3x^2 + 4$$

$$y + 2x = 7$$

Give your solutions correct to 3 significant figures.

.....

(Total for Question 3 is 4 marks)

4. Show that $\frac{6x-y}{10xy}+\frac{1}{2x}-\frac{2y-7x}{5xy}$ simplifies to $\frac{k}{y}$ where k is an integer.

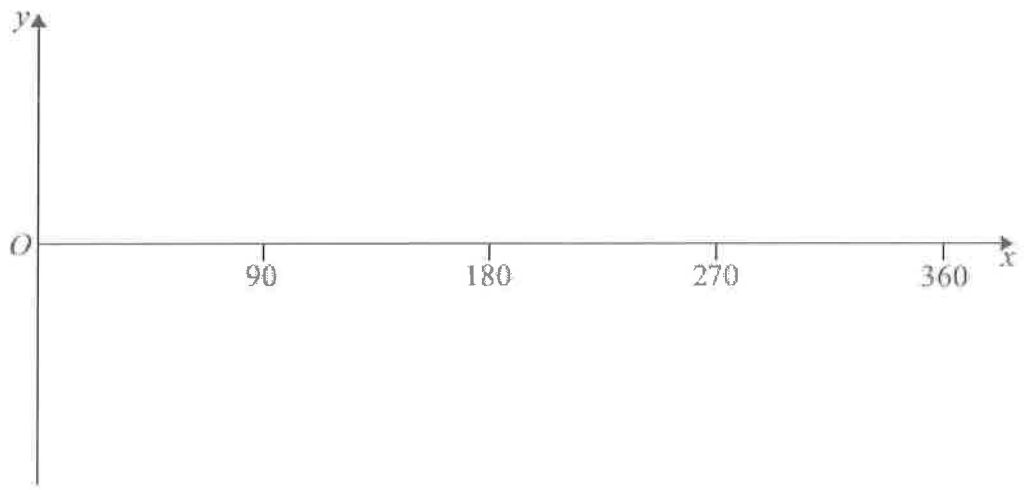
(Total for Question 4 is 3 marks)

5. Solve $2x^2 - 2x - 1 = 0$ by completing the square give your answer in surd form.

(3)

(Total for Question5 is 3marks)

6.(*a*)Sketch the graph of $y = \sin x°$ for $0 \leq x \leq 360$



(2)

(*b*) Solve the equation $2 \sin x° = -1$ for $0 \leq x \leq 360$

.....

(2)

(Total for Question 6 is 4 marks)

7. (*a*) Simplify fully $\frac{(a-3)^2}{5(a-3)}$

.....

(1)

(*b*) Factorise $3k^2 + 11k - 4$

.....

(2)

(*c*) Simplify fully $\frac{4-x^2}{x^2+3x} \div \frac{x+2}{x+3}$

.....

(3)

(Total for Question 7 is 6 marks)

8.Solve the following

(a) $x^2 - 6x = 7$

---

(2)

(b) $9x^2 - 1 = 0$

---

(2)

(Total for Question8 is 4marks)

9. Use algebra to solve the simultaneous equations

$$4x - 5y = 20$$

$$6x + 7y = -57$$

You must show all your working.

$x =$ .....

$y =$ .....

(Total for Question 9 is 4 marks)

10. $f(x) = \dfrac{5x-3}{4}$

(a) Find $f^{-1}(x)$

$f^{-1}(x) =$ .....

(2)

For all values of x

$$g(x) = (x-1)^2 \text{ and } h(x) = 1-2x$$

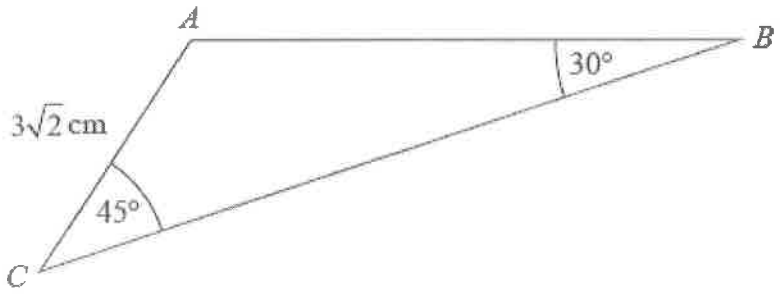
(b) Work out the value of gh(5)

gh(5) = ...

(2)

(Total for Question 10 is 4 marks)

11. ABC is a triangle.



Work out the length of AB.

..... cm

(Total for Question 11 is 3 marks)

12(a)Rationalise the denominator of $\frac{15}{\sqrt{5}}$

Give your answer in its simplest form.

.....

(2)

(b) Write $\frac{\sqrt{75}-2}{1+2\sqrt{3}}$ in the form $\frac{a-b\sqrt{3}}{c}$ where a, b and c are integers.

.....

(4)

(Total for Question 12 is 6 marks)

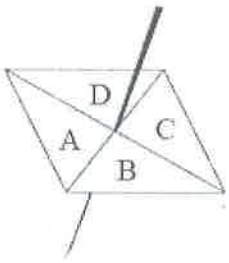
TOTAL FOR PAPER IS 47 MARKS

Answer ALL questions.

Write your answers in the space provided

You must write down all the stages in your working.

1. Here is a biased spinner.



The table shows the probabilities that when the spinner is spun it will land on A, on B, on C and on D.

Letter	A	B	C	D
Probability	0.4	0.21	0.32	0.07

Luka will spin the spinner 200 times.

Work out an estimate for the number of times the spinner will land on A.

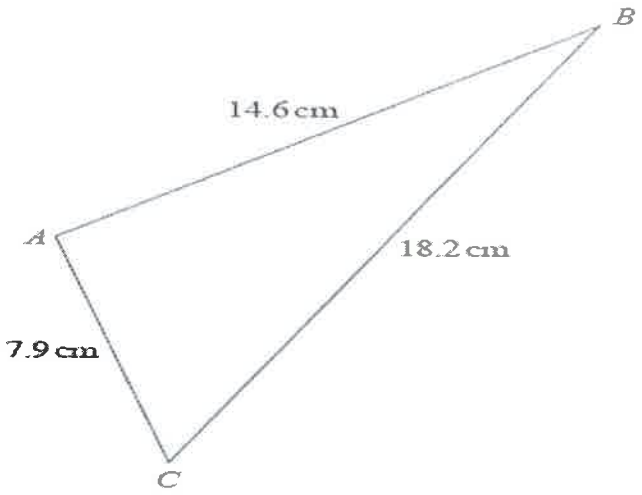
$0.4(200) = 80$

[1] [1]

80

(Total for Question 1 is 2 marks)

2.Here is triangle *ABC*.



Work out the area of triangle *ABC*.

Give your answer correct to 3 significant figures.

$7.9^2 = 14.6^2 + 18.2^2 - 2(14.6)(18.2)\cos B$

$\Rightarrow \angle B = \cos^{-1}\left(\dfrac{7.9^2 - 14.6^2 - 18.2^2}{-2(14.6)(18.2)}\right) = 24.9^\circ$ [1] [1]

$\text{Area} = \frac{1}{2}(14.6)(18.2)\sin 24.9 = 55.9\ \text{cm}^2$ [1] [1]

55.9 ..... cm^2

(Total for Question 2 is 4 marks)

3. Solve the simultaneous equations

$$y^2 = 3x^2 + 4$$

$$y + 2x = 7$$

Give your solutions correct to 3 significant figures.

$y = 7 - 2x$

replace $(7-2x)^2 = 3x^2 + 4$

$49 - 28x + 4x^2 = 3x^2 + 4$

$x^2 - 28x + 45 = 0$ [1]

$x_1 = \frac{28 - \sqrt{604}}{2} = 14 - \sqrt{151}$ [1] 1.71 $\Rightarrow y_1 = 7 - 2(14 - \sqrt{151})$

$= -21 + 2\sqrt{151}$

$= 3.58$ [1]

$x_2 = \frac{28 + \sqrt{604}}{2} = 14 + \sqrt{151}$ [1] 26.3 $\Rightarrow y_2 = -21 - 2\sqrt{151}$

$= -45.6$

$(1.71, 3.58)$ $(26.3, -45.6)$

(Total for Question 3 is 4 marks)

4. Show that $\frac{6x-y}{10xy}+\frac{1}{2x}-\frac{2y-7x}{5xy}$ simplifies to $\frac{k}{y}$ where k is an integer.

$$\frac{6x-y+5y-2(2y-7x)}{10xy}$$ [1]

$$=\frac{6x-y+5y-4y+14x}{10xy}$$ [1]

$$=\frac{20x}{10xy}=\frac{2}{y}$$ [1]

(Total for Question 4 is 3 marks)

5. Solve $2x^2-2x-1=0$ by completing the square give your answer in surd form.

$$2\left(x^2-x+\left(\tfrac{1}{2}\right)^2-\left(\tfrac{1}{2}\right)^2\right)-1=0$$

$$2\left(x-\tfrac{1}{2}\right)^2-2\left(\tfrac{1}{4}\right)-1=0$$ [1]

$$2\left(x-\tfrac{1}{2}\right)^2=\frac{3}{2}$$

$$\left(x-\tfrac{1}{2}\right)^2=\frac{3}{4}$$ [1]

$$x-\tfrac{1}{2}=\pm\frac{\sqrt{3}}{2}$$

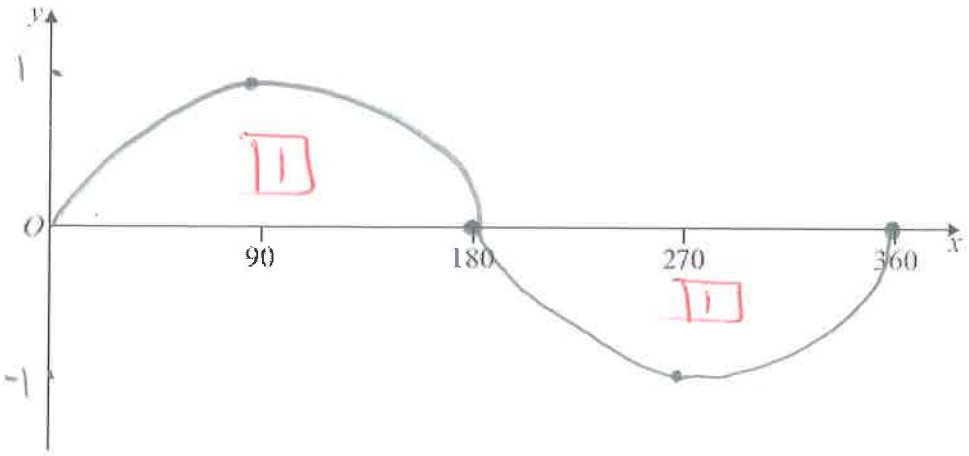
$$x=\frac{\sqrt{3}+1}{2}$$ [1]

or $x=-\frac{\sqrt{3}+1}{2}$

(3)

(Total for Question5 is 3marks)

6.(*a*)Sketch the graph of $y = \sin x°$ for $0 \leq x \leq 360$



(2)

(*b*) Solve the equation $2 \sin x° = -1$ for $0 \leq x \leq 360$

$\sin x = -\frac{1}{2}$

$x = -30°$

$\Rightarrow x = 180 + 30$ or $360 - 30$

$x = 210°$, $330°$

.....

(2)

(Total for Question 6 is 4 marks)

7. (*a*) Simplify fully $\frac{(a-3)^2}{5(a-3)}$

$\frac{a-3}{5}$ [1]

.....

(1)

(*b*) Factorise $3k^2 + 11k - 4$

$3k^2 - k + 12k - 4$

$k(3k-1) + 4(3k-1)$

$(3k-1)(k+4)$

$S = 11$

$P = -12$ $-1, 12$

[1] [1]

$(3k-1)(k+4)$

.....

(2)

(*c*) Simplify fully $\frac{4-x^2}{x^2+3x} \div \frac{x+2}{x+3}$

[1]

$\frac{(2-x)(2+x)}{x(x+3)} \cdot \frac{(x+3)}{(x+2)} = \frac{2-x}{x}$

[1] [1]

.....

(3)

(Total for Question 7 is 6 marks)

8.Solve the following

(a) $x^2 - 6x = 7$

$x^2 - 6x - 7 = 0$

$(x-7)(x+1) = 0$

$x = 7$ or $x = -1$ [1] [1]

(2)

(b) $9x^2 - 1 = 0$

$9x^2 = 1$

$x^2 = \frac{1}{9}$ [1]

$x = \pm\frac{1}{3}$ [1]

(2)

(Total for Question8 is 4marks)

9. Use algebra to solve the simultaneous equations

$(4x - 5y = 20)\ 7$

$(6x + 7y = -57)\ 5$

You must show all your working.

$28x - 35y = 140$ [1]

$30x + 35y = -285$ [1]

$58x = -145$

$x = -\frac{5}{2}$

$\Rightarrow 4\left(-\frac{5}{2}\right) - 5y = 20$

$-5y = 30$

$y = -6$

$x =$ $-\frac{5}{2}$ [1]

$y =$ -6 [1]

(Total for Question 9 is 4 marks)

10. $f(x) = \frac{5x-3}{4}$

(a) Find $f^{-1}(x)$

$y = \frac{5x-3}{4}$

$x = \frac{5y-3}{4}$ [1]

$4x = 5y - 3$

$4x + 3 = 5y$

$y = \frac{4x+3}{5}$ [1]

$f^{-1}(x) = \frac{4x+3}{5}$

(2)

For all values of x

$g(x) = (x-1)^2$ and $h(x) = 1 - 2x$

(b) Work out the value of gh(5)

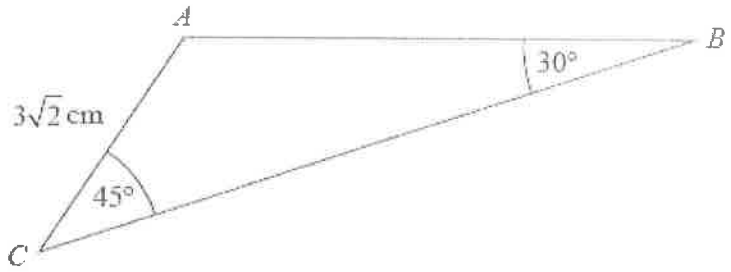
$g(1-2(5)) = g(-9) = (-9-1)^2 = (-10)^2 = 100$ [1] [1]

$gh(5) = 100$

(2)

(Total for Question 10 is 4 marks)

11. ABC is a triangle.



Work out the length of AB.

$\frac{3\sqrt{2}}{\sin 30} = \frac{AB}{\sin 45}$ [1] $\Rightarrow \sin 30\, AB = 3\sqrt{2} \sin 45$

$AB = \frac{3\sqrt{2} \sin 45}{\sin 30}$ [1]

$AB = 6\text{ cm}$ [1]

6 ..... cm

(Total for Question 11 is 3 marks)

12(a)Rationalise the denominator of $\frac{15}{\sqrt{5}}$

Give your answer in its simplest form.

$$\frac{15\sqrt{5}}{\sqrt{5}\sqrt{5}} = \frac{15\sqrt{5}}{5} = 3\sqrt{5}$$

M1 M1 A1

.....

(2)

(b) Write $\frac{\sqrt{75}-2}{1+2\sqrt{3}}$ in the form $\frac{a-b\sqrt{3}}{c}$ where a, b and c are integers.

$$\frac{(5\sqrt{3}-2)}{(1+2\sqrt{3})}\frac{(1-2\sqrt{3})}{(1-2\sqrt{3})} = \frac{5\sqrt{3}+4\sqrt{3}-2-30}{(1)^2-(2\sqrt{3})^2}$$

M1 M1 A1

$$= \frac{9\sqrt{3}-32}{1-12} = \frac{9\sqrt{3}-32}{-11} = \frac{32-9\sqrt{3}}{11}$$

M1 A1

.....

(4)

(Total for Question 12 is 6 marks)

TOTAL FOR PAPER IS 47 MARKS