Centre Number	Candidate Number

MINISTRY OF EDUCATION AND HUMAN RESOURCE DEVELOPMENT

SOLOMON ISLANDS SCHOOL CERTIFICATE

2017

MATHEMATICS

WEDNESDAY 2ND NOVEMBBER 9.00 AM **TIME: 3 HOURS plus 10 mins. reading time**

SECTION	CONTENT	MARK
A	Multiple Choice Questions	20
B	Short Answer Questions	20
C	Long Answer Questions	60
	TOTAL	**100**

INSTRUCTIONS TO CANDIDATES

1. Do not open this Booklet until you are told to do so.
2. Make sure both your Centre Number and Candidate Number are written in the spaces provided at the top right hand corner and also on the back flap at the back of this booklet.
3. Before you answer the questions, read through the instructions carefully.
4. Answer all questions and do all the working out on the spaces provided. Do not use correction fluid.
5. You are allowed to use a Scientific Calculator.
6. Do not use mobiles in the Examination room

THIS BOOKLET CONTAINS 23 NUMBERED PAGES.

SECTION A: MULTIPLE CHOICE QUESTIONS (20 MARKS)

WRITE THE LETTER OF THE MOST CORRECT ANSWER IN THE BOX PROVIDED IN THE BACK FLAP. EACH QUESTION (Q1-Q20) IS WORTH ONE (1) MARK EACH.

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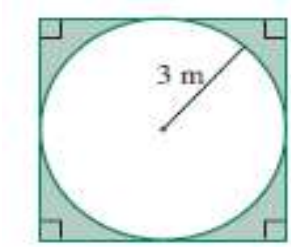
1. $\sqrt{2} \times \sqrt{3}$ is equal to

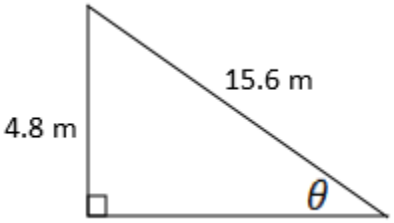
   A. $\sqrt{5}$
   B. $3\sqrt{2}$
   C. $2\sqrt{3}$
   D. $\sqrt{6}$

2. The **shaded** area is equal to



   A. $6^2 - \pi(\,3^2\,)m^2$
   B. $2 \times 6 - \pi(3)^2 m^2$
   C. $6^2 - \pi(2 \times 3)m^2$
   D. $\pi(3)^2 - 6m^2$

3. A walkway corridor which is 15.6 metres long rises 4.8 metres. The **angle** that it makes with the horizontal is



   A. 16^0
   B. 16.9^0
   C. 17.9^0
   D. 18.5^0

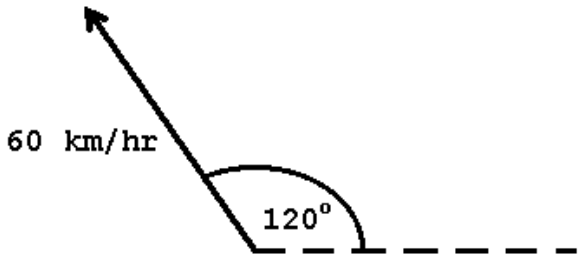
4. An object travels at 60 km/h at an angle of 120^0. Express this as a column vector

A. $\begin{bmatrix} 30 \\ 52 \end{bmatrix}$

B. $\begin{bmatrix} -30 \\ 52 \end{bmatrix}$

C. $\begin{bmatrix} -30 \\ -52 \end{bmatrix}$

D. $\begin{bmatrix} 30 \\ -52 \end{bmatrix}$



5. The formulae for finding the volume of a sphere is

A. $4\pi r^2$

B. $\pi r^2 \times h$

C. $\frac{1}{3}\pi r^2 \times h$

D. $\frac{4\pi r^3}{3}$

6. The solution to the equation $4(2x + 5) = 7x + 18$ is

A. $x = 2$

B. $x = -2$

C. $x = 1$

D. $x = -1$

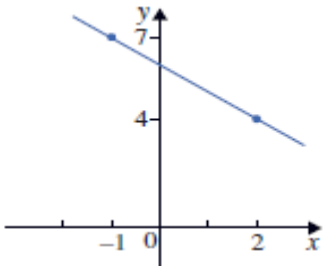
7. The gradient of the line below is

A. 1

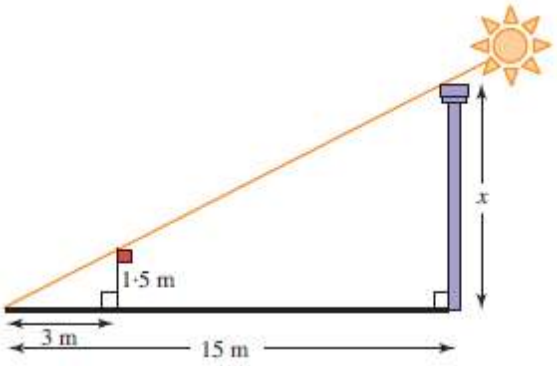
B. $1x$

C. -1

D. $-1x$



8. A flagpole 1·5 metres tall casts a shadow 3 metres in length. The height of a tower x that casts a shadow 15 metres long at the same time is



A. $7.5\ m$
B. $30\ m$
C. $15\ m$
D. $0.9\ m$

9. When $2x^2 - 8$ is fully factorized, it should be;

A. $2(x^2 - 4)$
B. $2\ (x-2)\ (x+2)$
C. $2(x-2)\ (x+4)$
D. $(2x-2)\ (x+4)$

10. The **median** for the following set of numbers $1, 3, 5, 6, 6, 7, 7, 8, 10, 12$ is;

A. 6
B. 6.5
C. 7
D. 11

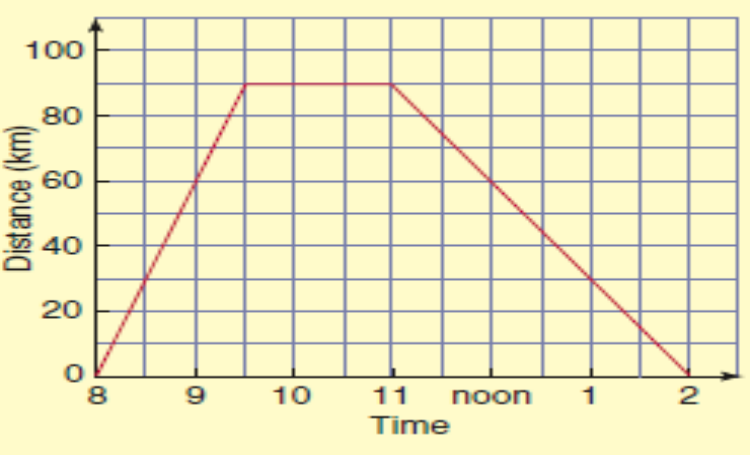
11. Two dice are thrown, what is the **probability** that both numbers appearing are the same

A. $\frac{1}{4}$
B. $\frac{1}{9}$
C. $\frac{1}{6}$
D. $\frac{1}{12}$

12. Solve the pair of **simultaneous equations** $2x + y = 3$ and $2y + x = 0$

A. $x = 2 \quad and \quad y = -1$
B. $x = -1 \quad and \quad y = 2$
C. $x = 1 \quad and \quad y = -2$
D. $x = -2 \quad and \quad y = 1$

13. The graph below shows the trip of a boy who travels from his home. How far from home is he at the end of his trip?



A. 2 hours
B. 90 km away
C. 0 km away
D. 6 hours

14. Find the **simple interest** on a principal of \$30,000 at 5 % per annum for 10·5 years

A. $\$\,1{,}575$
B. $\$\,10{,}500$
C. $\$\,15{,}750$
D. $\$\,45{,}750$

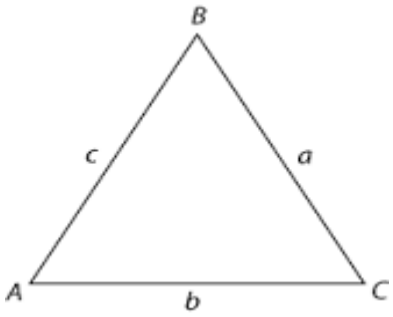
15. The graph shows the number of hours spent on sleeping by Solomon Water workers. How many workers spent less than 8 hours of sleeping every day?

A. 5 workers
B. 8 workers
C. 17 workers
D. 22 workers

16. A circle of radius r centered at point (a, b) would have an **equation** of;

A. $(x - a)^2 + (y - b)^2 = r^2$
B. $ax^2 + bx + c = 0$
C. $ax^3 + bx^2 + cx + r = 0$
D. $y = a^x$

17. Which of the following is **NOT** a correct formula for Cosine Rule?



A. $a^2 = b^2 + c^2 + 2bc\ Cos\ A$
B. $a^2 = b^2 + c^2 - 2bc\ Cos\ A$
C. $b^2 = a^2 + c^2 - 2ac\ Cos\ B$
D. $c^2 = a^2 + b^2 - 2ab\ Cos\ C$

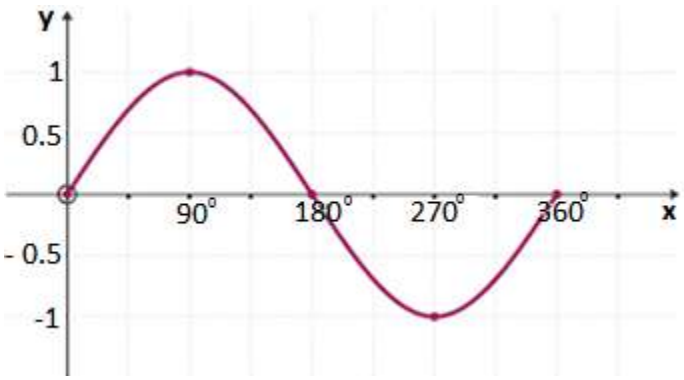
18. When we simplify $\frac{(10x^2 + 15x)}{5x}$ we get

A. $2x + 15$
B. $10x + 3$
C. $2x + 3$
D. $5x$

19. **m, n, o**, and **p** are four even numbers below 10. What will happen to their **mean** if each of them is halved?

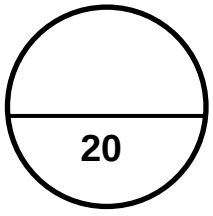
A. Stays the same
B. Doubled
C. Squared
D. Halved

20. What is the **period** of the graph below?



A. 1
B. -1
C. 180^0
D. 360^0

Total marks for Section A:



SECTION B: SHORT ANSWER QUESTIONS (20 MARKS)

WRITE THE ANSWERS FOR EACH QUESTION ON THE SPACES PROVIDED. IT IS IMPORTANT THAT YOU SHOW ALL YOUR WORKING OUT AS SOME MARKS ARE AWARDED FOR APPROPRIATE METHODS AND PARTIALLY CORRECT ANSWERS.

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21. Simplify $(4)^k \times (2)^1$

Answer: _____

(2 marks)

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22. Complete the table below to calculate the investment if \$5,500 is invested at 4·5% compound interest for 3 years. The interest is calculated and paid annually. The first year has been done for you.

$\boldsymbol{Year}$	$\boldsymbol{Value\ at\ Start}$	$\boldsymbol{Interest\ at\ 4.5\ \%}$	$\boldsymbol{Value\ at\ end}$
1	\$ 5500	\$ 247.50	\$ 5747.50
2	\$ 5747.50		
3			

Calculate the value of the investment at the end of the third year?

Answer: _____

(2 marks)

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23. Rearrange the formula to make r the subject $V = \frac{2R}{(R - r)}$

Answer: _____

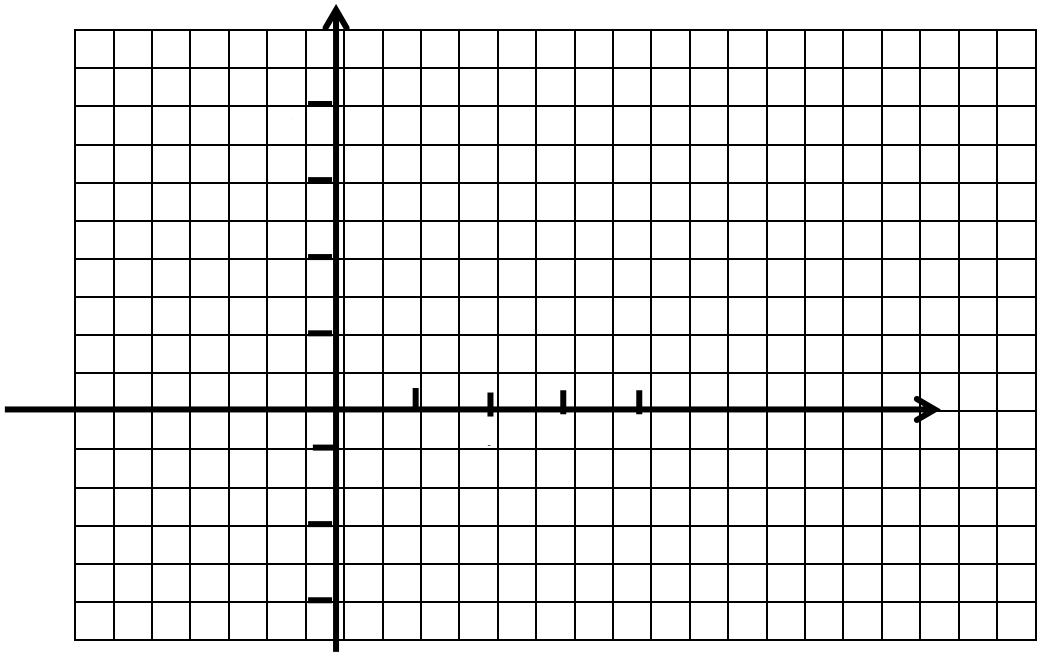
(2 marks)

24. Use the quadratic formula or otherwise to find the solutions to the quadratic equation $2x^2 - 3x = 2$

Answer: _____

(2 marks)

25. Use the grid below to answer a) and b)



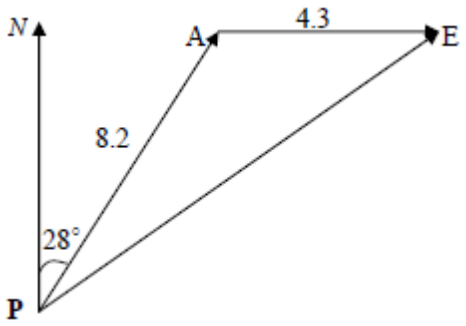
a) Draw the lines $y = x$ and $y = -x + 3$ on the same axes below

b) Shade the region where it both satisfies $y \leq x$ and $y \geq -x + 3$

Answer: _____

(3 marks)

26. A ship leaves port **P** on a bearing of 28° and travels 8.2 miles. The ship then turns due East and travels 4.3 miles. The sketch for its journey is given below.
How far is the ship from port **P**? (Correct your answer to 2 decimal places)



Answer: _____
(3 marks)

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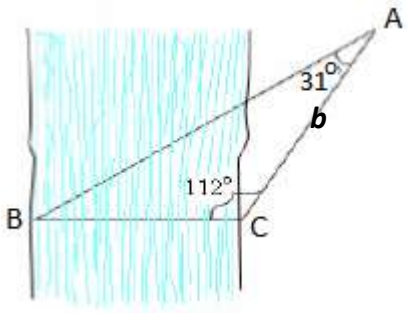
27. A student surveyor wishes to measure the distance across a river. A sketch of it is shown in the diagram below. He finds that angle C is 112° and angle A is 31°.The length b is 115.67 m.

a) Find the width of the river, that is, length BC. (Correct your answer to 2decimal places)



Answer: _____
(2 marks)

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28. The number of children per family at Mataniko Compound is displayed in a frequency table.

$No: of\ Children$ x	$Frequency$ f	xf
1	5	
2	7	
3	6	
4	7	
5	5	

a) Find the **mean** number of children per family for Mataniko Compound?

Answer: _____
(2 marks)

29. Given the following numbers 26 , 2 , 23, 7, 16, 13, 6, 24, 19,10, 21, 17 find

a) The Lower Quartile

Answer: _____
(1 mark)

b) The Upper Quartile

Answer: _____
(1 mark)

TOTAL MARKS FOR SECTION B:

20

SECTION C: LONG ANSWER QUESTIONS (60 MARKS)

WRITE THE ANSWERS TO EACH QUESTION ON THE SPACES PROVIDED. IT IS IMPORTANT THAT YOU SHOW ALL YOUR WORKING OUT AS SOME MARKS ARE AWARDED FOR APPROPRIATE METHODS AND PARTIALLY CORRECT ANSWERS.

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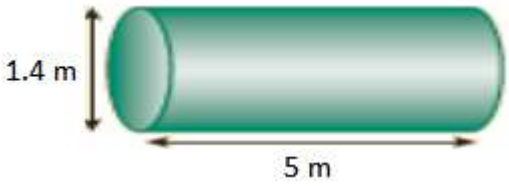
30. The new highway currently under construction in Honiara is $2\ km$ long and $40\ m$ wide. The thickness of tar to be put on top of it is $10\ cm$.

    a) Calculate the volume of tar needed in m^3 to cover the whole highway.

Answer: _____
(2 marks)

    b) The tar is usually poured by tanker truckers, see diagram below. The tank is cylindrical with a diameter of $1.4\ m$ and length of $5\ m$. Calculate the volume of the tank. (Round answer to 2 decimal places)



Answer: _____
(2 marks)

c) If Kitano Construction (the company constructing the road) has got only two identical tanker trucks. How many trips will each of them need to fully cover the road with tar?

Answer: _____
(3 marks)

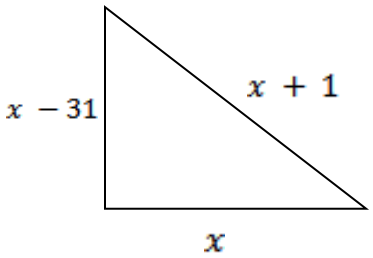
d) If each of them can only make 5 trips per day, how many days will they take to complete the job?

Answer: _____
(1 mark)

e) If it cost $ 1,500 for a trip how much will the company charge the Government at the end of the project.

Answer: _____
(2 marks)

31. A right-angled triangle has sides of lengths $x, x + 1 \text{ and } x - 31$. All lengths are in meters.



a) Write an equation for the given problem using Pythagoras theorem.

Answer: _____
(2 marks)

b) Express the equation in the form $ax^2 + bx + c = 0$

Answer: _____
(3 marks)

c) Solve for $\boldsymbol{x}$

Answer: _____
(2 marks)

d) What is the length for the 3 sides,

Base = _____ (1 mark)

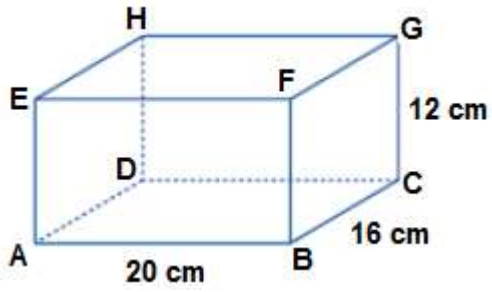
Height = _____ (1 mark)

Hypotenuse = _____ (1 mark)

e) Calculate the area of the triangle

Answer: _____
(2 marks)

32. This cuboid is 20 cm long, 16 cm wide and 12 cm tall.



a) Name the projection of BH onto the plane ABCD?

Answer: _____
(1 mark)

b) Calculate the length of the Line BH

Answer: _____
(2 marks)

c) Calculate the angle the Line BH makes with the plane ABCD?

Answer: _____
(2 marks)

d) Name the projection of AG onto the plane EFGH?

Answer: _____

(1 mark)

e) Calculate the Length of Line BE

Answer: _____

(2 marks)

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33. The table below contains some information about the number of participants from each country and the reason for their selection

Country	Religious Representative	Cultural Representative	Political Representative	Total
Fiji	5	5	6	16
Tonga	3	2	4	9
Samoa	5	4	4	13
Vanuatu	4	3	4	11
Total	17	14	18	49

a) The first participant interviewed was a religious representative. What is the probability that the participant was representing Vanuatu?

Answer: _____

(2 marks)

b) What is the probability that the participant interviewed was one of the cultural representatives?

Answer: _____
(2 marks)

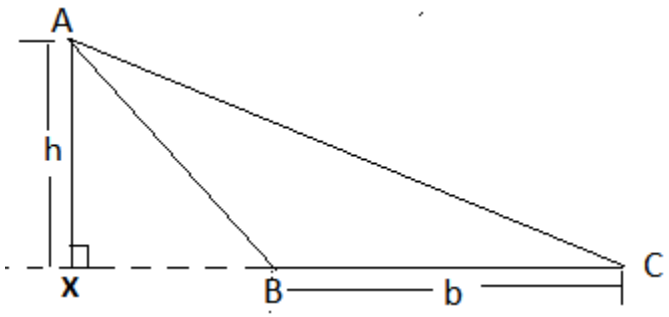
c) At the end of the meeting, all the Tongan participants were gathered together for a group photo. What is the probability that the television interviewer intervened and picked one of their political representatives?

Answer: _____
(2 marks)

d) While waiting for flights to go home, all the Fiji and Vanuatu participants went for a kava night. What is the probability of selecting a Political Representative of Fiji during that time?

Answer: _____
(2 marks)

34. The Solomon Islands patrol boat was on duty when they received a call that 3 Vietnamese boats were fishing illegally in our reefs. The position of the 3 Vietnamese boats with respect to our patrol boat is shown on the diagram below.The Solomon Islands patrol boat is at point X and the 3 Vietnamese boats are at points A, B and C.



Other information

Length AB = 7 km and Length AC = 15 km, Angle BAC = 18°

a) Calculate the distance **b**

Answer: _____

(2 marks)

b) Calculate angle ABC

Answer: _____

(2 marks)

c) Point **x**, **B** and **C** lie on a straight line forming a right angle with line AX, calculate the distance **h.**

Answer: _____

(2 marks)

d) Which boat will be easy for Solomon Islands patrol boat to arrest first? Boat A or boat B?

Answer: _____

(2 marks)

e) If the Solomon Islands patrol boat's speed during the arrest was 18 knots (33.336km/hour), how long will it take for it to reach the closest boat?

Answer: _____

(2 marks)

35. Given $y = x^2 - 2x - 3$ and $y = x + 1$

a) Calculate the **coordinates** of the x and y intercepts of the straight line graph.

x Intercept (___, ___) (1 mark)

y Intercept (___, ___) (1 mark)

b) Calculate the **coordinates** of the x and y intercepts of the quadratic graph.

x Intercept 1 (___,___) (1 mark)

x Intercept 2 (___, ___) (1 mark)

y intercept (___,___) (1 mark)

c) Calculate the coordinates of the **turning point** of the quadratic graph.

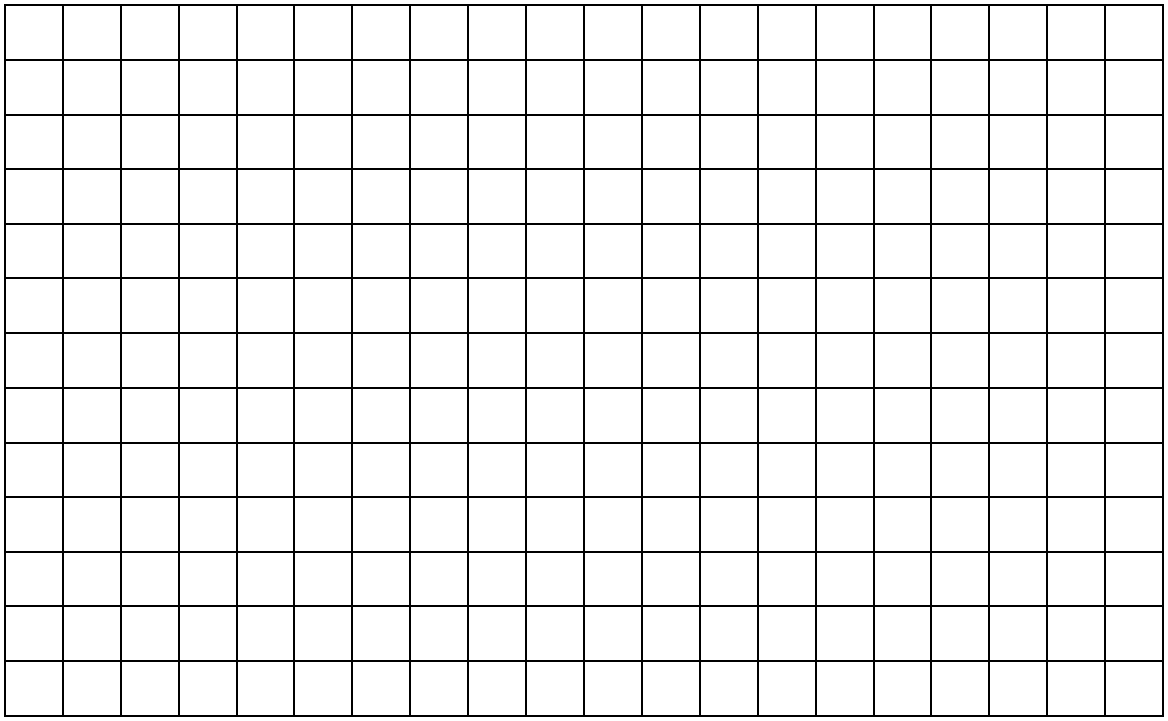
Turning point: (_____,_____)

(2 marks)

d) Graph the line and the parabola on the same set of axes below

Answer: _____

(3 marks)

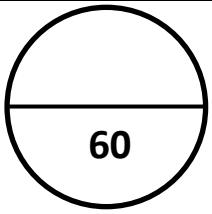


e) From your graph or otherwise find the coordinates for the points on intersection.

Point of intersection :(_____, ___) and (_____ , ___)

(2 marks)

Total marks for Section C:



SISC – MATHEMATICS 2017

CENTRE NUMBER			CANDIDATE NUMBER				

SECTION A
MULTIPLE CHOICE (20 MARKS)

Write the letter of the correct answer in the box provided. Make sure your answer is put alongside the right question number.

Example: If you consider A is the correct answer, Write it like this: **A**

To change your answer from A to C, Cross out A and write the new answer **C** By the box, like this: ~~A~~ **C**

1		11	
2		12	
3		13	
4		14	
5		15	
6		16	
7		17	
8		18	
9		19	
10		20	

FOR MARKERS USE ONLY

SECTION	MARK	ACTUAL MARK
A	20	
B	20	
C	60	
TOTAL	100	
Markers Initial		