South Sydney High School

TRIAL SCHOOL CERTIFICATE EXTERNAL TEST

MATHEMATICS

INSTRUCTION BOOKLET

Directions to students

1. Preparation time: 10 minutes
2. Total working time: 2 hours.
3. Do NOT begin the Test until the supervisor tells you to do so.
4. This test has TWO sections.
   Section 1: Questions 1 - 25 (25 marks)
   Section 2: Questions 26 - 80 (75 marks)
5. The formulae listed on page 4 of the Instruction Booklet may be used in BOTH Sections 1 and 2.
6. There will be a short break between Section 1 and Section 2.
7. Your answers to Section 1 will be collected before you start work on Section 2.
8. Section 1
   - Working time: 30 minutes.
   - Attempt A L L questions.
   - Calculators are NOT to be used in Section 1.
9. Section 2
   - Working time: 90 minutes.
   - Attempt A L L questions.
   - Calculators M A Y be used in Section 2. Calculators must be silent, battery or solar-powered, and hand-held.

SAMPLE QUESTIONS AND ANSWERS

Here is an example of a multiple choice question that has been answered.

1. The number of days in November is:

○ 28 ○ 29 ● 30 ○ 31

The oval shape has been filled in to show that 30 is the answer.

Here is an example of a short free response question that has been answered.

2. $7 \div 2 =$

3	·	5					

The correct answer 3.5 has been written in the boxes.

Here is an example of a multiple choice question which may have more than one correct answer. (Both correct answers must be shown).

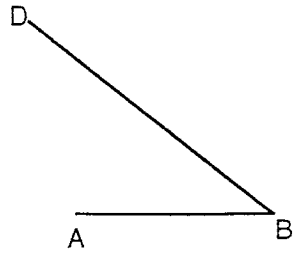
3. Which of the fractions below is equal to $\frac{2}{3}$?

○ $\frac{2 - 1}{3 - 1}$ ○ $\frac{2 + 1}{3 + 1}$ ● $\frac{2 \times 1}{3 \times 1}$ ● $\frac{2 \div 1}{3 \div 1}$

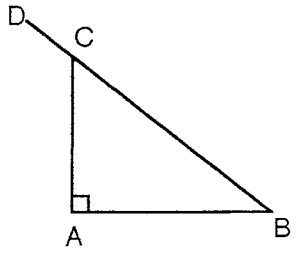
Two oval shapes have been filled to show the two correct answers.

Here is an example of a diagram completion question.

4. Complete triangle ABC if it is to be right angled at A and C must be on BD.



The question has been answered below.



Line AC is drawn using a set square or protractor to complete ΔABC.

FORMULAE

FOR USE IN SECTION 1 AND SECTION 2

Circumference of a circle = π x diameter

$$[C = \pi d]$$

Area of a circle = π x radius squared

$$[A = \pi r^2]$$

Area of a parallelogram = base x perpendicular height

$$[A = bh]$$

Area of a rhombus = half the product of the diagonals

$$[A = \frac{1}{2}xy]$$

Area of trapezium = half the sum of the parallel sides x perpendicular height

$$[A = \left(\frac{a + b}{2}\right) h]$$

Volume of a prism = area of cross-section x height

$$[V = Ah]$$

Volume of a cylinder = π x radius squared x height

$$[V = \pi r^2 h]$$

Pythagoras' theorem states:

In a right angled triangle,
the hypotenuse squared = the sum of the squares of the other two sides

$$[c^2 = a^2 + b^2]$$

South Sydney High School

TRIAL SCHOOL CERTIFICATE EXTERNAL TEST

MATHEMATICS SECTION 1

QUESTION BOOKLET

Directions to students

1. You are allowed 30 minutes to answer Section 1.
2. Section 1: Questions 1 - 25 (25 marks)
3. Attempt A L L questions in Section 1.
4. Calculators are NOT to be used in Section 1.
5. The formulae listed on page 4 of the Instruction Booklet may be used in Section 1.
6. Write your answers to Section 1 in the spaces provided.

This paper **must not be removed** from the examination room

Student name:_____

SECTION 1

1. 20 000 x 500 =

2. 0.25 x 480 is the same as:

- ◯ 480 ÷ 2
- ◯ 480 ÷ 4
- ◯ 4.8 x 10
- ◯ 480 x 4

3. 10% of 0.05 =

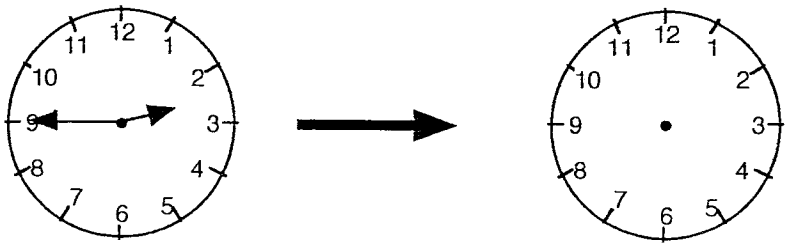
- ◯ 0.5
- ◯ 50
- ◯ 0.005
- ◯ 5.0

4. Which two numbers complete the following pattern ?

1, 3, 6, ___, ___

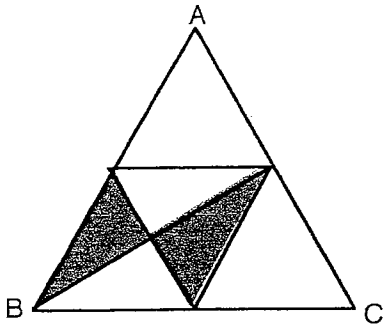
- ◯ 12 and 17
- ◯ 9 and 12
- ◯ 10 and 15
- ◯ 11 and 16

5. This clock is correctly set at 2:45 p.m. A fault in the clock makes it lose 4 minutes every hour.



When the correct time is 7:00 p.m., draw the hands on the second clock face to show what time it would read.

6.



The triangle ABC is equilateral.

What is the ratio of the black triangles to the equivalent sized white triangles?

	:						

---

7. 25300 written in scientific notation is:

- ○ 2.53×10^{6}
- ○ 2.53×10^{-6}
- ○ 2.53×10^{4}
- ○ 2.53×10^{-4}

---

8. The lines below represent two of the sides of a rectangle.

By measurement and calculation, find the perimeter of the rectangle (in millimetres)?

								mm

---

9. What value of Δ would give a mean of 16 for the scores in this table?

Score	Frequency
11	4
18	Δ

- ○ 7
- ○ 9
- ○ 8
- ○ 10

---

10. If Terry spends 24 minutes out of 80 minutes on Section A of his exam paper, what percentage of time remains for Section B?

								%

In each of Questions 11, 12 and 13, there may be more than one correct answer. Fill in every correct answer for each of these questions.

11. Debbie is a hammer thrower and some of her past throws are recorded below, in metres.

58.90	58.70	58.58	58.20	56.52
56.52	56.48	56.40	58.58	57.43

Her modal throw was:

◯ 58.90 ◯ 58.58 ◯ 56.52 ◯ 56.40

---

12. Which of the following statements are true about the fraction $\frac{3}{10}$?

Choose the correct statement(s).

◯ less than 25% ◯ equal to $\frac{30}{100}$

◯ same as 0.3 ◯ more than 33%

---

13. A rectangle has a perimeter of 50 centimetres. Its dimensions could be:

◯ 25 cm by 2 cm ◯ 15 cm by 10 cm

◯ 40 cm by 10 cm ◯ 13 cm by 12 cm

---

14. Which of the following will be equal to 1.9% on the calculator?

◯ 1.9 x 100 ◯ $\frac{1.9}{100}$ ◯ 0.019 ◯ $\frac{100}{1.9}$

End of questions in Section 1 that may require you to fill in more than one correct answer.

15. $97 \times 116 + 3 \times 116 =$

---

16. Jenny calculates her 'scoring rate' (SR) in a game of netball using the formula:

$$SR = \frac{\text{goals scored}}{\text{goals attempted}} \times 100$$

Jenny has scored 30 goals out of 40 attempts.

If she scores 10 goals from the next 10 attempts, by how much would her scoring rate increase?

								%

---

17. Place two of the numbers 2, 6, 13, 21 in the boxes to make a fraction as close as possible to $\frac{1}{4}$.

$$\frac{\square}{\square}$$

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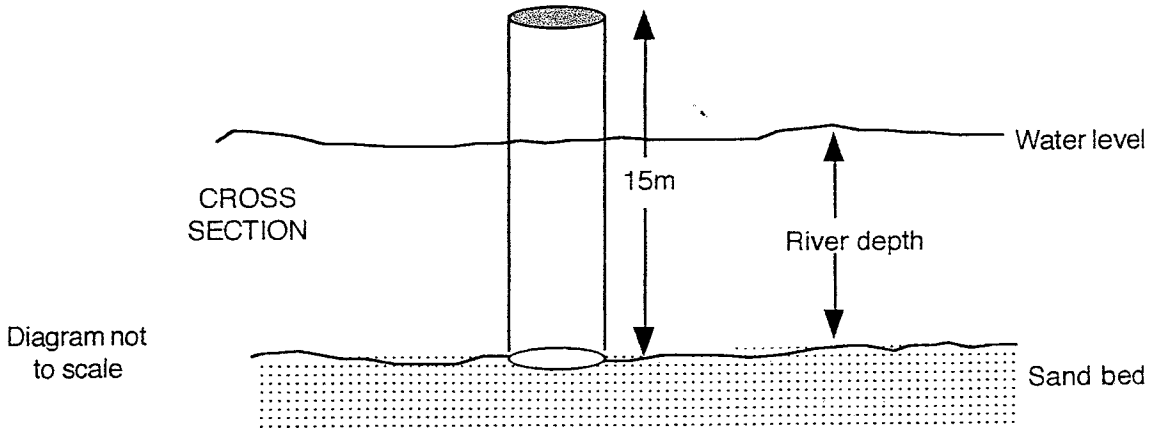
18. A 15 metre length pipe is placed into a river until it reaches the sand bed. A cross-section of the river is shown below. (Diagram not to scale)



The ratio of the length of pipe out of the water to under the water is 3:7.

How deep is the river at the point where the pipe is placed (in metres)?

								metres

---

19. The table shows the percentages of the types of transport taken by school students at a certain school.

BUS	TRAIN	CAR
40%	38%	5%

The school has 560 students. How many travel by car ?

○ 28 ○ 224

○ 56 ○ 280

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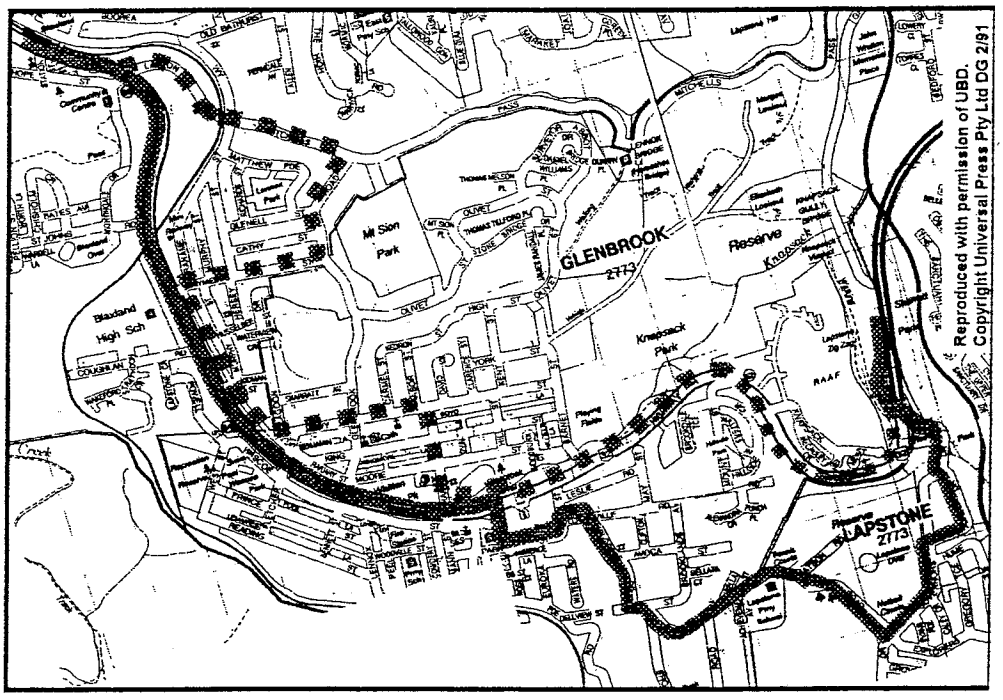
20. The map below shows the region covering the Lower Blue Mountains. If the distance from Lapstone to Glenbrook on this map is 3 kilometres.

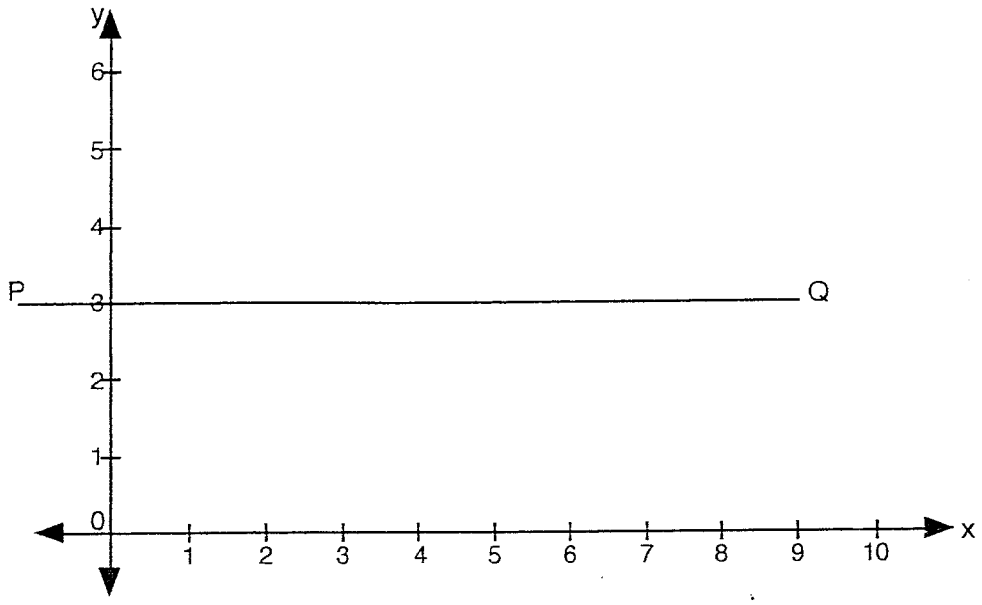


Which of the following would be an estimate of the total area covered by the map?

○ 54 m^2 ○ 5.4 km^2

○ 54 km^2 ○ 540 km^2

21.



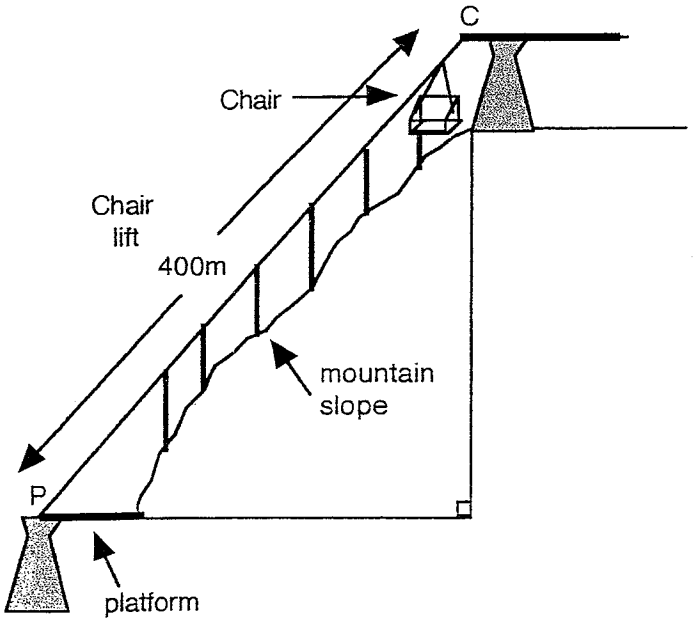
Claudia has drawn the line PQ parallel to the x-axis.

She needs to make a point A which is 2 units from both the line PQ and the y-axis.

The co-ordinates of A could be:

(,)

22.

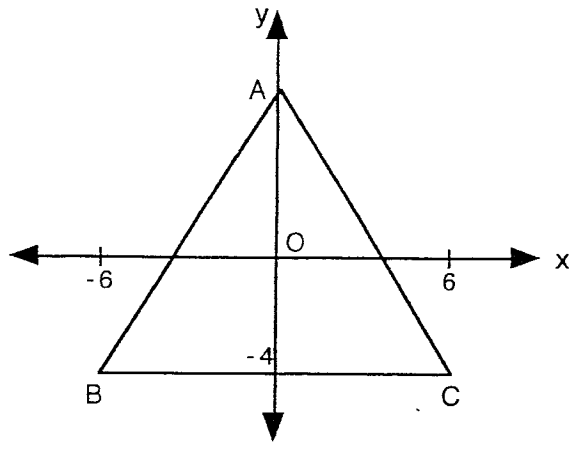


A chair lift operates between C and the platform at P on a mountain slope, length 400 metres. The lift stops for 10 minutes at C and P on each return operation and covers a distance of 20 metres every 30 seconds.

On one morning, the lift leaves C at 8:30 a.m. At what time will the lift return to C for the second time.

		:			a	m	

23.



The triangle ABC is isosceles with AB = AC. BC crosses the y-axis at -4.

If the area of ΔABC is 72 square units, at what point does A lie on the y-axis ?

○ 6 ○ 3

○ 4 ○ 8

---

24. In a class of 24 students there are 14 boys. On Monday 2 boys are absent. What is the probability of selecting a girl from this class, on Monday, at random?

○ $\frac{5}{11}$ ○ $\frac{5}{12}$

○ $\frac{6}{11}$ ○ $\frac{7}{12}$

---

25. Half of $\frac{x}{10}$ =

○ $\frac{2x}{5}$ ○ $\frac{x}{10} \div \frac{1}{2}$

○ $\frac{x}{5}$ ○ $\frac{x}{20}$

END OF SECTION 1

South Sydney High School

TRIAL SCHOOL CERTIFICATE EXTERNAL TEST

MATHEMATICS SECTION 2

PART A QUESTION BOOKLET

Directions to students

1. You are allowed 90 minutes to answer A L L of Section 2.

2. Section 2 has TWO parts.

Part A:	Questions 26-75	(50 marks)
Part B:	Questions 76 - 80	(25 marks)

3. Attempt A L L questions in Section 2.

4. Calculators M A Y be used in Section 2.

5. The formulae listed on page 4 of the Instruction Booklet may be used in Section 2.

6. Write your answers to Section 2 Part A in the spaces provided.

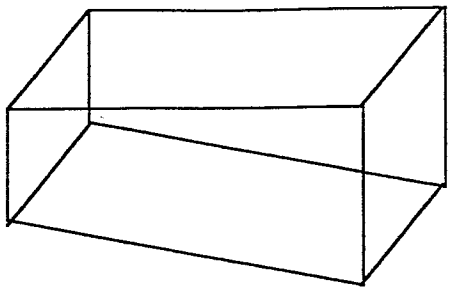
This paper **must not be removed** from the examination room

Student name:_____

SECTION 2

PART A

The diagram shown may be used to answer Questions 26 and 27.



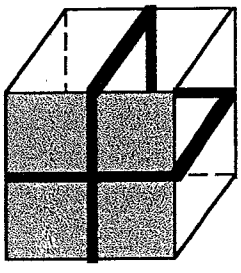
26. Swimming pools used for racing, slope uniformly from one end to the other. The geometric name of these pools would be:

- ◯ rectangular prisms
- ◯ trapezoidal prisms
- ◯ square prisms
- ◯ they have no name as they are made of two different shapes

27. The shape of the bottom of the pool is a:

- ◯ trapezium
- ◯ rectangle
- ◯ square
- ◯ has no name as it is sloping

28.



A piece of tape is wrapped around all the faces of the cube shown exactly once. What is the length of tape?

								cm

---

29. The XPT train travels at 120 km/h. How many minutes will it take to travel the 40 kilometres between Strathfield and Penrith?

								minutes

---

30. The square (☐) represents the number missing from the pattern below. What is the number?

7, 15, 31, ☐ 87, 127, 175

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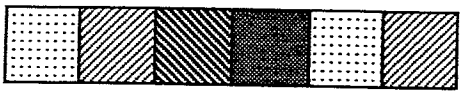
31. The diagram below shows part of a tiled border.



If the border is extended, the 101st tile shape will be:

---

32. The cost (C) in dollars of a taxi ride in Sydney, is given by the formula:

$C = 0.75 \times D + 2$, where D is the distance of the ride in kilometres.

The cost of a 24 kilometre ride is:

$

---

33. During the recent water crisis in Sydney students had to fill a 375 mL bottle each day with clean water from a large cylindrical vessel. The large vessel could hold 30 Litres. How many bottles could it fill?

---

34. The table below shows the exchange rate for the Australian dollar against other countries:

WHAT YOUR DOLLAR BUYS:				
Canadian dollar	1.03		Malaysian ringgit	1.88
French franc	4.35		NZ dollar	1.08
German mark	1.29		Singapore dollar	1.06
HK dollar	5.79		Swiss franc	1.08
Indonesian rupiah	1816		Thai baht	17.7
Italian lira	1268		US dollar	0.751
Japanese yen	85.3		UK pound	0.458

How many Japanese yen can be bought with $200 Australian?

---

35. Which competitor achieved both the lowest score on the beam and the highest score on the bars?

GYMNASTICS SCORES			
	Beam	*Vault*	*Bars*
Natasha	9.40	9.85	9.70
Tania	9.85	9.20	9.75
Heather	9.40	9.50	9.75
Ayumi	9.62	9.85	9.65

---

36. In the clocks below, the times in London (UK), Perth (Australia) and Suva (Fiji) are all shown using the 24 hour time system.

London

1	2	:	0	0

Perth

2	0	:	0	0

Suva

		:		

Perth is 8 hours ahead of London and 4 hours behind Suva.

What time is it in Suva ?

		:		

---

37. Tim makes the following statements concerning a rhombus:

I. The diagonals bisect each other.

II. The diagonals are equal.

III. The diagonals bisect the angles.

He is correct in:

- ○ I, II and III
- ○ I and II only
- ○ I and III only
- ○ II and III only

---

38. The odometer readings for a truck at the start and finish of a job are as follows:

START	7	5	2	9	6
FINISH	7	6	2	4	8

If the trip took 8 hours, what is the truck's average speed in kilometres per hour?

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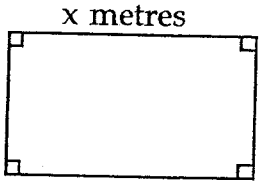
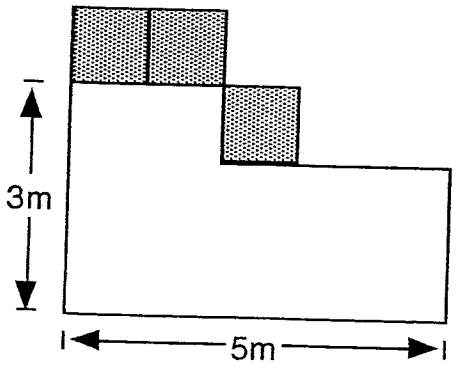
39. The width of a rectangle is 2 metres shorter than its length. If the perimeter is 20 metres, the value of x is:



- ○ 10
- ○ 6
- ○ 12
- ○ 7.3

40.



Lee is laying sandstone pavers around her pool.

Each paver is 1 metre by 1 metre. How many more pavers does Lee need to lay?

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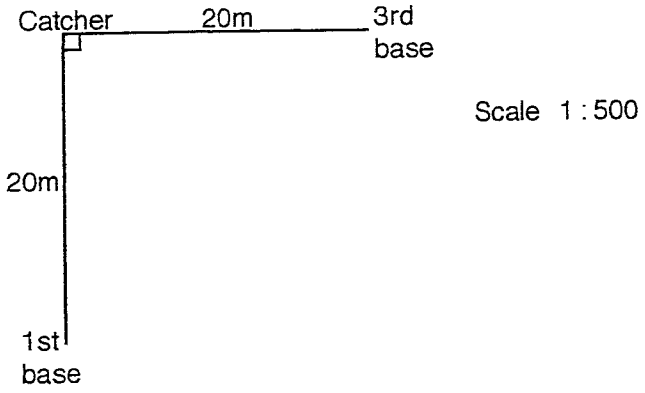
41. A school's Physical Education Head Teacher is designing a softball pitch. He has drawn a scale diagram of the field as shown below:



The pitcher is to stand 12.5 metres from the catcher, between 1st and 3rd base. Using geometrical instruments, place an X where the pitcher stands.

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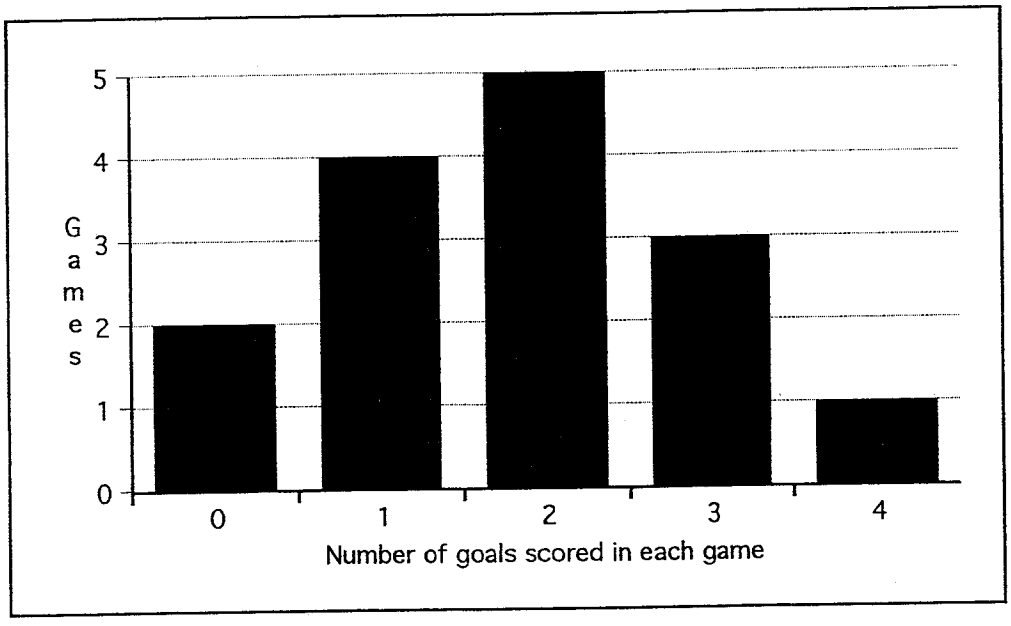
42. The following graph shows how a team's soccer goals for a season were scored.



What was the average number of goals scored per game?

---

43. A number is decreased by 5 and the result is doubled to equal 85. Which equation could represent this information?

- ○ $(x - 5) + 2 = 85$
- ○ $x - 10 = 85$
- ○ $2x - 5 = 85$
- ○ $2x - 10 = 85$

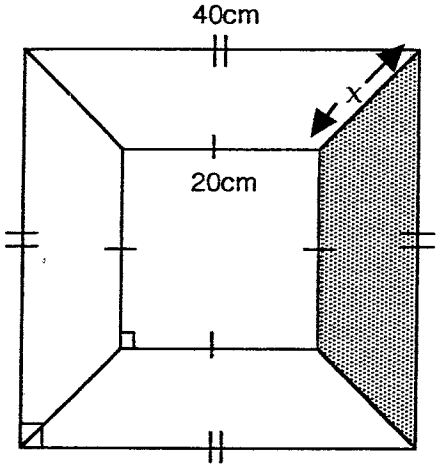
---

44. Kira forms the following number pattern.

The first 6 numbers are: -1, 1, -2, 2, -3, 3, ...

What is the sum of the first 100 numbers in Kira's pattern?

Use the diagram below to answer Questions 45 and 46.



A backing board for a picture frame (40cm x 40cm) has a section (20cm x 20cm) cut from its centre.

45. What is the area of the shaded section, in cm^2?

46. What is the length of x in the frame? (Give your answer to 2 decimal places).

Each of Questions 47, 48 and 49 may have more than one correct answer. Fill in every correct answer for each of these questions.

---

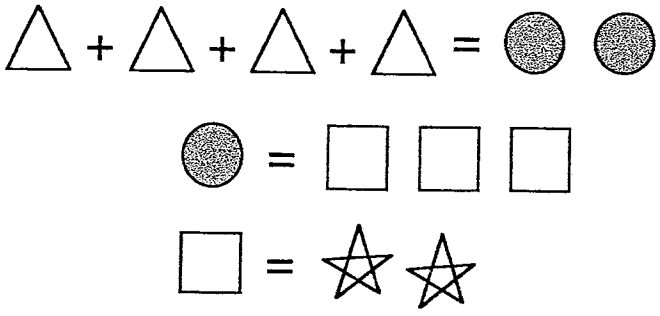
47. A formula for finding the sum (S) of the angles in a regular polygon is:

$S = (2n - 4) \times 90^\circ$, where n is the number of sides in the figure.

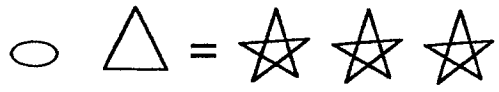
Which of the following formula could give the same result?

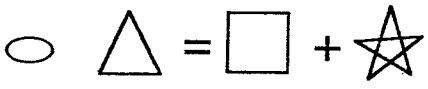
- ◯ $S = (n - 2) \times 45^\circ$
- ◯ $S = 4(n - 2) \times 45^\circ$
- ◯ $S = (n - 2) \times 180^\circ$
- ◯ $S = 4(n - 8) \times 180^\circ$

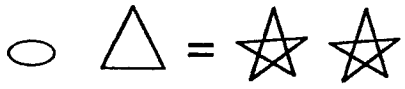
48.



Using the code shown above, which of the following would be true?







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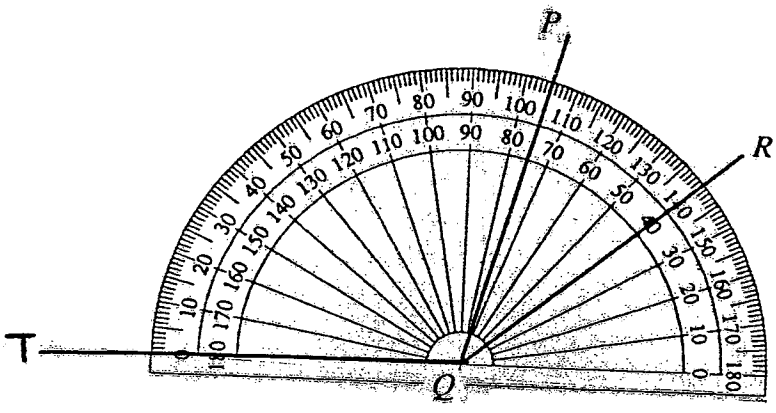
49. A student uses a protractor to measure different angles.



Which of the following statements is correct?

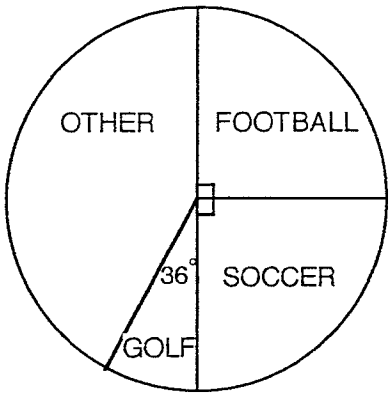
- ○ ∠TQP=75°
- ○ ∠PQR=35°
- ○ ∠TQR=40°
- ○ ∠TQR=140°

End of questions in Section 2 that may require you to fill in more than one correct answer.

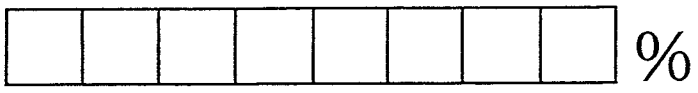
Now go on to Questions 50 to 75.

Refer to the graph below to answer Questions 50 and 51.

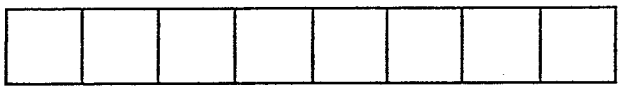
The sector graph shows how much time a school spends on different sports.



50. What percentage of the school's time is spent on golf?



51. The school spends 5 hours on football. What is the total number of hours spend on all sports?



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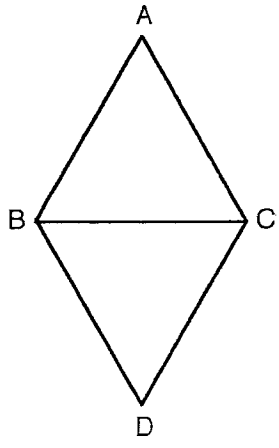
52. In the diagram, ΔABC and ΔBCD are equilateral, what shape best describes ABCD?

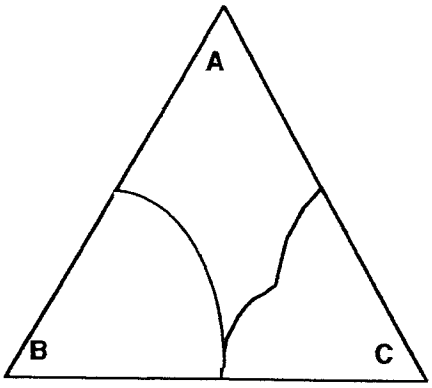


○ square ○ kite

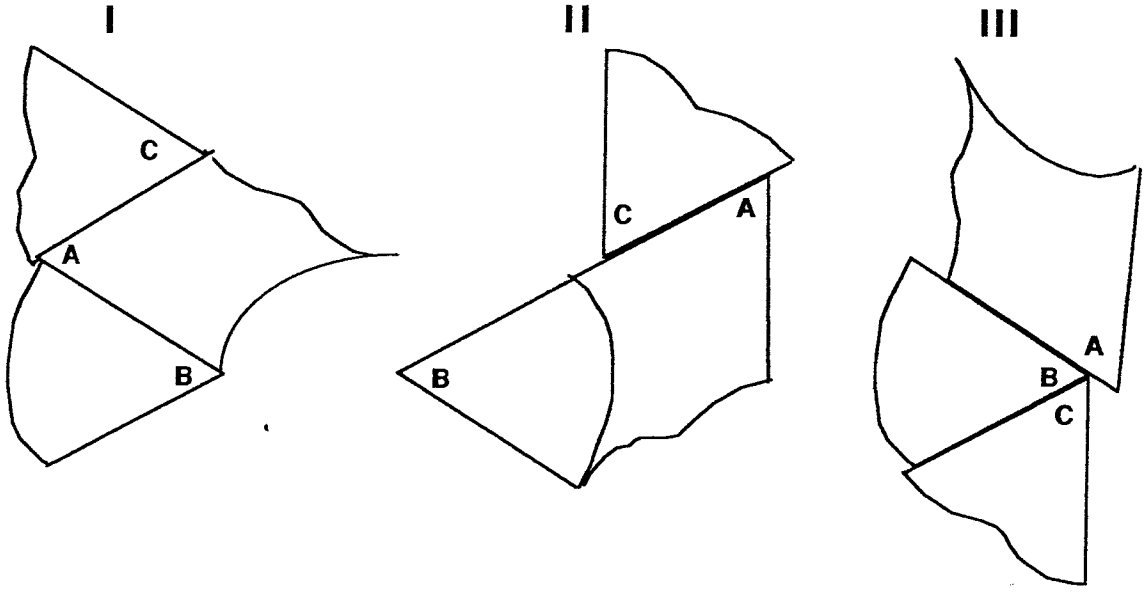
○ trapezium ○ rhombus

---

53. A triangle is to be painted in three different colours labelled A, B and C and then each part cut from the triangle and placed together to make different designs.



Three different designs are shown below:



In which diagram(s) would: $\angle A + \angle B + \angle C = 180^\circ$

- ○ II only
- ○ I and II
- ○ II and III
- ○ I, II and III

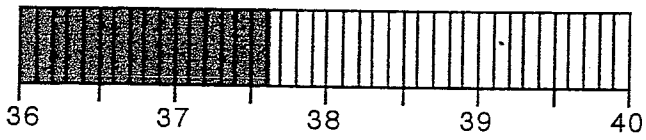
---

54. Tony Lockett has a kicking average of 4.95, as shown in the following table.

PLUGGER WATCH			
All-time leading goal scorers			
	Goals	Games	Average
Gordon Coventry	1299	306	4.25
Tony Lockett	1268	256	4.95
Jason Dunstall	1252	268	4.67
Doug Wade	1057	267	3.96
Gary Ablett	1030	248	4.15

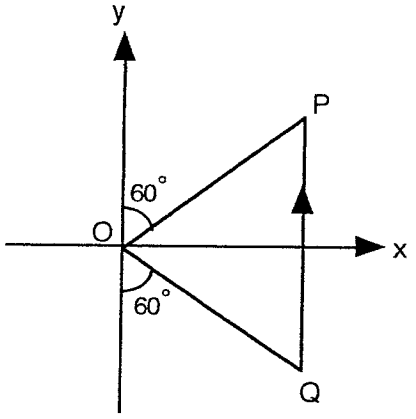
If he wishes to increase his average to 5.00 by the time he has played 300 games, how many more goals must he score?

55. A person's temperature can be measured with a thermometer. A 'normal' reading is 37.6° C as shown below:



A person with a high temperature is 1.5° above normal. Complete the shading on the thermometer to show this high temperature.

56.



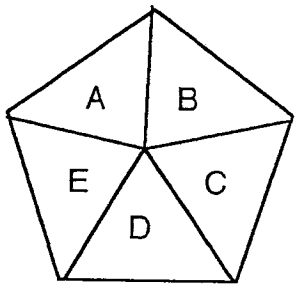
In the diagram, PQ is parallel to the y-axis.

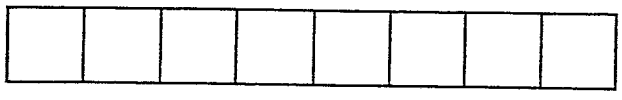
Triangle POQ is:

- ⬭ equilateral
- ⬭ right angled
- ⬭ isosceles
- ⬭ scalene

---

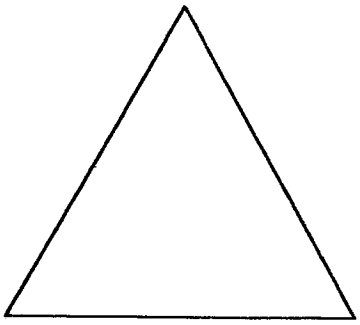
57. A spinning wheel for a game is divided into 5 equal parts as shown. What is the angle at the centre of each part?



 degrees

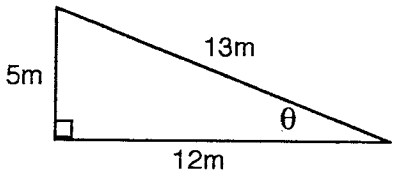
---

58. Imran has to make a triangular pyramid by folding this equilateral triangle. Indicate, by drawing lines on the triangle, where Imran must make his folds.



---

59. In the triangle below, the value of sin θ would be:



○ $\frac{12}{13}$ ○ $\frac{13}{12}$

○ $\frac{5}{13}$ ○ $\frac{13}{5}$

---

60. The following table shows the number of frequent flyer points required in order to travel free to various destinations in either economy, business or first class travel with Qantas.

Zone	Maximum distance (km)	POINTS REQUIRED		
		Economy	Business	First
1	0 - 1,240	9,000	11,250	13,500
2	1,241 - 1,700	17,000	21,250	25,500
3	1,701 - 2,900	25,000	31,250	37,500
4*	2,901 - 11,000	30,000	37,500	45,000
5**	2,901 - 7,300	30,000	45,000	60,000
6**	7,301 - 11,000	40,000	60,000	80,000
7	11,001 - 14,600	60,000	90,000	120,000
8	14,601 - 20,000	80,000	120,000	160,000
9	20,001 - 31,000	100,000	150,000	200,000
10	31,000 - 50,000	130,000	195,000	260,000
11	50,001 - 70,000	150,000	225,000	300,000

* Wholly domestic Australia flights ** International flights

A person has 120 000 points. What is the maximum distance this person can travel?

km

---

61. A solid figure is constructed using 4 congruent triangles and a square.

The figure could be a:

- ○ triangular prism
- ○ triangular pyramid
- ○ square pyramid
- ○ hexagon

---

62. A local high school conducted a survey at the Principal's request, on how students travelled to and from school. The information collected is shown below:

TRANSPORT	DATA
Car	234
Bus	810
Foot	???
Cycle	48

It was noted that 19.5% of students arrived by car.

How may students arrived at the school by foot?

63.

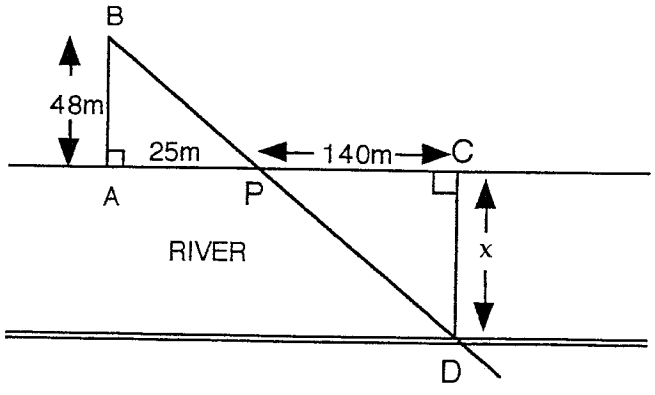
X	0	1	2	3	15
Y	11	9	7	5	

The missing number in the number pattern shown is:

- ○ -19
- ○ -2
- ○ 0
- ○ 3

---

64. The diagram below shows that A, P and C are 3 points on a river bank with B being 48 metres in a straight line from the bank. D is a point on the other bank, directly opposite C.

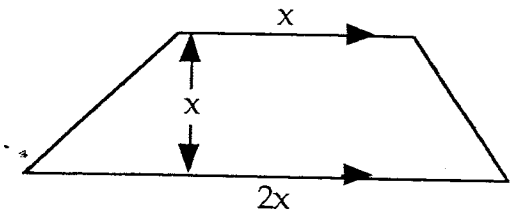


What is the width of the river between C and D, indicated by x in the diagram?

								metres

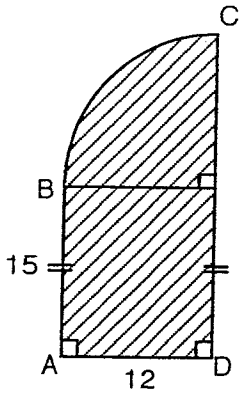
65.

Which expression correctly gives the area of the trapezium?



- ○ $3x^2$
- ○ $3x + \frac{x}{2}$
- ○ $6x^2$
- ○ $\frac{3x^2}{2}$

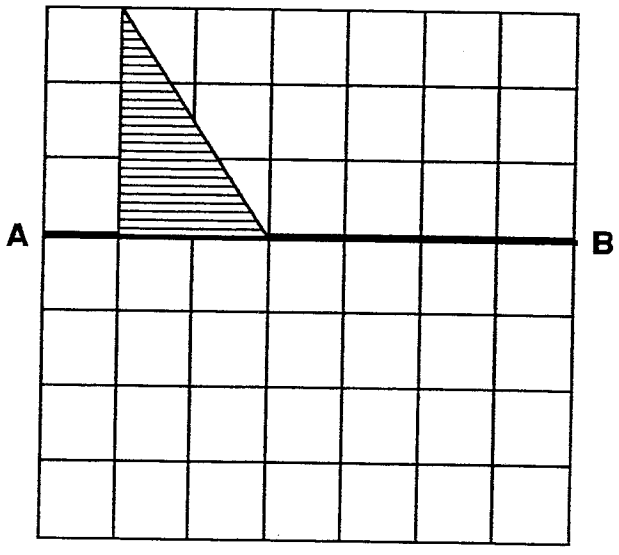
66.



The diagram shows a window made from a rectangle and quarter circle. Which of the following would be a correct way to calculate the perimeter of the window ABCD?

- ○ $(2 \times 15) + (2 \times 12) + 6\pi$
- ○ $(3 \times 15) + (2 \times 12) + 12\pi$
- ○ $(2 \times 15) + (3 \times 12) + 3\pi$
- ○ $(3 \times 15) + 12 + 6\pi$

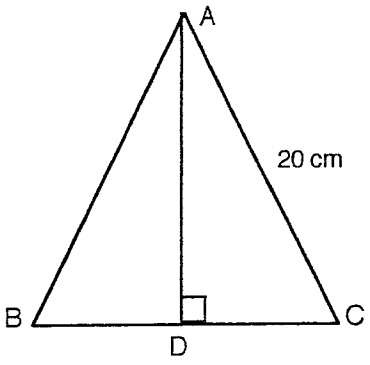
67.



The triangle is to be <u>reflected</u> in the line AB and <u>then translated</u> 4 units to the right.

Show the transformations on the grid.

68.



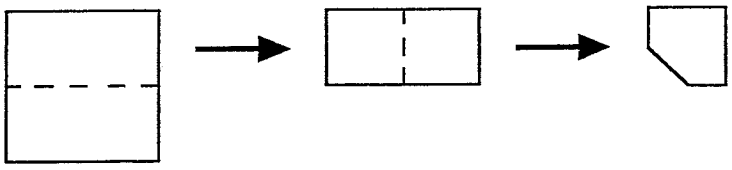
In the diagram, triangle ABC is isosceles.

The length of AD is:

- ◯ equal to AB
- ◯ more than 20cm
- ◯ less than 20cm
- ◯ equal to 20cm

---

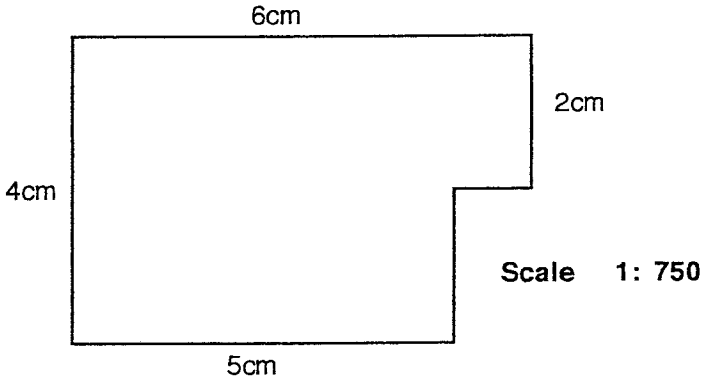
69. A square piece of paper is folded twice along the dotted lines and a corner is cut out of the shape formed, as shown. When the paper is unfolded, what shape was cut from the middle ?

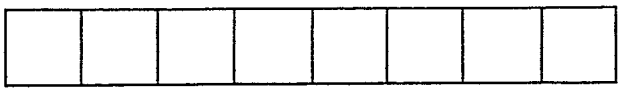


- ◯ triangle
- ◯ rhombus
- ◯ rectangle
- ◯ square

---

70. Below is a scale drawing of a property. What is the perimeter of the property <u>in metres</u>?



 metres

---

71. A pair of shoes is increased in price by 15% and sells for $92. What was the price increase, in dollars?

○ $80 ○ $13.80 ○ $12 ○ $78.20

---

72. For the scores: 20, 25, 45, 50, and 50, which statement is correct?

○ The mode is less than the mean
○ The median is greater than the mean
○ The range is greater than the median
○ The mean is smaller than the range

---

73. If $a = -2$, then $2a^2 =$

○ 16 ○ -16 ○ 8 ○ -8

---

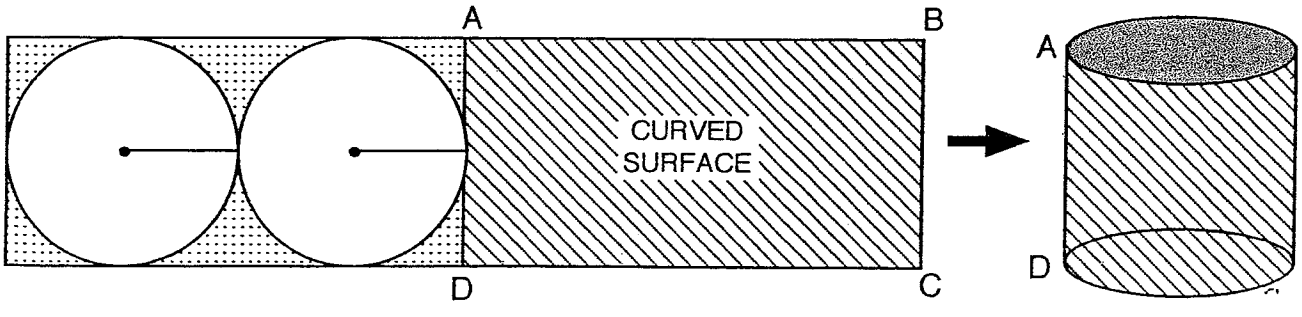
74. Nick's tap loses 5 mL of water every 2 minutes. Harry's tap loses 250 mL every hour. What is the ratio of Nick's to Harry's loss of water, from their taps ?

○ 1:50 ○ 1:125 ○ 3:2 ○ 3:5

---

75. A cylinder is to be made from a piece of cardboard as shown, with minimal wastage. (There is no gap between the circles, the rectangular section or the end of the cardboard).

The circular top and base are exactly 10cm radii. B is to meet A when ABCD forms the curved surface of the cylinder.



What is the area of the rectangle ABCD, representing the curved surface of the cylinder?

○ 20π ○ 100π

○ 400π ○ 800π

END OF PART A.....GO ON TO PART B

South Sydney High School

TRIAL SCHOOL CERTIFICATE EXTERNAL TEST

MATHEMATICS SECTION 2

PART B QUESTION BOOKLET

Directions to students

1. You are allowed 90 minutes to answer A L L of Section 2.

2. Section 2 has TWO parts.

Part A:	Questions 26-75	(50 marks)
Part B:	Questions 76 - 80	(25 marks)

3. Attempt A L L questions in Section 2.

4. Calculators M A Y be used in Section 2.

5. The formulae listed on page 4 of the Instruction Booklet may be used in Section 2.

6. Write your answers to Section 2 Part B in this booklet.

7. Necessary working should be shown.

This paper **must not be removed** from the examination room.

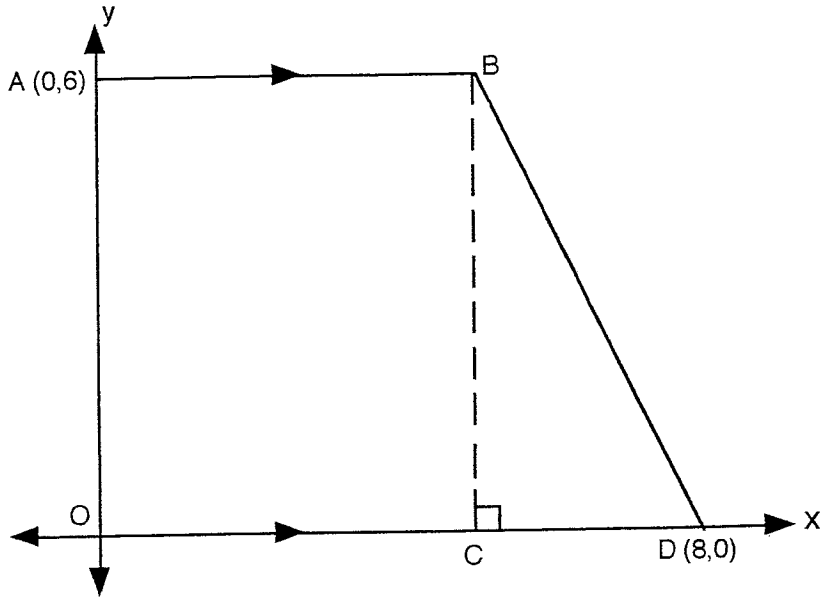
Student name:_____

SECTION 2

PART B

Question 76 (5 marks)

In the diagram, the length of CD is 3 units.



a) Write down the co-ordinates of B.

_____

b) What is the area of the rectangle ABCO ?

_____

c) What is the area of the figure ABDO ?

_____

_____

d) What geometric shape is the figure ABDO ?

_____

e) Calculate the length of AD.

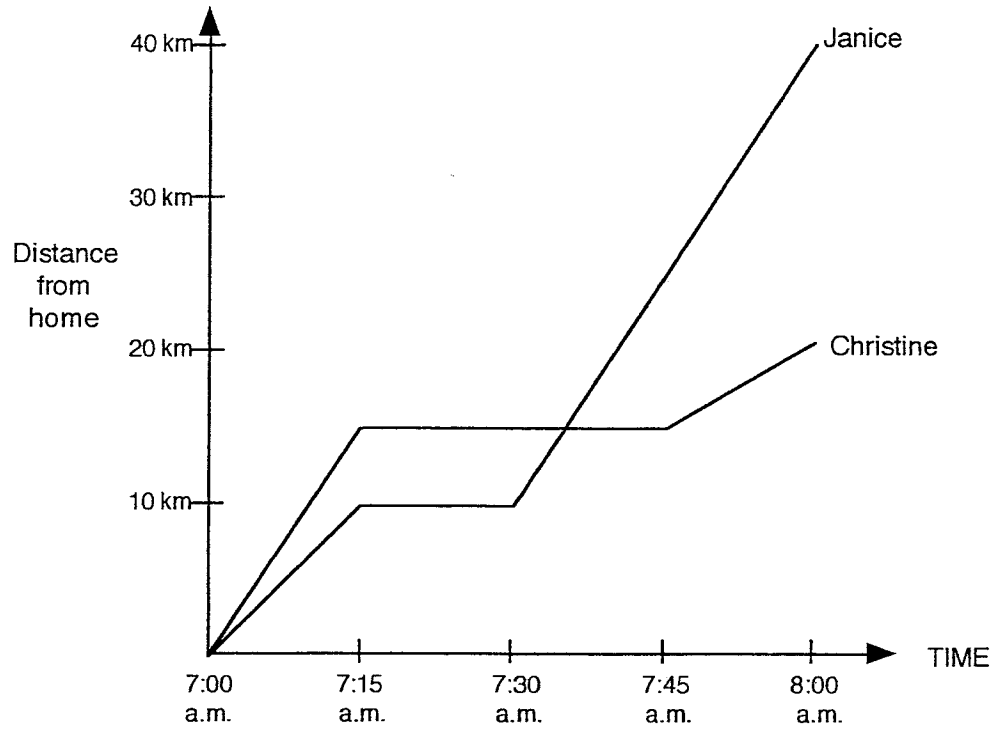
_____

_____

_____

Question 77 (5 marks)

Christine, Michael and Janice leave home to go to work. The travel graphs of Janice and Christine are shown below. Janice drives to the train station for her journey and Christine drives to the bus station for her journey.



a) How many more minutes did Christine wait to catch the bus, than Janice waited for her train?

_____

b) How much further is Janice's work than Christine's work from the stations where they caught public transport?

_____

c) What percentage of total time from home to work did Christine spend waiting for the bus?

_____

_____

d) Michael also leaves home at 7 a.m. and drives to work 30 km away, arriving at 8:00 a.m. Draw a line graph on the diagram above to indicate Michael's journey.

e) Which person, Christine, Michael or Janice, travelled the slowest between 7 a.m. and 7:15 a.m.? Give a reason for your answer.

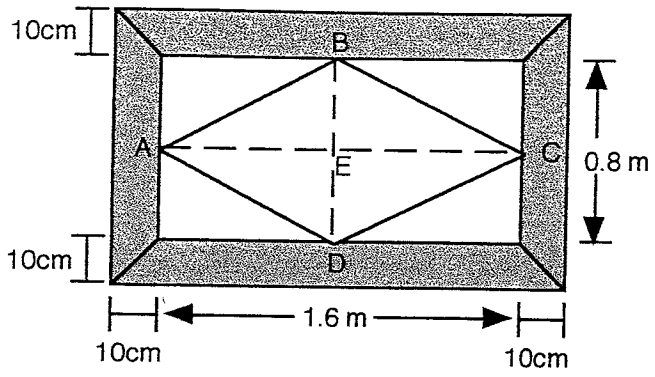
_____

_____

_____

Question 78 (5 marks)

Lisa and John are going to renovate a feature window at their home measuring 1.6 metres by 0.8 metres, plus a timber frame.



The shaded section is the timber frame around the window that is moulded at 45° angles at each corner as shown. The frame is 10 cm wide.

The section ABCD is a stained glass section of the window.

a) Allowing for the moulded corners, what length of timber is required for the frame ?

_____

b) What shape is the stained glass ?

_____

c) Calculate the area of the stained glass used in the window ?

_____

_____

d) What percentage of the glass used in the window is the <u>stained glass section</u> labelled ABCD ?

_____

e) The stain glass used costs $\frac{4}{5}$ of the total cost of glass in the window. If each section of stained glass of size BEC costs $120, what is the total cost of glass used in the window?

_____

_____

Question 79 (5 marks)

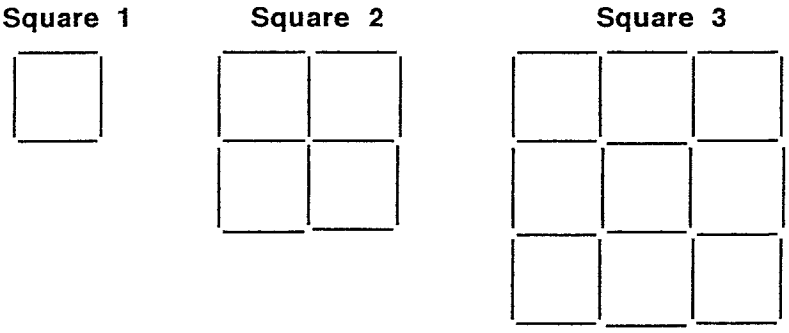
Use this pattern to answer the following questions:

$4 = 1 \times 4$
$12 = 2 \times 6$
$24 = 3 \times 8$

a) Complete the next line in the pattern.

_____

b)

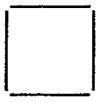


Each square is made with matchsticks. How many matchsticks will appear in Square 4 of the diagram?

_____

c) The diagram is extended to Square 10. How many matchsticks will appear in Square 10?

_____

d) What will be the total number of squares of this size  in the Square 10 diagram?

_____

_____

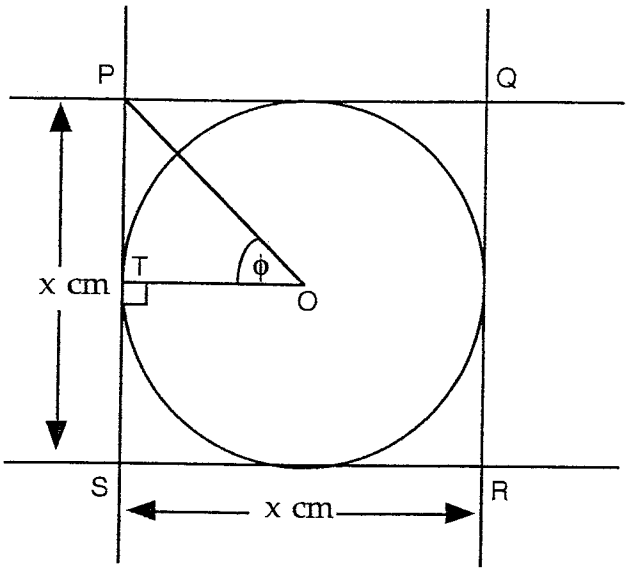
e) What is the largest square diagram that can be formed using 1000 matchsticks?

_____

_____

Question 80 (5 marks)

A circle is to be cut from a piece of square cardboard of side x cm, labelled PQRS in the diagram. Point O is the centre of the cardboard. OT is the radius of the circle.



a) Write an algebraic expression for the area of the square PQRS?

_____

b) Write an expression which gives the area of ΔOTP.

_____

c) Write a formula for the area of the circle in terms of π and x.

_____

_____

d) Write an expression for the area of cardboard remaining after the circle is cut out.

_____

_____

e) Write down the size of $\angle POT$ (Φ) in the diagram.

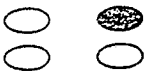
_____

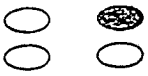
END OF TEST

Trial School Certificate Mathematics
Section 1. SOLUTIONS

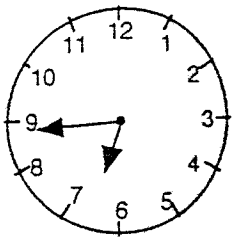
1. 10000000

2. 

3. 

4. 

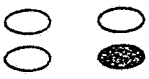
5. 6:43 drawn on clock face



6. 2:6 or 1:3

7. 

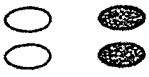
8. 120

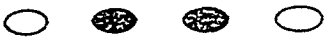
9. 

10. 70

11. 

12. 

13. 

14. 

15. 11600

16. 5%

17. $\frac{6}{21}$

18. 10.5

19. 

20. 

21. (2,5) or (2,1) or (-2,1) or (-2,5)

22. 9:40

23. 

24. 

25. 

Trial School Certificate Mathematics
Section 2. Part A. SOLUTIONS

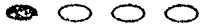
26. 

27. 

28. 80 cm

29. 20

30. 55

31. 

32. 20

33. 80

34. 17000

35. Heather

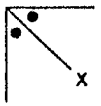
36. 24:00

37. 

38. 119

39. 

40. 17

41. 

42. 1.8

43. 

44. 0 or zero

45. 300

46. 1.1.1

47. 

48. 

49. 

50. 10%

51. 20

52. 

53. 

54. 232

55. Shaded to 39.1

56. 

57. 72

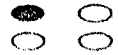
58. 

59. 

60. 31000 km

61. 

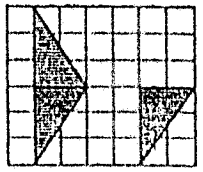
62. 108

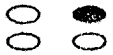
63. 

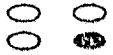
64. 268.8

65. 

66. 

67. 

68. 

69. 

70. 150

71. 

72. 

73. 

74. 

75. 

Trial School Certificate Mathematics
Section 2. Part B. SOLUTIONS

Question 76

a) (5,6) (1)

b) $5 \times 6 = 30$ units^2 (1)

c) $\frac{1}{2}(6)(5+8) = 39$ units^2 (1)

d) Trapezium (1)

e) $AD^2 = 6^2 + 8^2$
$= 100$
$AD = 10$ (1)

Question 77

a) 15 mins (1)

b) 25 km (1)

c) 50%

d) Graph for Michael (1)

e) Michael (1)

Question 78

a) $(2 \times 1.8) + (2 \times 1) = 5.6$ m (1)

b) Rhombus (1)

c) $A = \frac{1}{2} \times 1.6 \times 0.8 = 0.64$ m^2 (1)

d) $\frac{0.64}{1.28} = 50\%$ (1)

e) $480 \times \frac{5}{4} = \$600$ (1)

Question 79

a) $40 = 4 \times 10$ (1)

b) 40 (1)

c) 220 (1)

d) 110 (1)

e) Square 21 (1)

Question 80

a) x^2 cm^2 (1)

b) $\frac{1}{2} \times \frac{x}{2} \times \frac{x}{2} = \frac{x^2}{8}$ cm^2 (1)

c) $A = \pi r^2$
$= \pi \left(\frac{x}{2}\right)^2$
$= \frac{\pi x^2}{4}$ cm^2 (1)

d) $x^2 - \frac{\pi x^2}{4}$
$= x^2\left(1 - \frac{\pi}{4}\right)$ (1)

e) $\tan \phi = \frac{\frac{x}{2}}{\frac{x}{2}}$
$= 1$
$\phi = 45^\circ$ (1)