2008 School Certificate Test
Mathematics

Section 1

25 marks
Time allowed for this section is 30 minutes

Answer Questions 1–25 in the spaces provided

Calculators are NOT to be used in this section

There will be a short break between Section 1 and Section 2

S2

Answer the questions in the spaces provided.

___

1 To evaluate $10 - 3 \times 2$, which operation would you do first: subtraction or multiplication?

....

2 A standard six-sided die is numbered from 1 to 6.

What is the probability of rolling a 5?

....

....

3 Ellen has $10 more than Angela. In total they have $36.

How much money does Ellen have?

....

....

....

4 One day at Mawson Station in Antarctica, the maximum temperature was recorded at 2°C and the minimum temperature was −6°C.

What is the difference between these temperatures?

....

5 The pulse rates of 17 people are recorded in the stem and leaf plot below.

5	4					
6	2	8	8			
7	0	2	2	2	6	8
8	4	4	6			
9	0	2	2	8		

What is the median pulse rate?

....

6 Between which two consecutive whole numbers does $\dfrac{7}{2}$ lie?

....

....

7 The diagonals of this rectangle intersect at a point.

What are the coordinates of this point?

....
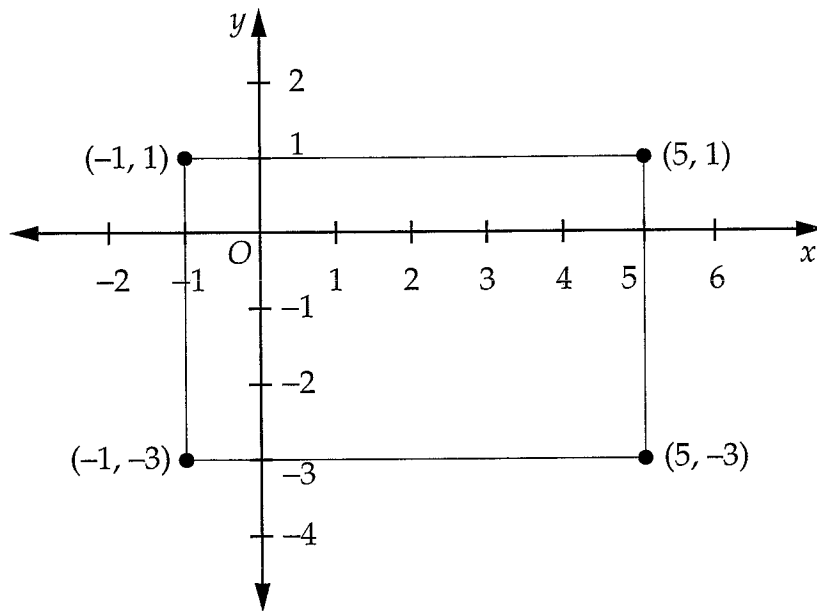
8 Complete the next line of this pattern.

$$7^2 = 100 - 6 \times 10 + 9$$
$$17^2 = 400 - 6 \times 20 + 9$$
$$27^2 = 900 - 6 \times 30 + 9$$
$$37^2 = \boxed{}$$

9 What is a half of one fifth?

....

....

10 The volume of this rectangular prism is 18 cm³.
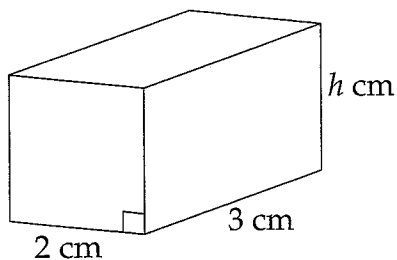
NOT TO SCALE

What is the value of h?

....

....

11 John has a bag of 15 marbles. The probability of selecting a yellow marble from the bag is $\frac{2}{3}$.

How many yellow marbles are in the bag?

....

....

12 The gold in Pharaoh Tutankhamen's coffin has a mass of 110 kg.

If 1 gram of gold is worth $30, what is the value of the gold in the coffin?

....

....

13 Express 2.5×10^{-3} in decimal form.

....

....

14 The relationship between the length of your forearm in centimetres and your height in centimetres can be given by the formula

$$\text{Height} = 4.3 \times \text{length of forearm} + 62$$

A girl's forearm is 20 cm long.

Use the formula to calculate her height.

....

....

....

15 Carl was asked to add $\frac{19}{20}$ and $\frac{14}{15}$. Before using his calculator, Carl estimated that the answer should be close to 2.

Explain how Carl could have done this by estimation.

....

....

16 Brad finds the value of x in the following diagram to be 70.

What reason could he then give that y is also equal to 70?

NOT TO
SCALE

....

....
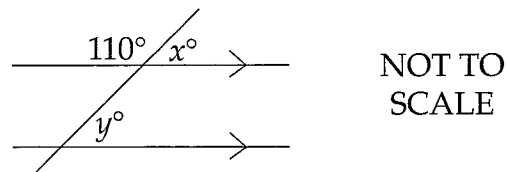
17 The recommended daily intake of iron is 15 milligrams. One serving of cereal contains 3 milligrams of iron.

What percentage is this of the recommended daily intake?

....

....

....

18 *ABCD* is a rectangle where *BC* = 16 m and *CD* = 6 m. The midpoint of *AD* is *E*.
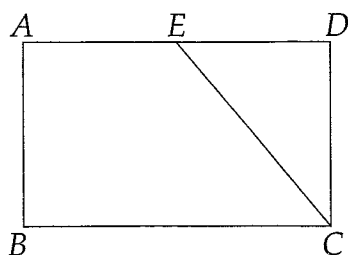
NOT TO
SCALE

Find the length of *EC*.

....

....

....

19 The odometer on a car reads 82 928 km.

| 8 | 2 | 9 | 2 | 8 |
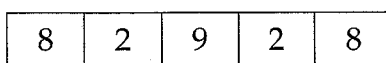
This is a palindromic number because it reads the same forwards as backwards.

What will be the next palindromic number to appear on the odometer?

....

....

20 Figure *ABCD* is a kite. The diagonals intersect at *E*.
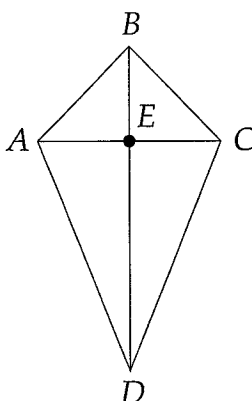
By using the properties of a kite, state another fact about *E*.

....

....

21 Write 0.017 as a percentage.

....

22 A set of four numbers has a range of 4 and a mean of 4. None of the numbers is 4.

Write a set of possible numbers.

....

....

23 The circumference of this circle is 31.4 cm. The diameter is 10 cm.
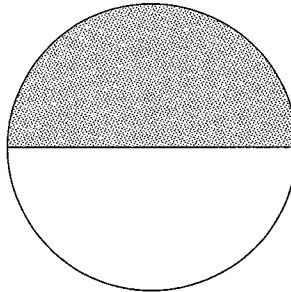
Calculate the perimeter of the shaded semi-circle.

....

....

....

24 At each vertex of a cube three faces meet. The vertices of a cube are numbered 1 to 8. The same number is written near the vertex on every face. One view of the cube is shown.
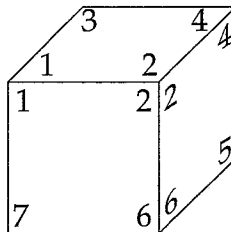
What is the sum of all the numbers on the cube?

....

....

25   The diagram shows a road from A to B and a mobile phone tower T. The distance from A to B is 60 km, and the tower has a transmitting range of 25 km.

Using the given scale and your geometrical instruments, mark on the diagram the section of the road on which there is mobile phone reception.

Scale 1 cm = 5 km

A •——• B

• T

End of Section 1

– 10 –

2008 School Certificate Test

Mathematics

Section 2

75 marks

Time allowed for this section is
1 hour and 30 minutes

This section has TWO parts

Part A – Questions 26–80   55 marks
Part B – Questions 81–84   20 marks

Calculators may be used in this section

Do not commence Section 2 until you are
instructed to do so

Part A

Questions 26–80   55 marks

Use the Section 2 – Part A Answer Sheet for Questions 26–80.

Instructions for answering multiple-choice questions

- For Questions 26–75, select the alternative A, B, C or D that best answers the question. Fill in the response oval completely.

  Sample: 2 + 4 =   (A) 2   (B) 6   (C) 8   (D) 9

  A $\bigcirc$ B $\bullet$ C $\bigcirc$ D $\bigcirc$

- If you think you have made a mistake, put a cross through the incorrect answer and fill in the new answer.

  A $\bullet$ B $\times$ C $\bigcirc$ D $\bigcirc$

- If you change your mind and have crossed out what you consider to be the correct answer, then indicate the correct answer by writing the word *correct* and drawing an arrow as follows.

  A $\times$ B $\times$ C $\bigcirc$ D $\bigcirc$

  correct

26 Which diagram correctly labels the sides of the triangle in relation to angle θ?

(A)

adjacent / hypotenuse / opposite / θ

(B)

hypotenuse / adjacent / opposite / θ

(C)

adjacent / hypotenuse / opposite / θ

(D)

opposite / hypotenuse / adjacent / θ
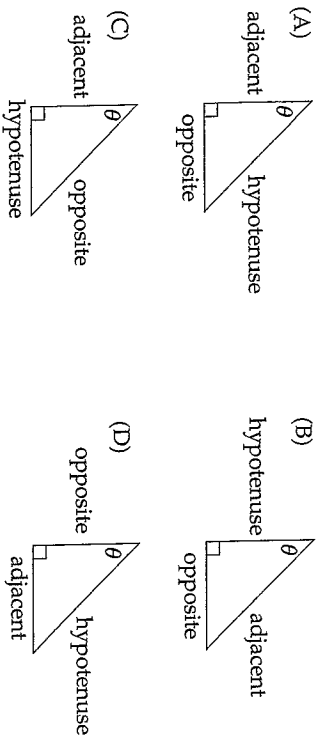
27 Simplify $a^6 \div a^2$.

(A) 1^3 (B) 1^4 (C) a^3 (D) a^4

28 Which of the following is seven million, twenty thousand and forty?

(A) 702 400   (B) 720 040   (C) 7 002 040   (D) 7 020 040

29 Sydney is 2 hours behind Fiji. A plane leaves Sydney at 8.00 am and flies to Fiji. The flight takes 4 hours and 30 minutes.

What time is it in Fiji when the plane arrives?

(A) 2.30 pm   (B) 10.30 am   (C) 12.30 am   (D) 12.30 pm

30 What value of y satisfies the inequality $5y < -15$?

(A) -4 (B) -3 (C) 0 (D) 3

31 Chris is buying a new car.

The car can be

- a hatchback, sedan or wagon
- red, blue, yellow, white or black
- manual or automatic

Using this information, how many different choices of car does Chris have?

(A) 10   (B) 15   (C) 16   (D) 30

-13-

32 Which of the following is equivalent to $\sin x°$?

3 / 4 / 5 / $x°$ / $y°$
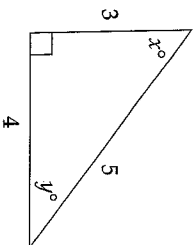
(A) $\cos x°$ (B) $\sin y°$ (C) $\cos y°$ (D) $\tan x°$

33 Simplify $3n - 15 + 2n - 2$.

(A) $n - 17$ (B) $5n - 13$ (C) $5n - 17$ (D) $5n + 17$

34 Which of the following groups is arranged from smallest to largest?

(A) $0.705,\ 72\%,\ \dfrac{3}{4}$ (B) $72\%,\ 0.705,\ \dfrac{3}{4}$

(C) $0.705,\ \dfrac{3}{4},\ 72\%$ (D) $\dfrac{3}{4},\ 0.705,\ 72\%$

35 A racing car travels at a speed of 180 km/h.

How far does it travel in 5 minutes?

(A) 3 km   (B) 15 km   (C) 36 km   (D) 900 km

36 What is the range and mode of the data in this dot plot?

6 7 8 9 10 11 12
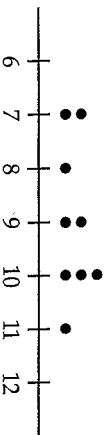
(A) range 4, mode 9   (B) range 4, mode 10

(C) range 5, mode 9   (D) range 5, mode 10

-14-

37 What is the value of y?

NOT TO SCALE
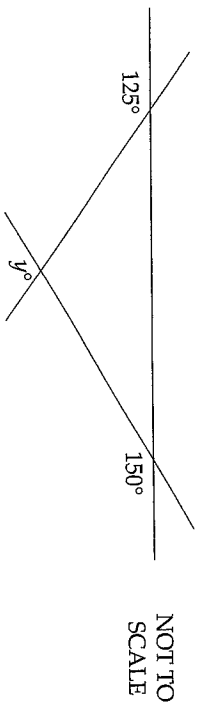
(A) 85 (B) 95 (C) 125 (D) 150

38 Mark left home and drove to work. Along the way he had to stop at a school crossing. He then travelled at an increased speed, until he arrived at work.

Which graph best shows his journey?

(A)

Distance from home

Time

(B)

Distance from home

Time

(C)

Distance from home

Time

(D)

Distance from home

Time
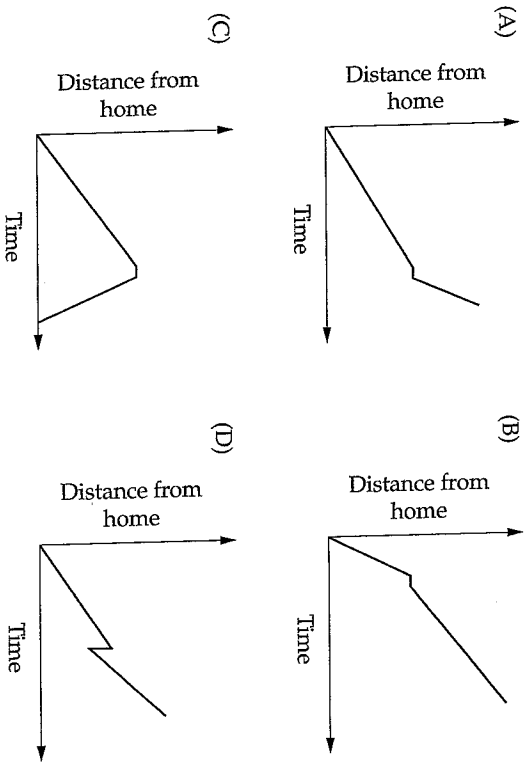
39 A school day begins at 8.52 am and finishes at 3.15 pm.

How many hours and minutes are in this school day?

(A) 5 hours and 37 minutes

(B) 6 hours and 23 minutes

(C) 6 hours and 37 minutes

(D) 7 hours and 23 minutes

40 The diagram shows a shape made up of a rectangle and a triangle.

NOT TO SCALE
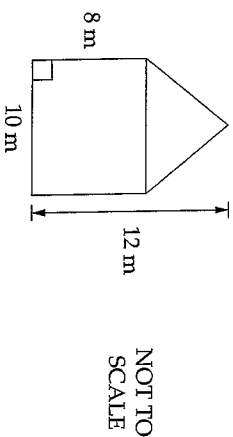
What is the area of the shape?

(A) 60 m² (B) 100 m² (C) 120 m² (D) 140 m²

41 Kay has a mobile phone contract with these conditions.

Voice call connection fee	27 cents per call
Standard voice call	38.5 cents per 30 seconds or part thereof
Text messages	25 cents per message

She makes one phone call to Alex for 4 minutes and 35 seconds, and sends three text messages to Lee.

How much do these calls and text messages cost Kay?

(A) $4.12 (B) $4.49 (C) $4.60 (D) $4.87

Use the following information to answer Questions 42–43.

On Monday, Luke went to the gym and worked out on four machines. The fraction of the time he spent on each machine is represented by the divided bar graph below.

Weights	Rowing machine	Treadmill	Bike
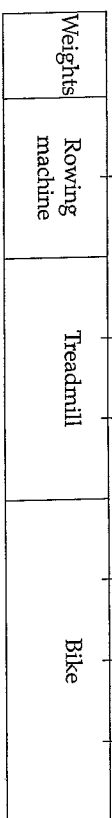
42 For what fraction of the time was Luke on the bike?

(A) $\frac{1}{4}$ (B) $\frac{3}{10}$ (C) $\frac{2}{5}$ (D) $\frac{2}{3}$

43 Luke spent 24 minutes on the treadmill.

How long did he spend working out at the gym?

(A) 56 minutes   (B) 60 minutes   (C) 80 minutes   (D) 96 minutes

44 What are the values of x and y?
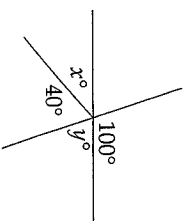
NOT TO SCALE

(A) $x = 70$, $y = 70$ (B) $x = 60$, $y = 80$

(C) $x = 50$, $y = 90$ (D) $x = 40$, $y = 100$

45 What fraction of the square is shaded?
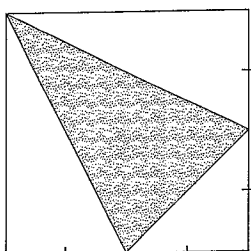
(A) $\frac{1}{4}$ (B) $\frac{3}{8}$ (C) $\frac{2}{5}$ (D) $\frac{1}{2}$

46 Which of these is the best buy?

(A) COFFEE 125 g $2.80

(B) COFFEE 200 g $4.55

(C) COFFEE 500 g $10.95

(D) COFFEE 750 g $16.50
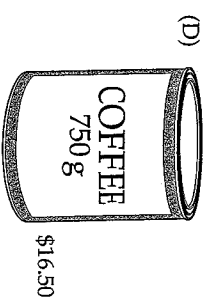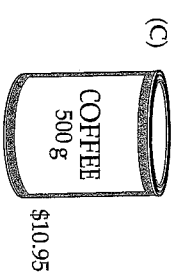
47 A set of traffic lights shows red for 45 seconds, green for 30 seconds and amber for 5 seconds.

At any instant, what is the probability that the lights show green?

(A) $\frac{1}{3}$ (B) $\frac{2}{3}$ (C) $\frac{3}{5}$ (D) $\frac{3}{8}$

48 What is the ratio of 1 cm to 0.1 m?

   (A) 1:10   (B) 10:1   (C) 1:100   (D) 100:1

49 What is the value of x?
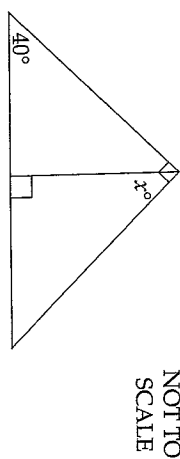
NOT TO SCALE

   (A) 30   (B) 40   (C) 45   (D) 50

50 Which line has a gradient of $-\dfrac{2}{3}$?

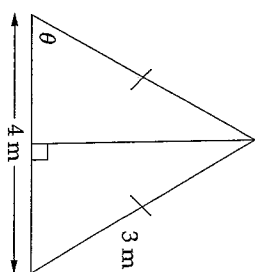   (A)

   (B)

NOT TO SCALE

   (C)

   (D)
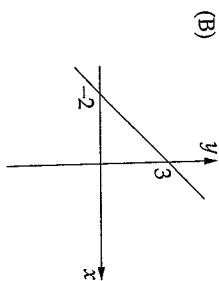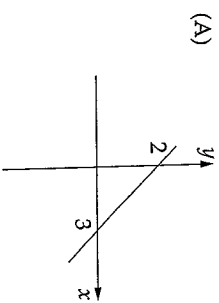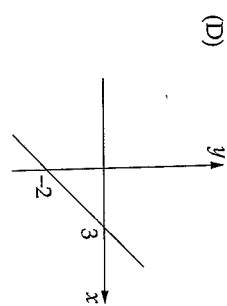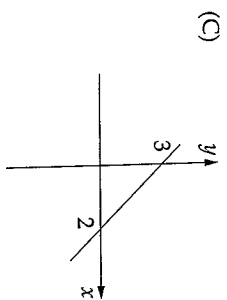
51 A set of numbers is 4, 25, 36, 49, 60.

The number 60 has a property that none of the other numbers has.

What is this property?

   (A) It is divisible by 4.   (B) It is a multiple of 6.

   (C) It is not a prime number.   (D) It is not a square number.

52 For the triangle, which statement is correct?

   (A) $\cos\theta = \dfrac{2}{3}$ (B) $\tan\theta = \dfrac{3}{2}$ (C) $\tan\theta = \dfrac{3}{4}$ (D) $\cos\theta = \dfrac{4}{3}$

53 Which of the following equations is equivalent to $\dfrac{3m-5}{4} = 12$?

   (A) $3m - 20 = 48$ (B) $3m - 5 = 48$ (C) $3m - 5 = 3$ (D) $\dfrac{3m}{4} = 17$

54 Which of the following properties is true for a rhombus but not for any other parallelogram?

   (A) Opposite angles are equal.

   (B) Diagonals bisect each other.

   (C) Diagonals intersect at right angles.
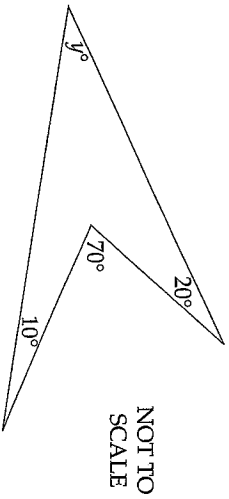
   (D) Co-interior angles are supplementary.

55 What is the area of the largest circle that can fit inside a square of side length 6 cm?

6 cm
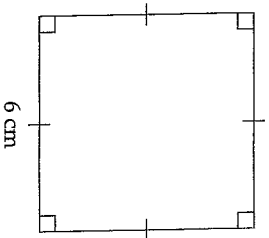
NOT TO SCALE

(A) $36 \, \text{cm}^2$ (B) $6\pi \, \text{cm}^2$ (C) $9\pi \, \text{cm}^2$ (D) $36\pi \, \text{cm}^2$

56

$y°$

$20°$

$70°$

$10°$

NOT TO SCALE

What is the value of y?

(A) 15   (B) 30   (C) 35   (D) 40

57 $\left(\dfrac{2d}{e}\right)^3 =$

(A) $\dfrac{6d^3}{e}$ (B) $\dfrac{6d^3}{e^3}$ (C) $\dfrac{8d^3}{e}$ (D) $\dfrac{8d^3}{e^3}$

58 Emma solved the following equation.

$$5(x - 3) = 2x + 6$$

$5x - 15 = 2x + 6$ ....Line 1
$5x = 2x + 21$ ....Line 2
$7x = 21$ ....Line 3
$\therefore x = 3$ ....Line 4

She made a mistake in her working.

In which line did her mistake occur?

(A) Line 1   (B) Line 2   (C) Line 3   (D) Line 4

59 Both of these scales are evenly balanced.
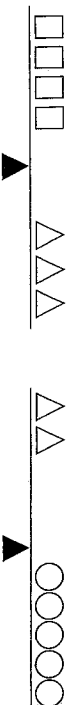
What is the correct arrangement of the masses from heaviest to lightest?

(A) △ ○ □   (B) ○ □ △

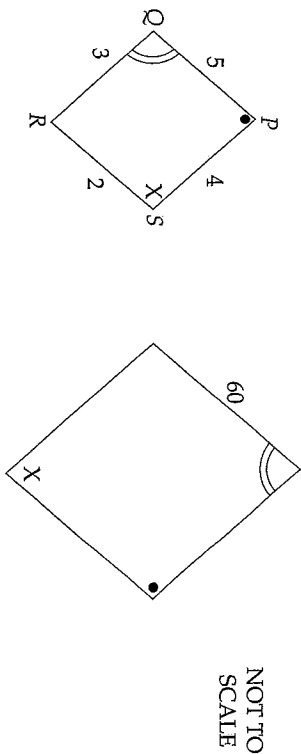(C) □ △ ○   (D) △ □ ○

60 What is the equation of the line through (4, 5) parallel to the y axis?

(A) $x = 4$ (B) $x = 5$ (C) $y = 4$ (D) $y = 5$

61 Which set of measurements cannot be the side lengths of a triangle?

(A) 3 cm, 4 cm, 5 cm
(B) 3 cm, 5 cm, 7 cm
(C) 3 cm, 6 cm, 8 cm
(D) 3 cm, 7 cm, 11 cm

62

Quadrilateral PQRS is enlarged to form another quadrilateral, as shown.

NOT TO SCALE

What is the enlargement factor?

(A) 12 (B) 15 (C) 20 (D) 30

63

$\dfrac{a}{2} + \dfrac{b}{4} =$

(A) $\dfrac{a+b}{6}$ (B) $\dfrac{a+2b}{4}$ (C) $\dfrac{3ab}{4}$ (D) $\dfrac{2a+b}{4}$

64

The diagram shows William's pay slip.

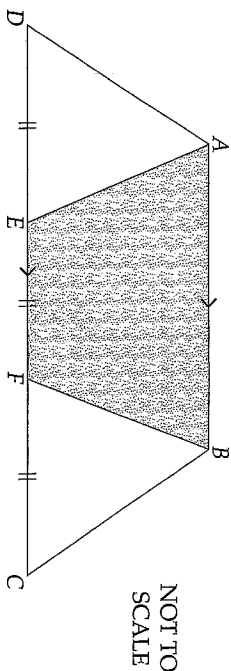| Name: William Ellis		Pay date: 12/11/2008
Rate of pay: $19.35/h	Hours	This pay
Normal	6	
Time and a half	6	
Double time	0	0
Gross pay:		$696.60

William dropped paint on his pay slip and some information was covered.

How many hours did he work at the normal rate?

(A) 24 (B) 27 (C) 30 (D) 36

65

ABCD is a trapezium.

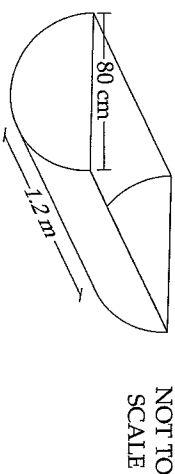$DE = EF = FC$ and $AB = 2 \times EF$

NOT TO SCALE

What fraction of the trapezium ABCD is shaded?

(A) $\dfrac{1}{3}$ (B) $\dfrac{1}{2}$ (C) $\dfrac{3}{5}$ (D) $\dfrac{2}{3}$

66

If n is a whole number, which expression would always give an odd number?

(A) $n+1$ (B) $2n+1$ (C) $3n$ (D) n^2+1

67

A bath is in the shape of half a cylinder.

NOT TO SCALE

Which calculation gives the volume of the bath in cubic metres?

(A) $V = \dfrac{1}{2} \times \pi \times 0.4^2 \times 1.2$

(B) $V = \dfrac{1}{2} \times \pi \times 0.8^2 \times 1.2$

(C) $V = \dfrac{1}{2} \times \pi \times 40^2 \times 1.2$

(D) $V = \dfrac{1}{2} \times \pi \times 80^2 \times 1.2$

68 The following table links the number of sides of a polygon to its angle sum.

Polygon	Number of sides	Angle sum
△	3	$1 \times 180 = 180°$
▱	4	$2 \times 180 = 360°$
⬠	5	$3 \times 180 = 540°$

How many sides are there on the polygon with an angle sum of 1080°?
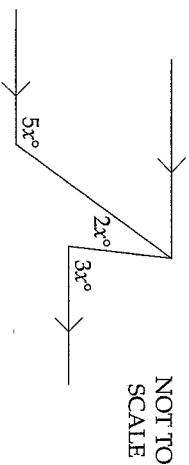
(A) 6   (B) 7   (C) 8   (D) 10

69 A large corporation donated money to community groups. Local schools received $255 000. This represented 17% of the total money donated. The Surf Life Saving Association received $135 000.

What percentage of the total money donated was given to the Surf Life Saving Association?

(A) 8%   (B) 9%   (C) 13.5%   (D) 53%

70 What is the value of x?

NOT TO SCALE

(A) 18   (B) 30   (C) 36   (D) 45

71 Part of a rectangle is shaded.

NOT TO SCALE
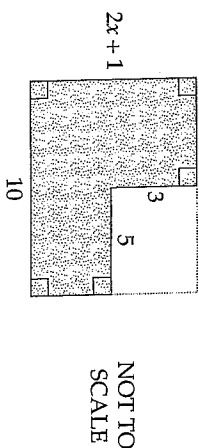
Which expression gives the area of the shaded part?

(A) $20x - 5$ (B) $20x - 14$ (C) $20x - 16$ (D) $20x - 25$

72 Two cars are travelling towards each other at 60 km/h and 80 km/h.

How far apart are they 15 minutes before they pass each other?

(A) 5 km   (B) $9\frac{1}{3}$ km   (C) 20 km   (D) 35 km

73 The diagram shows an A0 sheet of paper. Each A0 sheet is cut in half to form two A1 sheets. Each A1 sheet is cut in half to form two A2 sheets and so on.
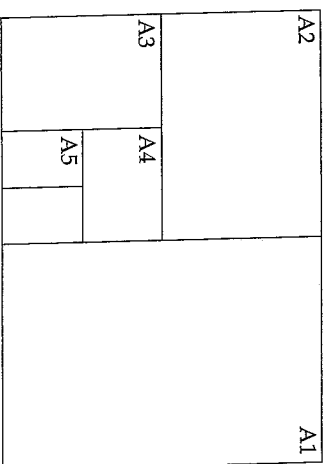
What is the ratio of the area of an A4 sheet to that of an A0 sheet?

(A) 1:4   (B) 1:8   (C) 1:16   (D) 1:32

74 One year from now, Naomi will be one third of her mother's age. Her mother is now 38 years old.

In how many years from now will Naomi be half her mother's age?

(A) 12   (B) 13   (C) 14   (D) 15

75 Container X and container Y have the same capacity. Container X is $\frac{1}{4}$ empty and container Y is $\frac{1}{2}$ empty.

Half the contents of container X are poured into container Y.

Container X   Container Y
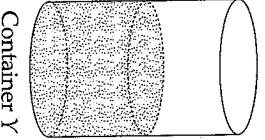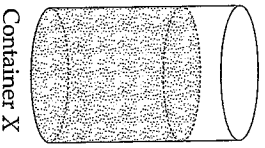
What fraction of container Y is then empty?

(A) $\frac{1}{8}$ (B) $\frac{3}{16}$ (C) $\frac{3}{8}$ (D) $\frac{7}{8}$

Section 2 (continued)

Instructions for answering Questions 76–80

■ Questions 76–80 contain options a, b, c and d. Each option may be Correct or Incorrect. In each question, one, two, three or four options may be Correct.

■ For Questions 76–80, fill in the response ovals on the Section 2 – Part A Answer Sheet to indicate whether options a, b, c and d are Correct or Incorrect. You must fill in either the Correct or the Incorrect response oval for each option.

		Correct	Incorrect
Sample:	a. 2 + 4 = 4 + 2	a. ●	○
	b. 2 − 4 = 4 − 2	b. ○	●
	c. 2 × 4 = 4 × 2	c. ●	○
	d. 2 + 4 = 4 ÷ 2	d. ○	●

■ If you think you have made a mistake, put a cross through your answer and fill in your new answer.

Correct   Incorrect

a. ✖   ●

■ If you change your mind and have crossed out what you consider to be the right answer, then indicate your intended answer by writing the word 'answer' and drawing an arrow as follows.

Correct
        answer
a. ✖   Incorrect
        ✖

76 Four students were asked to draw the net of a triangular prism.

Indicate whether each of the following is Correct or Incorrect.

a.
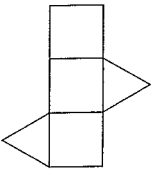
b.
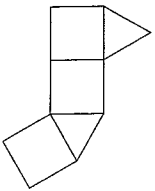
c.
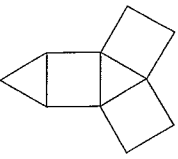
d.
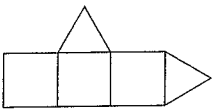
77 Angle D is acute and angle Q is obtuse. Angle R is the sum of angle P and angle Q.

Indicate whether each of the following is Correct or Incorrect.

a. Angle R could be a right angle.

b. Angle R could be an obtuse angle.

c. Angle R could be a straight angle.

d. Angle R could be a reflex angle.

78 Rebecca and Helen leave point A. Rebecca travels southwest and Helen travels southeast.

Indicate whether each of the following is Correct or Incorrect.

a. Helen could be north and east of Rebecca.

b. Helen could be south and east of Rebecca.

c. Rebecca could be due west of Helen.

d. Rebecca could be south and west of Helen.

79 This is a set of scores: 18, 20, 20, 25, 38.

A whole number score between 18 and 38 is added to the set of scores.

For the new set of scores, indicate whether each of the following is Correct or Incorrect.

a. The mean of the scores could stay the same.

b. The mean of the scores could decrease.

c. The median of the scores could stay the same.

d. The median of the scores could decrease.

80 During an election between two candidates, the count of the votes was

Isaac   5 000 votes
Sam   4 700 votes

There were 1000 postal votes still to be counted. It is known that more than half the postal votes will go to Sam and Isaac will get at least 20% of the postal votes.

Indicate whether each of the following is Correct or Incorrect.

a. Isaac could win by 250 votes.

b. Sam could win by 250 votes.

c. Isaac could win by 300 votes.

d. Sam could win by 300 votes.

Mathematics

Centre Number

Student Number

Section 2 (continued)

Part B

Questions 81–84   20 marks

Answer the questions in the spaces provided.

Question 81 (5 marks)

Please turn over

Question 81 (5 marks)

A competition records the time vehicles take to travel the track up a sand hill.
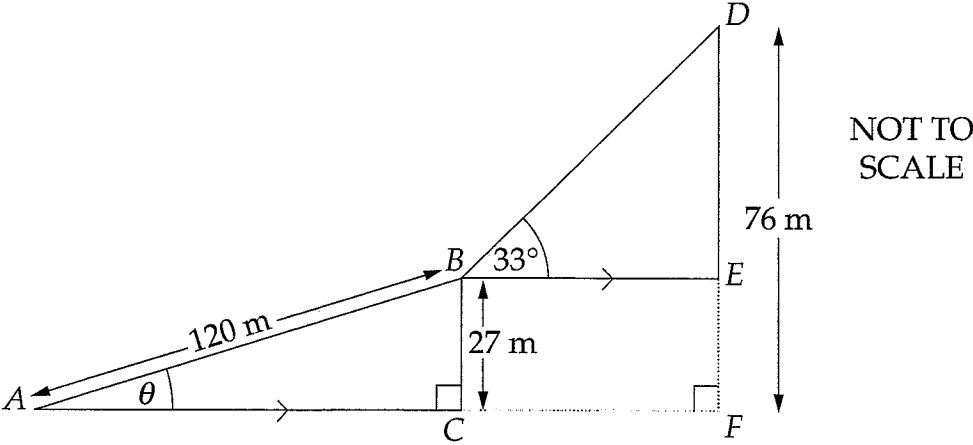
The diagram represents the track up a sand hill from A to B to D.

(a) The first stage of the track from A to B is 120 metres long. The road rises 27 metres over this distance ($BC = 27$ metres).

Find the angle of elevation (θ) of the track AB.

2

....

....

....

....

(b) If the second stage of the track is inclined at 33° to the horizontal, find the length of the track BD to the nearest metre. Show all calculations.

2

....

....

....

....

(c) The winning time for a vehicle to climb the hill from A to D was 1 minute and 15 seconds. Calculate the average speed of the vehicle in metres per second.

1

....

....

Question 82 (5 marks)

In a pre-Olympic archery tournament, archers fire at the target shown below. Naren fires 20 arrows at the target and his results are recorded in the table below.
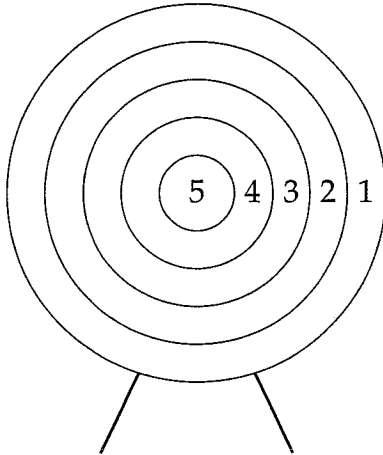
Target score	Frequency
1	2
2	6
3	7
4	2
5	3

(a) What is the mode of the target scores?

....

1

(b) What is the relative frequency of target score 4?

....

1

(c) Show that the mean of his scores is 2.9.

....

....

1

(d) Naren fires another 20 arrows. To qualify for the next round of the tournament he must score an overall mean greater than 4 from the 40 arrows.

Explain, with calculations, why Naren cannot progress to the next round.

....

....

....

....

2

Question 83 (5 marks)

The table shows the value of an investment of $1 compounded annually at varying rates of interest.

Years	5% pa	6% pa	7% pa	8% pa
1	1.0500	1.0600	1.0700	1.0800
2	1.1025	1.1236	1.1449	1.1664
3	1.1576	1.1910	1.2250	1.2597
4	1.2155	1.2625	1.3108	1.3605
5	1.2763	1.3382	1.4026	1.4693
6	1.3401	1.4185	1.5007	1.5869
7	1.4071	1.5036	1.6058	1.7138
8	1.4775	1.5939	1.7182	1.8509
9	1.5513	1.6895	1.8385	1.9990
10	1.6289	1.7909	1.9672	2.1589
11	1.7103	1.8983	2.1049	2.3316
12	1.7959	2.0122	2.2522	2.5182

Use the table to answer parts (a)–(c).

(a)   What is the value of $1 compounded annually at 5% per annum for   1
      7 years?

      ....

      ....

Question 83 continues on page 35

Question 83 (Continued)

(b)   Georgia won $1500 and decides to invest it for 5 years. She has two options.

   Option *A*   6% per annum compounded annually
   Option *B*   7% per annum simple interest

   (i)   If she chooses Option *A* to invest her money, how much interest will she earn?   **2**

   ....

   ....

   (ii)   Show, by calculation, which option gives her more interest and by how much.   **1**

   ....

   ....

   ....

   ....

(c)   Milly invests $5000 at 7% per annum compounded annually.   **1**

   During which year will her investment be doubled?

   ....

   ....

End of Question 83

Question 84 (5 marks)

Soccer players stand in circles for training. Each circle contains a different number of players. The diagrams below show the number of pathways a ball can take between players.
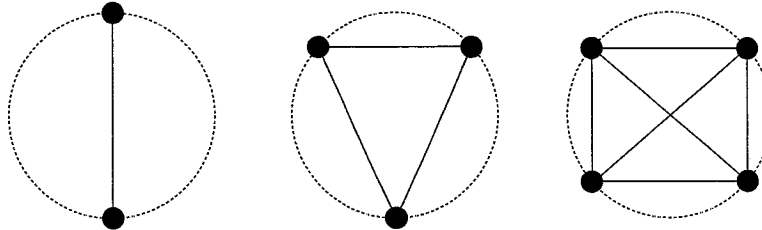
Number of players	2	3	4	5
Number of pathways	1	3	6	

(a)   (i)   What is the missing value in the table?   1

....

(ii)   How many players would there be in a circle with 36 pathways?   1

....

(b)   Kasey and Ben join a circle that already has 8 players. The ball is with another player.

What is the probability that the next pass is to either Kasey or Ben?   1

....

....

Question 84 (continued)

(c) A circle has a circumference of 44 metres. There are 8 players standing on   **2**
the circumference.

Calculate the longest pass that can be made in this circle and explain
why this would be the longest pass.

....

....

End of test

ANSWERS TO 2008 S.C. – SECTION 1

1	Multiply	2	$\frac{1}{6}$	3	$23	4	8^0	5	76	6	3,4
7	(2,−1)	8	1600−6 x 40+9	9	$\frac{1}{10}$	10	3	11	10	12	$3.3 million
13	0.0025	14	148 cm	15	1+1	16	corresponding	17	20%	18	10
19	83038	20	Check	21	1.7%	22	2,3,5,6	23	25.7	24	108
25	Check										

SECTION 2 –PART A

26	A	27	D	28	D	29	A	30	A	31	D
32	C	33	C	34	A	35	B	36	B	37	B
38	A	39	B	40	B	41	D	42	C	43	C
44	B	45	B	46	C	47	D	48	A	49	B
50	A	51	D	52	A	53	B	54	C	55	C
56	D	57	D	58	C	59	D	60	A	61	D
62	C	63	D	64	B	65	C	66	B	67	A
68	C	69	B	70	B	71	A	72	D	73	C
74	C	75	A								

SECTION 2 – PART B (Questions 76-80 only correct answers are shown)

76	a, c	77	b, c, d	78	a, b, c, d	79	b, c	80	a, b, c
81a	13^0	b	90 m	c	2.8 m/s				
82a	3	b	$\frac{1}{10}$	c	2.9	d	Check		
83a	$1.41	b	$507.30	c	11th				
84a (i)	10	(ii)	9	b	$\frac{1}{5}$	c	14.01 m		

- **Updated Nov/08**