TECK WHYE SECONDARY SCHOOL
Instilling life skills and values to achieve success
SEMESTRAL ASSESSMENT TWO 2010
Secondary One EXPRESS

1E

CANDIDATE NAME

CLASS

INDEX NUMBER

ELEMENTARY MATHEMATICS

4016

04 October 2010

2 hours 30 min

Additional Material: Graph Paper
Candidates answer on the Question Paper

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number on all the work you hand in.
Write in dark blue or black pen on both sides of the foolscap paper.
You may use a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.
If working is needed for any question it must be shown with the answer.
Omission of essential working will result in loss of marks.
Calculators should be used where appropriate.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
For π, use either calculator value or 3.142, unless the question requires the answer in terms of π.
At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.
The total number of marks for this paper is 100.

For Examiner's Use	
Section A	
Section B	
Total	

This document consist of **19** printed pages, including this page

Setter: Ms Liow Sio Sen
Vetter: Mr Min Sing

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For Examiner's Use			
Section A		Section B	
Question No.	Marks	Question No.	Marks
1		18	
2		[1]19	
3		20	
4		[1]21	
5		[1]22	
6		23	
7		[2]24	
8		[2]25	
9		[4]26	
10		27	
[1]11			
[1]12			
[1]13			
[3]14			
15			
[3]16			
[3]17			
Sub-Total		Sub-Total	
Total (Section A & B)			

[1] Algebra
[2] Mensuration
[3] Angle Properties
[4] Geometrical Construction

[TURN OVER

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Section A [50 marks]

1. (a) Express 84 as the product of its prime factors in index notation form.

Answer: ..... [2]

(b) Find the HCF and LCM of 84 and 100.

Answer: HCF = ... [1]

LCM = ...[1]

---

2. Using a calculator, evaluate the following, giving your answers correct to **two decimal places.**

(a) $\sqrt[3]{323} \times \frac{5}{42} - \sqrt{84}$

(b) $\sqrt{\frac{8.799 + (12 + 0.13)^2}{20.739}}$

Answer: (a) ..... [1]

(b) .....[1]

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3. Express the following numbers correct to **3 significant figures**.

(a) 0.005219

(b) 2471

Answer: (a) ..... [1]

(b) .....[1]

---

4. Without the use of calculator, estimate the value of $\frac{\sqrt{80}-(2.027)^2}{\sqrt[3]{26}}$, showing all the estimates used in your working clearly.

Answer ..... [2]

---

5. Given that $x : y = 3 : 8$ and $y : z = 12 : 13$, find

(a) $x : z$

(b) $\frac{2x}{3z}$, in the simplest form.

Answer: (a) ..... [1]

(b) .....[1]

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6. Arrange the following in ascending order

$1.75\ ,\ 1\frac{3}{5}\ ,\ 173\%\ ,\ -1.75\ ,\ 1.\dot{7}$

Answer: ..... [1]

---

7. A rope is cut into 3 pieces in the ratio 1:3:5. Given that the longest piece is 60 cm. Find

(a) the length of the original rope

(b) the length of the shortest piece of rope.

(adapted from N2002/1/2b)

Answer: (a) .....cm [2]

(b) .....cm [1]

---

8. In a theatre, $\frac{1}{5}$ of the audience were under the age of 50, $\frac{1}{4}$ of the audience were over 75 and $\frac{3}{4}$ of those over 75 were men. If the total number of audience was 80, find

(a) the number of audience that were between 50 and 75 inclusive

(b) the number of women over 75.

(adapted from N2007/1/2)

Answer: (a)..... [1]

(b)..... [1]

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9. The temperature at the bottom of a mountain is -4°C at 6 am. It rises to 8°C at 12 pm.

(a) Find the difference between the two temperatures

(b) Assuming that the temperature rises by 2°C per hour, find

(i) the temperature at the bottom of the mountain at 10 am

(ii) the time when the temperature is 0°C.

(adapted from N2002/1/9)

Answer: (a) .....°C [1]

(b) (i).....°C [1]

(b) (ii).....am [1]

---

10. A jacket costs $300. During a sale, a discount was given for making cash payment only. Ken used cash and paid $240 for the jacket. Calculate the percentage discount he was given.

Answer .....% [2]

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11. Given $a = 5$, $b = -6$ and $c = 1$, find the value of

(a) $a^2 + b^2 - 2ab$

(b) $\dfrac{-b + \sqrt{b^2 - 4ac}}{2a}$

Answer: (a) ..... [1]

(b) ..... [1]

---

12. Factorise the following expressions.

(a) $3xy - 6$

(b) $(a - 2b) + 5c(a - 2b)$

(c) $3ax + ay - 6bx - 2by$ (adapted from N2007/1/24b)

Answer: (a) ..... [1]

(b) ..... [1]

(c) ..... [2]

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13. Simplify the following expressions.

(a) $9x + 4(x + 3)$

(b) $4a - 3a \times \frac{1}{3} + 2$

(c) $4a - b + 2c - (a + 3b - 2c)$

(d) $\frac{2x^2}{6} \div \frac{3x}{4}$

(e) $\frac{1}{2} + \frac{x+3}{5}$

Answer: (a) ..... [1]

(b) ..... [1]

(c) ..... [2]

(d) ..... [2]

(e) ..... [2]

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14. Find

(a) the sum of the interior angles of a regular octagon (8-sided)

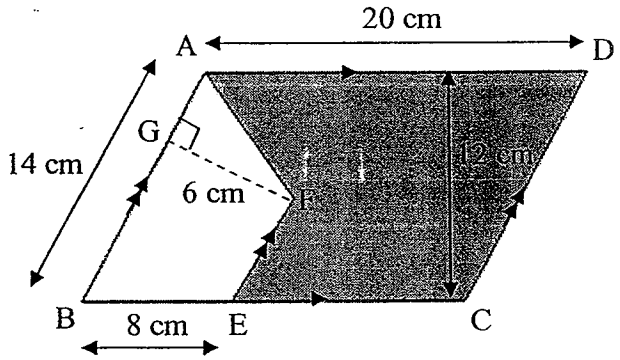
(b) one exterior angle of a regular octagon.

Answer: (a) .....° [2]

(b).....° [1]

---

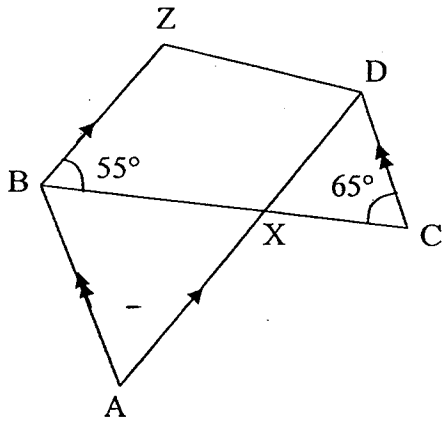
15. In the diagram below, $ABCD$ is a parallelogram where $AB = 14$ cm and $AD = 20$ cm, and $ABEF$ is a trapezium where $BE = 8$ cm, $FG = 6$ cm and EF is half the length of AB. Find the area of the shaded region.



Answer : .....cm^2 [3]

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16. In the diagram, BC is a straight line and intersects AD at X. $AB//CD$, $BZ//AD$, $\angle XBZ = 55°C$ and $\angle XCD = 65°C$. Showing all workings and stating the reasons clearly, find



(a) $\angle BXA$

(b) $\angle CXD$

(c) $\angle BAX$

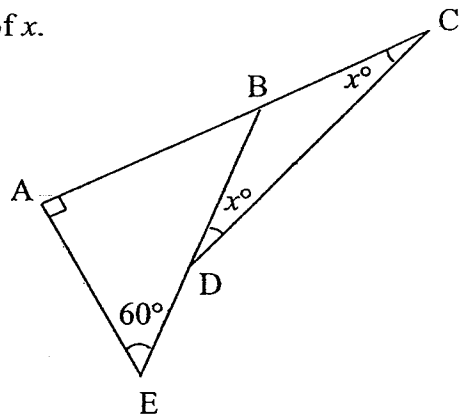
Answer: (a) .....° [1]

(b) ..... ° [1]

(c) ..... ° [2]

---

17. In the figure below, ABC and BDE are straight lines. Showing all workings and stating the reasons clearly, find the value of x.



Answer: x =..... [3]

.....End of Section A.....

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Section B [50 marks]

18. 32 boys and 52 girls signed up for an overseas learning trip. The teacher wanted to divide them into as many groups as possible where the number of boys in each group is the same and the number of girls in each group is also the same. Determine the number of groups and hence find the number of boys and girls in each group.

Answer: Number of groups = ... [2]

Number of boys = ...[1]

Number of girls = ...[1]

---

19. (a) A car travels 144 km in x hours. Write down, in its simplest form, an expression in terms of x for its average speed in metres per second

(N2001/1/16a)

Answer: ..... [2]

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(b) A car completes a journey in one hour. For the first half of the distance, the speed is 60 km/h and for the second half of the distance, the speed is 40 km/h. Find the total distance of the journey in km.

Answer: ..... [2]

20. The workers of an electronic company were given an increase amounting to 6% in their monthly salaries.

(a) If one of the workers earned $1600 per month originally, find his new monthly salary after the increment

(b) If after the increment, the worker decided to give 1% of his salary to charity, find the remaining amount of his salary.

Answer: (a) ..... [2]

(b) ..... [2]

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21. Solve the following equations:

(a) $7y + 6 = 3y - 10$

(b) $3(x-5) - 2x = 0$

(c) $1 - \frac{x+2}{7} = \frac{x}{3}$

Answer: (a) ..... [2]

(b) ..... [2]

(c) ..... [3]

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22. Andy has $2x$ books. Bill has 4 more books than Andy. Carol has half as many books as Bill.

(a) Write down an expression, in terms of x, for the number of books that Carol has.

(b) The total number of books is 121. Find the number of books that Bill has.

(N2004/1/16)

Answer: (a)..... [1]

(b)..... [2]

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23. The breadth of a rectangular land is 12 m less than its length. If the perimeter of the land is 60 m, find the area of the land.

Answer: ..... [2]

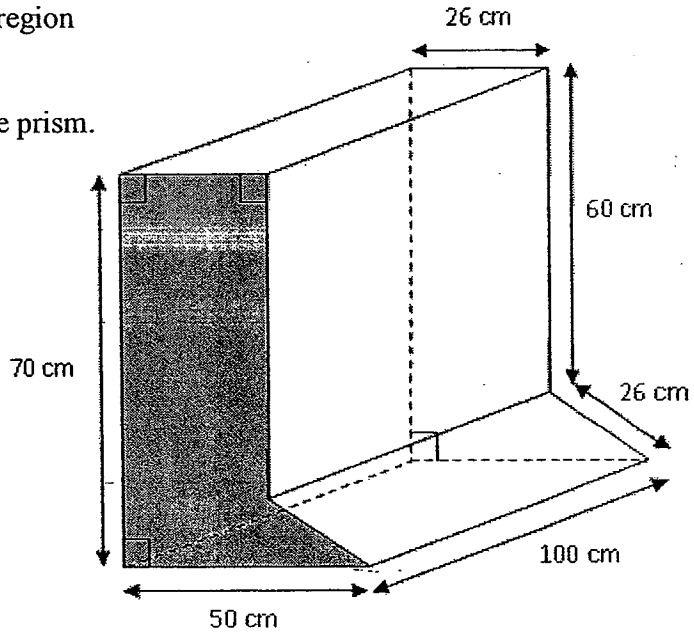
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24. The figure shows a road barrier which is a prism. Find

(a) the area of the shaded region

(b) volume of the prism

(c) total surface area of the prism.



Answer: (a) ..... [2]

(b)..... [2]

(c)..... [2]

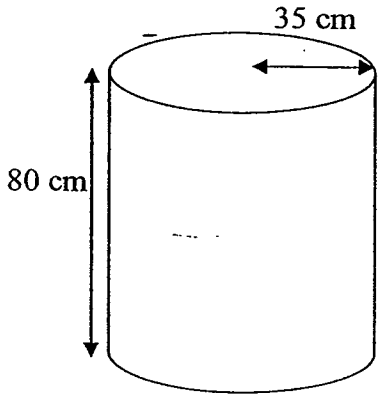
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25. A cylindrical barrel of radius 35 cm and height 80 cm is fully filled with water. A leak at the bottom of the barrel drains away 0.2 litre of water every minute. Find

(a) the volume of water (in litres) drained away if the water level in the barrel dropped by 6cm

(b) the time taken (in minutes) for the water level to drop by 6 cm.

[Take $\pi = \frac{22}{7}$]



Answer: (a) ..... [3]

(b)..... [1]

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26. On the space provided below, construct a triangle PQR, given that $PQ = 9$ cm, $PR = 5$ cm and $QR = 7$ cm. Label all vertices and sides given clearly. [3]

(a) Measure and write down the value of the largest angle of the triangle.

(b) On the same diagram, draw the perpendicular bisector of PQ [1]

(c) On the same diagram, draw the angle bisector of $\angle RPQ$. [1]

(d) On the same diagram, label the point X where the angle bisector of $\angle RPQ$ intersects the perpendicular bisector of PQ. [1]

(e) Hence, measure and write down the length of PX.

Answer: (a) ..... [1]

(e) ..... [1]

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27. (a) Given the function, $y = x + 2$, complete the table below. [1]

x	-4	-2	0	2	4
y	-2			4	6

(b) On a piece of graph paper, using a scale of 2 cm to represent 1 unit for both x- and y-axis, draw the graph of $y = x + 2$ for values of x ranging from -4 to 4. Label the graph clearly. [3]

(c) State the coordinates of the point(s) where the line cuts the x-axis

(d) State the coordinates of the y-intercept

(e) From your graph, find the value of y when $x = 2.5$

(f) Find the gradient of the line $y = x + 2$.

Answer: (c) ..... [1]

(d) ..... [1]

(e) ..... [1]

(f) ..... [1]

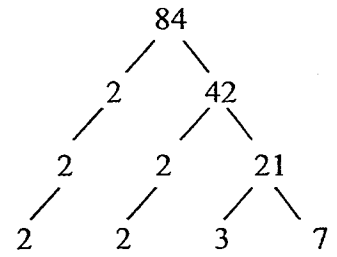
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Answer Scheme

Section A [50 marks]

1. (a) Express 84 as the product of its prime factors in index notation form.



Or Ladder Method - [M1]

$84 = 2^2 \times 3 \times 7$ - [A1]

Answer: ……$2^2 \times 3 \times 7$… [2]

(b) Find the HCF and LCM of 84 and 100.

$100 = 2^2 \times 5^2$
$84 = 2^2 \times 3 \times 7$

HCF $= 2^2$
$= 4$ - [B1] (remark: accept notation form)

LCM $= 2^2 \times 3 \times 5^2 \times 7$
$= 2100$ - [B1] (remark: accept notation form)

Answer: HCF = ……4…… [1]

LCM = ……2100……[1]

---

2. Using a calculator, evaluate the following, giving your answers correct to **two decimal places.**

(a) $\sqrt[3]{323} \times \frac{5}{42} - \sqrt{84}$

$= -8.348$

$= -8.35$ (2 dec. pl.) - [B1]

(b) $\sqrt{\frac{8.799 + (12 + 0.13)^2}{20.739}}$

$= 2.742$

$= 2.74$ (2 de. pl.) - [B1]

Answer: (a) ……-8.35…… [1]

(b) ……2.74……[1]

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3. Express the following numbers correct to **3 significant figures**.

(a) 0.005219 = 0.00522 (to 3 sig. fig.) - [B1]

(b) 2471 = 2470 (to 3 sig. fig.) - [B1]

Answer: (a) .....0.00522..... [1]

(b) .....2470.....[1]

---

4. Without the use of calculator, estimate the value of $\frac{\sqrt{80}-(2.027)^2}{\sqrt[3]{26}}$, showing all the estimates used in your working clearly.

$\approx \frac{\sqrt{81}-2^2}{\sqrt[3]{27}}$ - [M1]

$= \frac{9-4}{3}$

$= \frac{5}{3}$

$= 1\frac{2}{3}$ - [A1]

(Remark: deduct ½ mark if answer is written as improper fraction.)

Answer .....$1\frac{2}{3}$ ..... [2]

---

5. Given that $x : y = 3 : 8$ and $y : z = 12 : 13$, find

(a) $x : z$

(b) $\frac{2x}{3z}$, in the simplest form.

(a) $x : y = 9 : 24$ and $y : z = 24 : 26$

$x : z = 9 : 26$ - [B1]

(b) $\frac{2x}{3z} = \frac{18}{78}$

$= \frac{3}{13}$ - [B1]

Answer: (a) .....9 : 26..... [1]

(b) .....$\frac{3}{13}$.....[1]

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6. Arrange the following in ascending order

$1.75\ ,\ 1\frac{3}{5}\ ,\ 173\%\ ,\ -1.75\ ,\ 1.\dot{7}$

$1\frac{3}{5} = 1.6, \qquad 173\% = 1.73, \quad 1.\dot{7} = 1.777.....$

$-1.75,\ 1\frac{3}{5},\ 173\%,\ 1.75,\ 1.\dot{7}$ - [B1]

Answer: ...$-1.75,\ 1\frac{3}{5},\ 173\%,\ 1.75,\ 1.\dot{7}$ ..... [1]

---

7. A rope is cut into 3 pieces in the ratio 1:3:5. Given that the longest piece is 60 cm. Find

(c) the length of the original rope

(d) the length of the shortest piece of rope. (adapted from N2002/1/2b)

(a) 5 parts ---- 60 cm - [M1]

9 parts ---- 108 cm - [A1]

Length of the original rope is 108 cm.

(b) 1 part ---- 12 cm - [A1]

Length of the shortest piece of rope is 12 cm.

Answer: (a) .....108 cm..... [2]

(b) .....12 cm..... [1]

---

8. In a theatre, $\frac{1}{5}$ of the audience were under the age of 50, $\frac{1}{4}$ of the audience were over 75 and $\frac{3}{4}$ of those over 75 were men. If the total number of audience was 80, find

(c) the number of audience that were between 50 and 75 inclusive

(d) the number of women over 75.

(adapted from N2007/1/2)

(a) Number of audience under the age of 50 = 16
Number of audience over 75 = 20
Number of audience between 50 and 75 inclusive = 80-16-20
= 44 - [B1]

(b) The number of women over 57 = $\frac{1}{4} \times 20$
= 5 - [B1]

Answer: (a).....44..... [1]

(b).....5..... [1]

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9. The temperature at the bottom of a mountain is -4°C at 6 am. It rises to 8°C at 12 pm. Find

(c) The difference between the two temperatures

(d) Assuming that the temperature rises by 2°C per hour, find

a. the temperature at the bottom of the mountain at 10 am

b. the time when the temperature is 0°C.

(adapted from N2002/1/9)

(a) Difference $= 8°C - (-4°C)$

$= 12°C$ - [B1]

(b) (i) At 10 am, temp. $= 2 \times 4 + (-4)$

$= 4°C$ - [B1]

(ii)Time taken to rise from -4°C to 0°C = 2 hours

Time is 8 am. – [B1]

Answer: (a) .....12.....°C [1]

(b) (i).....4.....°C [1]

(b) (ii).....8.....am [1]

---

10. A jacket costs $300. During a sale, a discount was given for making cash payment only. Ken used cash and paid $240 for the jacket. Calculate the percentage discount he was given.

Discount $= \$300 - \$240$

$= \$60$ - [M1]

$$\% \text{ discount} = \frac{60}{300} \times 100\%$$

$= 20\%$ - [A1]

Answer ...:.....20.....% [2]

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11. Given $a = 5$, $b = -6$ and $c = 1$, find the value of

(c) $a^2 + b^2 - 2ab$

(d) $\dfrac{-b + \sqrt{b^2 - 4ac}}{2a}$

(a) $a^2 + b^2 - 2ab = 5^2 + (-6)^2 - 2(5)(-6)$

$= 121$ - [B1]

(b) $\dfrac{-b + \sqrt{b^2 - 4ac}}{2a} = \dfrac{-(-6) + \sqrt{(-6)^2 - 4(5)(1)}}{2(5)}$

$= 1$ - [B1]

Answer: (a) .....121..... [1]

(b) .....1..... [1]

---

12. Factorise the following expressions.

(d) $3xy - 6$

(e) $(a - 2b) + 5c(a - 2b)$

(f) $3ax + ay - 6bx - 2by$ (adapted from N2007/1/24b)

(a) $3xy - 6 = 3(xy - 2)$ - [B1]

(b) $(a - 2b) + 5c(a - 2b) = (a - 2b)(1 + 5c)$ - [B1]

(c) $3ax + ay - 6bx - 2by = a(3x + y) - 2b(3x + y)$ - [M1]

$= (3x + y)(a - 2b)$ - [A1]

Answer: (a) ..... $3(xy - 2)$ ..... [1]

(b) .... $(a - 2b)(1 + 5c)$ ..... [1]

(c) ... $(3x + y)(a - 2b)$ ..... [2]

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13. Simplify the following expressions.

(f) $9x+4(x+3)$

(g) $4a-b+2c-(a+3b-2c)$

(h) $\frac{2x^2}{6}\div\frac{3x}{4}$

(i) $4a-3a\times\frac{1}{3}+2$

(j) $\frac{1}{2}+\frac{x+3}{5}$

(a) $9x+4(x+3) = 9x+4x+12$

$= 13x+12$ - [B1]

(b) $4a-3a\times\frac{1}{3}+2 = 4a-a+2$

$= 3a+2$ - [B1]

(c) $4a-b+2c-(a+3b-2c) = 4a-b+2c-a-3b+2c$ -[M1]

$= 3a-4b+4c$ - [A1]

(d) $\frac{2x^2}{6}\div\frac{3x}{4} = \frac{2x^2}{6}\times\frac{4}{3x}$ - [M1]

$= \frac{4x}{9}$ - [A1]

(e) $\frac{1}{2}+\frac{x+3}{5} = \frac{5}{10}+\frac{2(x+3)}{10}$ - [M1]

$= \frac{5+2x+6}{10}$

$= \frac{11+2x}{10}$ - [A1]

Answer: (a) ..... $13x+12$ ..... [1]

(b) ..... $3a+2$ ..... [2]

(c) ... $3a-4b+4c$ ..... [2]

(d) ..... $\frac{4x}{9}$ ..... [1]

(e) ..... $\frac{11+2x}{10}$ ..... [2]

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14. Find

(a) the sum of the interior angles of a regular octagon (8-sided)

(b) one exterior angle of a regular octagon.

(a) Sum of int. angles = $(8-2) \times 180°$ - [M1]

$= 1080°$ - [A1]

(b) Ext. angle = $\frac{360°}{8}$

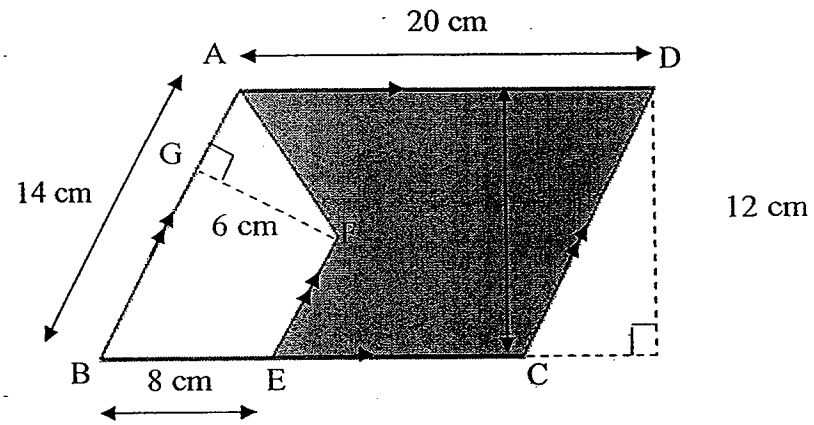
$= 45°$ - [B1]

Answer: (a) .....1080.....° [2]

(b) .....45..... ° [1]

---

15. In the diagram below, $ABCD$ is a parallelogram where $AB = 14$ cm and $AD = 20$ cm, and $ABEF$ is a trapezium where $BE = 8$ cm, $FG = 6$ cm and EF is half the length of AB. Find the area of the shaded region.



Area of //gram = 20×12

$= 240 \text{ cm}^2$ - [M1]

Area of trapezium = $\frac{1}{2}(7+14)(6)$

$= 63 \text{ cm}^2$ - [M1]

Area of shaded region = $240 - 63$

$= 177 \text{ cm}^2$ - [A1]

Answer : .....177.....cm^2 [3]

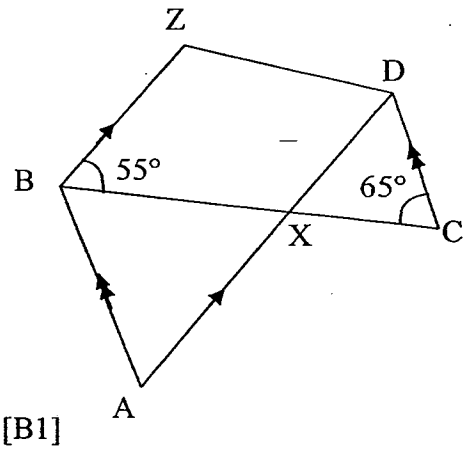
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16. In the diagram, BC is a straight line and intersects AD at X. $AB//CD$, $BZ//AD$, $\angle XBZ = 55°C$ and $\angle XCD = 65°C$. Showing all workings and stating the reasons clearly, find

(d) $\angle BXA$

(e) $\angle CXD$

(f) $\angle BAX$



(a) $\angle BXA = 55°$ (Alt. $\angle s$, BZ//AD) - [B1]

(b) $\angle CXD = 55°$ (Corr. $\angle s$, BZ//AD) or $55°$ (vert. Opp. $\angle s$) - [B1]

(c) $\angle ABX = 65°$ (Alt. $\angle s$, BZ//AD) - [M1]

$\angle BAX = 180° - (55° + 65°)$ (Int. $\angle s$, BZ//AD)

$= 60°$ - [A1]

Answer: (a) .....55.....° [1]

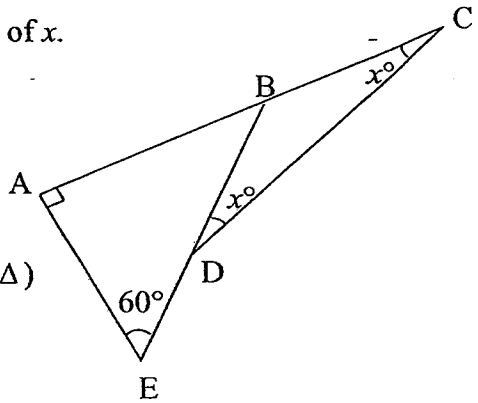
(b) .....55..... ° [1]

(c) .....60..... ° [2]

(Remark: Deduct ½ mark if no/wrong/incomplete reason is given)

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17. In the figure below, ABC and BDE are straight lines. Showing all workings and stating the reasons clearly, find the value of x.



$\angle ABE = 180° - 90° - 60°$ ($\angle s$ sum of Δ)

$= 30°$ - [M1]

$\angle ABE = 2x°$ (Ext. $\angle$ of Δ = sum of int. opp. $\angle s$) - [M1]

$30° = 2x°$

$x° = 15°$ - [A1]

Answer: x =.....15..... [3]

.....End of Section A.....

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Section B [50 marks]

18. 32 boys and 52 girls signed up for an overseas learning trip. The teacher wanted to divide them into as many groups as possible where the number of boys is the same in each group and the number of girls is also the same in each group. Determine the number of groups and hence find the number of boys and girls in each group.

$32 = 2^5$

$52 = 2^2 \times 13$

HCF $= 2^2$

$= 4$ - [M1]

No. of groups = 4 - [A1]

No. of boys = $32 \div 4$

$= 8$ - [B1]

No. of girls = $52 \div 4$

$= 13$ - [B1]

Answer: Number of groups = ...4..... [2]

Number of boys = ...8.....[1]

Number of girls = ...13.....[1]

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19. (a) A car travels 144 km in x hours. Write down, in its simplest form, an expression in terms of x for its average speed in metres per second

(N2001/1/16a)

Average speed $= \frac{144}{x}$ km/h - [M1]

$= \frac{144 \times 1000}{x \times 3600}$ m/s

$= \frac{40}{x}$ m/s - [A1]

Answer: ..... $\frac{40}{x}$ .....m/s... [2]

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19. (b) A car completes a journey in one hour. For the first half of the distance, the speed is 60 km/h and for the second half of the distance. the speed is 40 km/h. Find the total distance of the journey in km. (Let the total distance of the journey be D).

$\frac{\frac{1}{2}D}{60} + \frac{\frac{1}{2}D}{40} = 1$ - [M1] (remark: award M1 for forming an equation using time.)

$\frac{D}{120} + \frac{D}{80} = 1$

$\frac{2D+3D}{240} = 1$

$\frac{5D}{240} = 1$

$D = \frac{240}{5}$

$= 48$ km - [A1]

Answer: .....48 km..... [2]

---

20. The workers of an electronic company were given an increase amounting to 6% in their monthly salaries.

(c) If one of the workers earned \$1600 per month originally, find his new monthly salary after the increment

(d) If after the increment, the worker decided to give 1% of his salary to charity, find the remaining amount of his salary.

(a) His new salary $= \frac{106}{100} \times \$1600$ - [M1]

$= \$1696$ - [A1]

(b) The remaining amount $= \frac{99}{100} \times \$1696$ - [M1]

$= \$1679.04$ - [A1]

(Remark: accept error carried forward from (a))

Answer: (a) .....\$1696..... [2]

(b) .....\$1679.04..... [2]

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21. Solve the following equations:

(d) $7y + 6 = 3y - 10$

(e) $3(x-5) - 2x = 0$

(f) $1 - \frac{x+2}{7} = \frac{x}{3}$

(a) $7y - 3y = -6 - 10$ - [M1]

$4y = -16$

$y = -4$ - [A1]

(b) $3x - 15 - 2x = 0$ - [M1]

$x - 15 = 0$

$x = 15$ - [A1]

(c) $\frac{7}{7} - \frac{x+2}{7} = \frac{x}{3}$

$\frac{7-x-2}{7} = \frac{x}{3}$ - [M1]

$\frac{5-x}{7} = \frac{x}{3}$

$3(5-x) = 7x$ - [M1]

$15 - 3x = 7x$

$10x = 15$

$x = \frac{15}{10}$

$x = \frac{3}{2}$

$x = 1\frac{1}{2}$ - [A1]

OR $\frac{5-x}{7} - \frac{x}{3} = 0$ - [M1]

$\frac{3(5-x)-7x}{21} = 0$

$\frac{15-3x-7x}{21} = 0$

$\frac{15-10x}{21} = 0$

$15 - 10x = 0$

$10x = 15$

$x = \frac{15}{10}$

$x = \frac{3}{2}$

$x = 1\frac{1}{2}$ - [A1]

Answer: (a) .....$y = -4$..... [2]

(b) .....$x = 15$..... [2]

(c) .....$x = 1\frac{1}{2}$..... [3]

(Remark: deduct ½ mark if answer is not written as $y =$ or $x =$, and deduct ½ mark if answer is expressed as improper fraction)

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22. Andy has $2x$ books. Bill has 4 more books than Andy. Carol has half as many books as Bill.

(c) Write down an expression, in terms of x, for the number of books that Carol has.

(d) The total number of books is 121. Find the number of books that Bill has.

(N2004/1/16)

(a) Number of books that Carol has $= \frac{1}{2}(4+2x)$

$= 2+x$ - [B1]

(b) $2x+(4+2x)+(2+x)=121$ - [M1] (Remark: allow error carried forward from (a))

$5x+6=121$

$x=23$

Bill has 50 books. - [A1]

Answer: (a)... $2+x$..... [1]

(b).....50..... [2]

---

23. The breadth of a rectangular land is 12 m less than its length. If the perimeter of the land is 60 m, find the area of the land.

Let the length of the rectangular land be x. Then, the breadth is $(x-12)$.

$2(x-12)+2x=60$

$4x=84$

$x=21$ m - [M1] (remark: award M1 for finding either length or breadth.)

Area $= 21 \times 9$

$= 189\ m^2$ - [A1]

Answer: .....189 m^2..... [2]

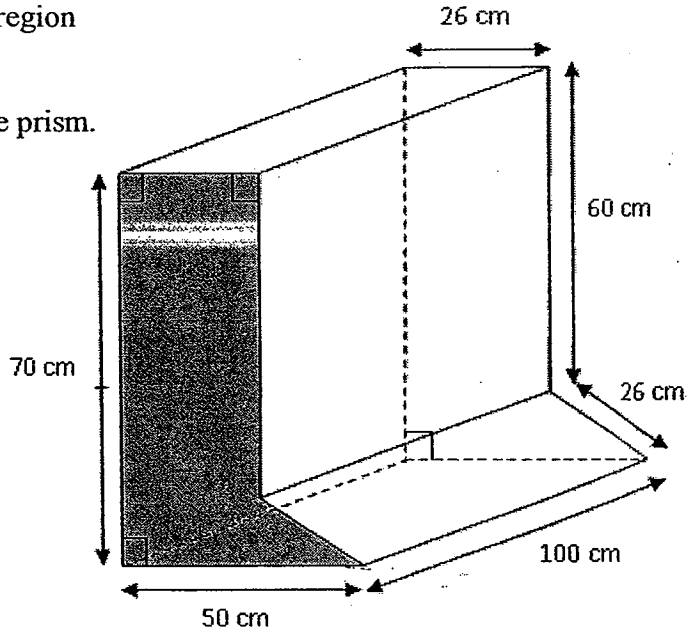
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24. The figure shows a road barrier which is a prism. Find

(d) the area of the shaded region

(e) volume of the prism

(f) total surface area of the prism.



(a) Area of shaded region = Area of rectangle + Area of trapezium

$= (26\times60) + \frac{1}{2}(26+50)(10)$ - [M1]

$= 1560 + 380$

$= 1940\ cm^2$ - [A1]

(b) Volume of prism = 1940×100 - [M1] (Remark: Allow error carried forward from (a))

$= 194\ 000\ cm^3$ - [A1]

(c) Total surface area = (Perimeter of base × height) + 2 × (base area)

$= [(26 + 60 + 26 + 50 + 70) \times 100] + 2\times1940$ - [M1]

$= 23200 + 3880$

$= 27\ 080\ cm^2$ - [A1]

Answer: (a) ……1940 cm^2…… [2]

(b)…… 194 000 cm^3…… [2]

(c)…… 27 080 cm^2…… [2]

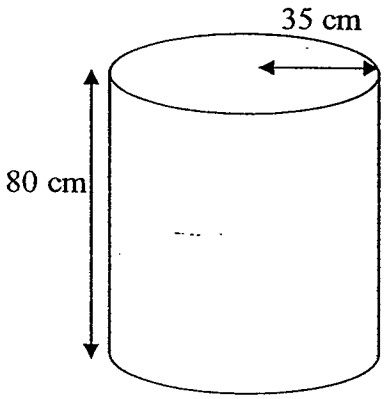
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25. A cylindrical barrel of radius 35 cm and height 80 cm is fully filled with water. A leak at the bottom of the barrel drains away 0.2 litre of water every minute. Find

(c) the volume of water (in litres) drained away if the water level in the barrel dropped by 6cm

(d) the time taken (in minutes) for the water level to drop by 6 cm.

[Take $\pi = \frac{22}{7}$]



(a) Volume of water drained away $= \pi \times (35)^2 \times 6$ - [M1]

$= \frac{22}{7} \times (35)^2 \times 6$

$= 23\ 100\ cm^3$ - [M1]

$= 23.1\ \ell$ - [A1]

(b) 0.2 ℓ of water takes 1 minute to drain away

23.1 ℓ of water will take $\frac{1}{0.2} \times 23.1 = 115.5$ min to drain away. - [B1]

Answer: (a) .....23.1 ℓ ..... [3]

(b).....115.5 min..... [1]

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26. On the space provided below, construct a triangle PQR, given that $PQ = 9$ cm, $PR = 5$ cm and $QR = 7$ cm. Label all vertices and sides given clearly. [3]

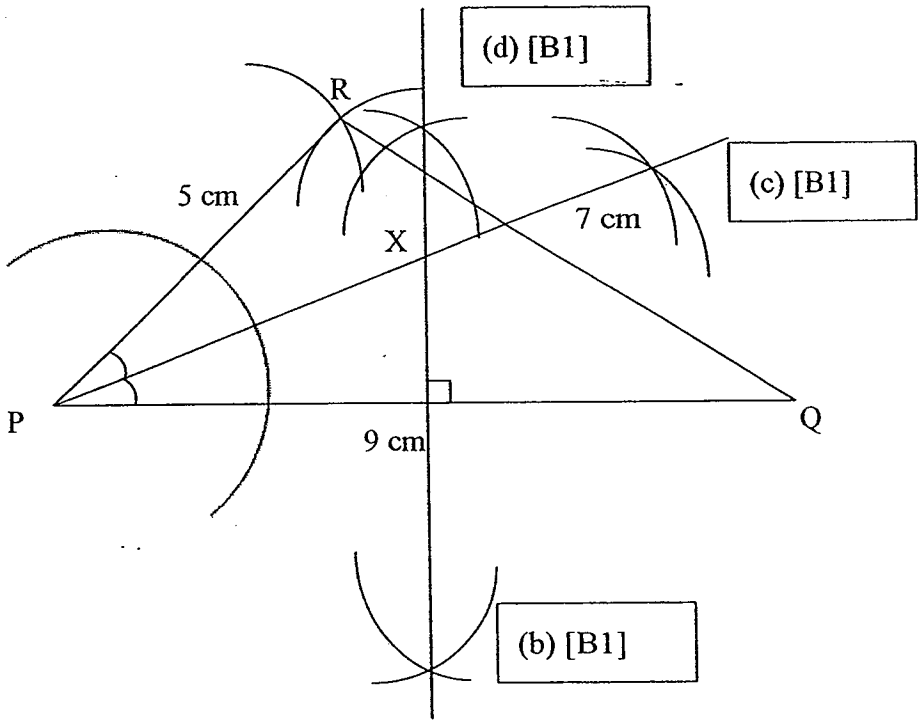
(f) Measure and write down the value of the largest angle of the triangle.

(g) On the same diagram, draw the perpendicular bisector of PQ [1]

(h) On the same diagram, draw the angle bisector of $\angle RPQ$. [1]

(i) On the same diagram, label the point X where the angle bisector of $\angle RPQ$ intersects the perpendicular bisector of PQ. [1]

(j) Hence, measure and write down the length of PX.



Construction of triangle:
Construction method – [B1]
Labelling – [B1]
Accuracy – [B1]

Answer: (a) ...96°..... [1]

(e) .....5.1 cm..... [1]

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27. (a) Given the function, $y = x + 2$, complete the table below. [1]

x	-4	-2	0	2	4
y	-2	**0**	**2**	4	6

(Remark: Award 0 mark if one of the answers is wrong)

(b) On a piece of graph paper, using a scale of 2 cm to represent 1 unit for both x- and y-axis, draw the graph of $y = x + 2$ for values of x ranging from -4 to 4. Label the graph clearly. [3]

(c) State the coordinates of the point(s) where the line cuts the x-axis

(d) State the coordinates of the y-intercept

(e) From your graph, find the value of y when $x = 2.5$

(f) Find the gradient of the line $y = x + 2$.

Answer: (c) .....(-2 , 0)..... [1]

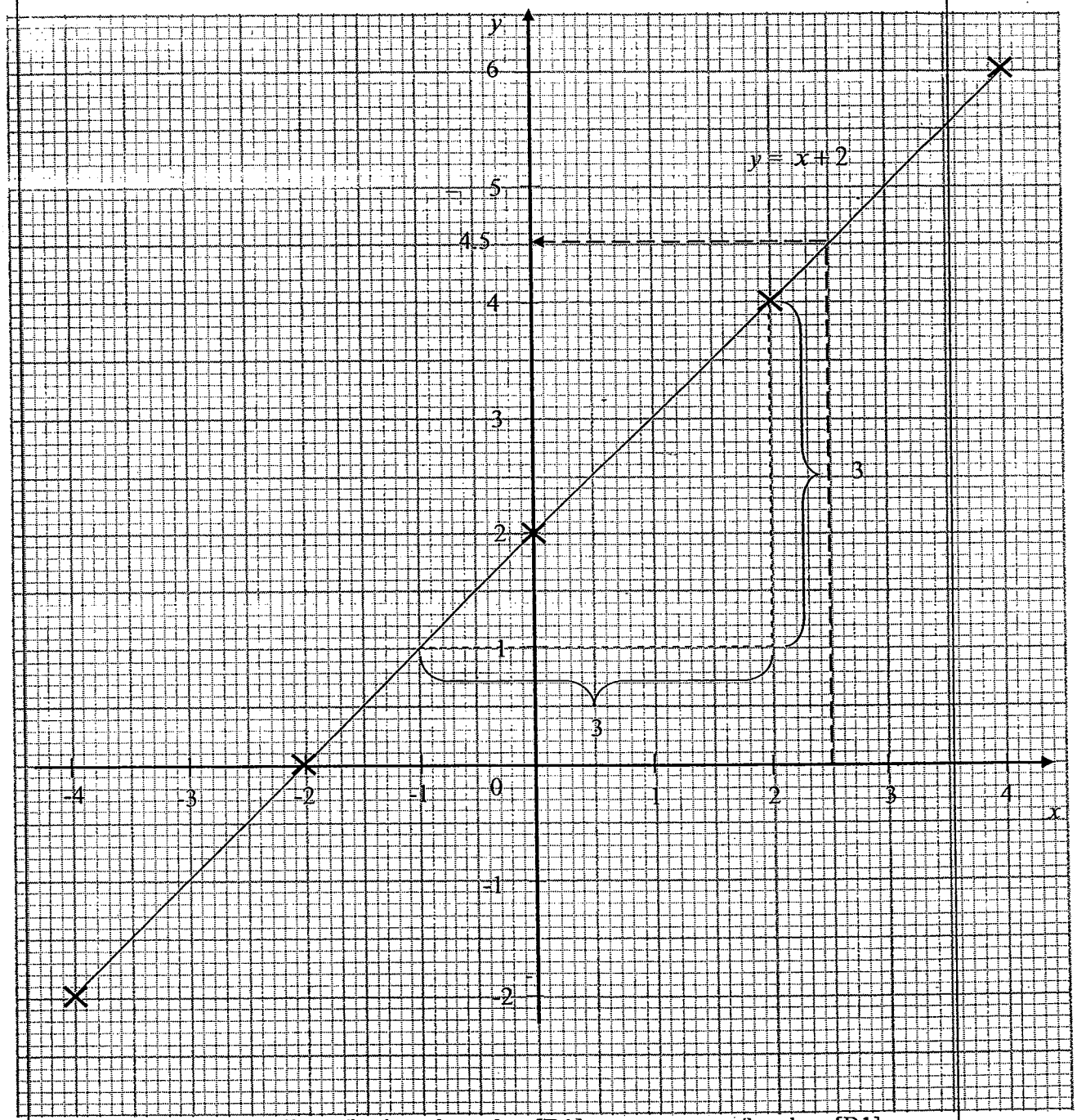
(d). .....(0 , 2)..... [1]

(e) .....4.5..... [1]

(Remark: Award 0 mark if no evidence of answer obtained from the graph)

(f) .....1..... [1]

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(Remark: Labelling of axis and graph – [B1], correctness of scale – [B1], Graph – [B1])

.....End of Paper.....

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