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**BEATTY SECONDARY SCHOOL
END-OF-YEAR EXAMINATION 2015**

SUBJECT : Mathematics

LEVEL : Sec 1 Express

PAPER : 1

DURATION : 1 hour 15 minutes

SETTER : Mr Alvin Lim

DATE : 7 Oct 2015

CLASS :	NAME :	REG NO :
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READ THESE INSTRUCTIONS FIRST

Write your name, class and index number in the spaces on the top of this page.

Write in dark blue or black pen.

You may use a pencil for any diagrams or graphs.

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.

You are expected to use a scientific calculator to evaluate explicit numerical expressions.

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 your calculator value or 3.142, unless the question requires the answer in terms of π .

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 **50**.

For Examiner's Use
50

This paper consists of **13** printed pages (including this cover page)

66

|Turn over

Answer **all** the questions.

For
Examiner's
Use

For
Examiner's
Use

- 1 (a)** Correct 5196.28 to 3 significant figures.

Answer : (a) [1]

- (b)** Evaluate $\frac{268.221 \times (7.562)^2}{(1.998)^3}$, giving your answer correct to 1 decimal place.

Answer : (b) [1]

- 2 (a)** Arrange the following numbers in ascending order.

$$-\frac{1}{4}, 0.33, \sqrt{2}, -1.45$$

Answer : (a) [1]

- (b)** Represent the numbers in (a) on the given number line. [2]

Answer (b) :



For
Examiner's
Use

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Use

- 3 Kevin cycled at a speed of 8 km/h for 84 minutes for the first part of a journey. He then decided to slow down and continued to cycle for another 13 km at a speed of 5 km/h for the rest of the journey. Calculate
- (a) the distance travelled in the first part of the journey,

Answer : (a) km [1]

- (b) the average speed for the whole journey.

Answer : (b) km/h [2]

- 4 Andy wanted to buy a pair of shoes which costs \$240. The shopkeeper gave Andy a discount and Andy paid \$225 for the pair of shoes instead. Calculate the percentage discount.

Answer : % [2]

67 [Turn over

For
Examiner's
Use

For
Examiner's
Use

5 Showing your workings clearly, evaluate

(a) $-22 - 6 \div (-2),$

Answer : (a) [2]

(b) $\left(-\frac{1}{3}\right)^2 - \left(-\frac{4}{9}\right).$

Answer : (b) [2]

6 Factorise the following completely.

(a) $9qx - 12x^2$

Answer : (a) [1]

(b) $(2y - 3) + x(3 - 2y)$

Answer : (b) [2]

For
Examiner's
Use

For
Examiner's
Use

7 Solve the following equations.

(a) $5x - 25 = 3(3x + 2)$

Answer : (a) $x = \dots\dots\dots$ [3]

(b) $\frac{x}{3} - \frac{x-1}{6} = 2$

Answer : (b) $x = \dots\dots\dots$ [3]

68 | Turn over

For
Examiner's
Use

For
Examiner's
Use

- 8 (a) Find the prime factorization of 2772, expressing your answer in index notation.

Answer : (a) [2]

- (b) Given that the prime factorization of 4200 is $2^3 \times 3 \times 5^2 \times 7$, find the highest common factor of 2772 and 4200.

Answer : (b) [1]

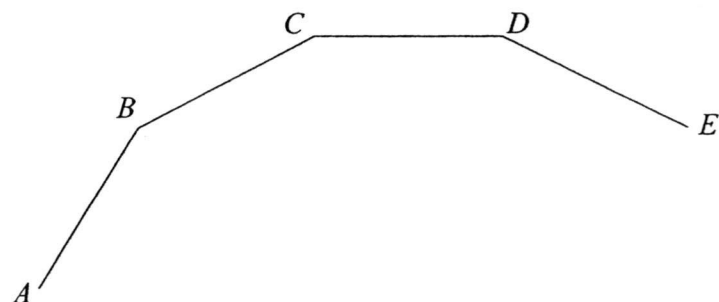
- (c) Find the smallest integer k such that $(2772 \times 4200k)$ is a square number.

Answer : (c) $k =$ [1]

For
Examiner's
Use

- 9 The diagram shows part of a regular 16-sided polygon.

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Examiner's
Use



Calculate

- (a) $\angle BCD$,

Answer : (a) [2]

- (b) the size of the exterior angle.

Answer : (b) [1]

69 [Turn over

For
Examiner's
Use

For
Examiner's
Use

10 The first four terms of a sequence are 8, 13, 18, 23.

(a) Write down the 7th term of the sequence.

Answer : (a) [1]

(b) Find an expression, in terms of n , for the n th term of the sequence.

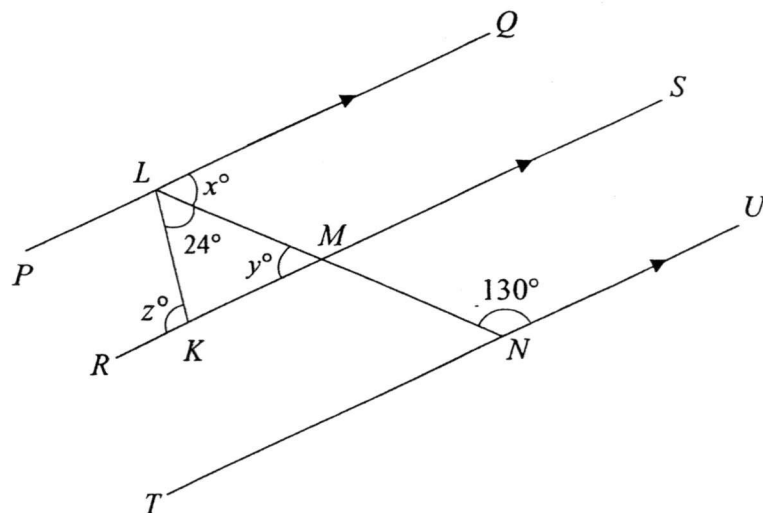
Answer : (b) [1]

(c) Find the 65th term of the sequence.

Answer : (c) [1]

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UseFor
Examiner's
Use

- 11 (a) Find the values of x , y and z in the following diagram, stating your reasons clearly.



Answer : (a) $x = \dots\dots\dots$ [1]

$y = \dots\dots\dots$ [1]

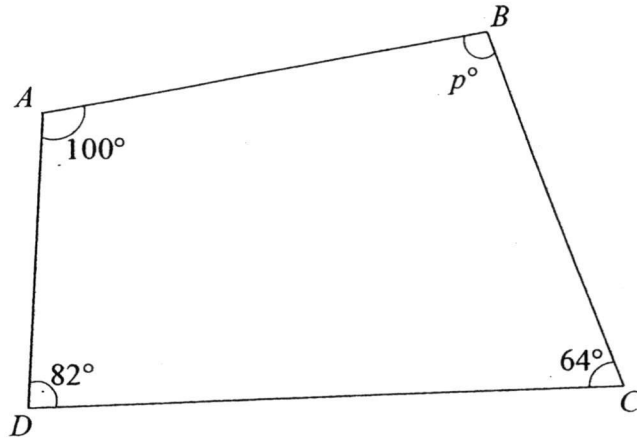
$z = \dots\dots\dots$ [1]

70 [Turn over

For
Examiner's
Use

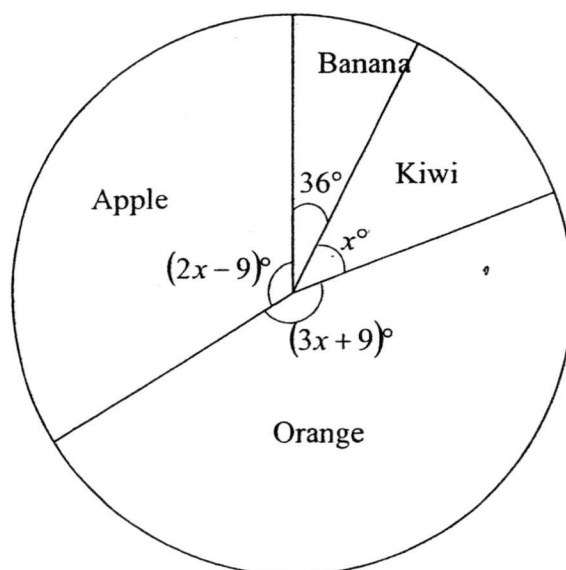
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Use

- (b) $ABCD$ is a quadrilateral. Given that $\angle BAD = 100^\circ$, $\angle ADC = 82^\circ$ and $\angle BCD = 64^\circ$, find the value of p .



Answer : (b) $p = \dots\dots\dots$ [2]

12 The pie chart below represents the favourite fruits of students in a class.



- (a) Find the value of x .

Answer : (a) $x = \dots\dots\dots$ [2]

- (b) Find the percentage of students whose favourite fruit is apple.

Answer : (b) $\dots\dots\dots\%$ [2]

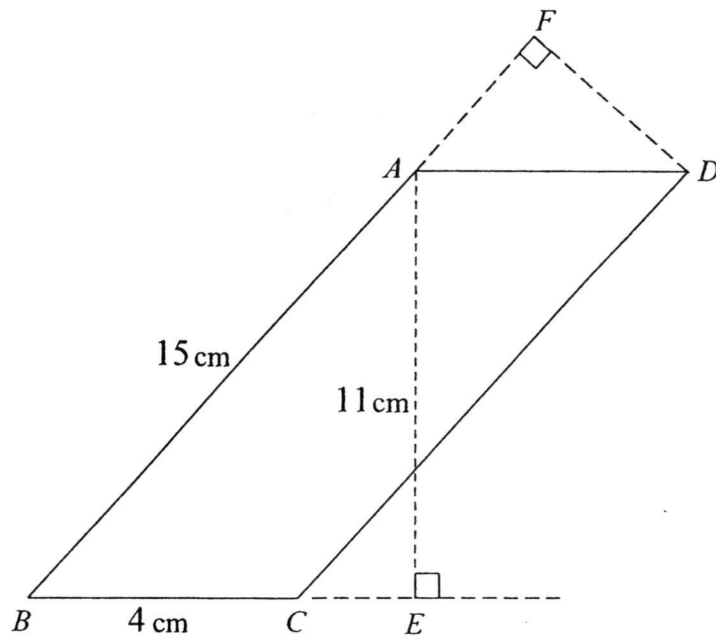
- (c) Given that there are a total of 40 students in the class, find the number of students whose favourite fruit is orange.

Answer : (c) $\dots\dots\dots$ [2]

71 [Turn over

For
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UseFor
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Use

- 13 (a) In the diagram, $ABCD$ is a parallelogram. $AB = 15$ cm, $BC = 4$ cm and $AE = 11$ cm. AE is perpendicular to BE and DF is perpendicular to BF .



- (i) Find the area of parallelogram $ABCD$.

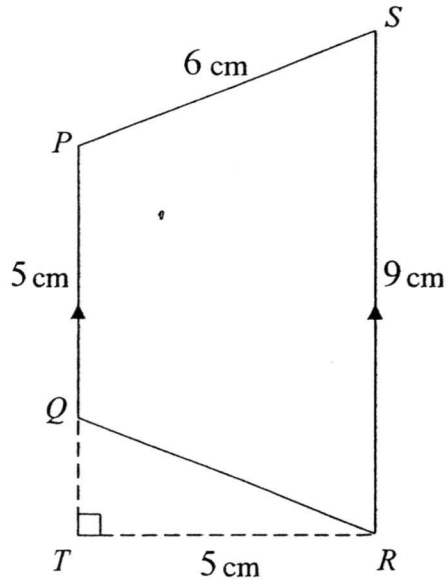
Answer : (a) (i) cm^2 [1]

- (ii) Find the length of DF .

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

For
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Use

- (b) In the diagram, $PQRS$ is a quadrilateral. $PQ = 5$ cm, $RS = 9$ cm, $PS = 6$ cm, $TR = 5$ cm and QP is parallel to RS .



- (i) State the special name of quadrilateral $PQRS$.
- (ii) Find the area of quadrilateral $PQRS$.

Answer : (b) (i) [1]

(ii) cm^2 [2]

~ End of Paper ~

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Answers

- 1(a)** 5200
1(b) 1923.0
2(a) $-1.45, -\frac{1}{4}, 0.33, \sqrt{2}$
3(a) $11.2 / 11\frac{1}{5}$ km
3(b) $6.05 / 6\frac{1}{20}$ km/h
4 $6.25 / 6\frac{1}{4}$ %
5(a) -19
5(b) $\frac{5}{9}$
6(a) $3x(3q - 4x)$
6(b) $(2y - 3)(1 - x)$
7(a) $x = -7\frac{3}{4}$
7(b) $x = 11$
8(a) $2772 = 2^2 \times 3^2 \times 7 \times 11$
8(b) HCF = 84
8(c) $k = 66$
9(a) 157.5°
9(b) 22.5°
10(a) 38
10(b) $3 + 5n$
10(c) 328
11(a) $x = 50$
 $y = 50$
 $z = 74$
11(b) $p = 114$
12(a) $x = 54$
12(b) 27.5%
12(c) 19
13(a) 44 cm^2
 $2\frac{14}{15} \text{ cm}$
13(b) Trapezium
 35 cm^2



BEATTY SECONDARY SCHOOL
END-OF-YEAR EXAMINATION 2015

SUBJECT : Mathematics

LEVEL : Sec 1 Express

PAPER : 1

DURATION : 1 hour 15 minutes

SETTER : Mr Alvin Lim

DATE : 7 Oct 2015

MARKING SCHEME

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Answer **all** the questions.

For
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Use

For
Examiner's
Use

- 1 (a)** Correct 5196.28 to 3 significant figures.

$$5196.28 = 5200 \text{ (3 s.f.)} \quad [\text{B1}]$$

Answer : (a) 5200 [1]

- (b)** Evaluate $\frac{268.221 \times (7.562)^2}{(1.998)^3}$, giving your answer correct to 1 decimal place.

$$\frac{268.221 \times (7.562)^2}{(1.998)^3} = 1923.0 \text{ (1 d.p.)} \quad [\text{B1}]$$

Answer : (b)^o 1923.0 [1]

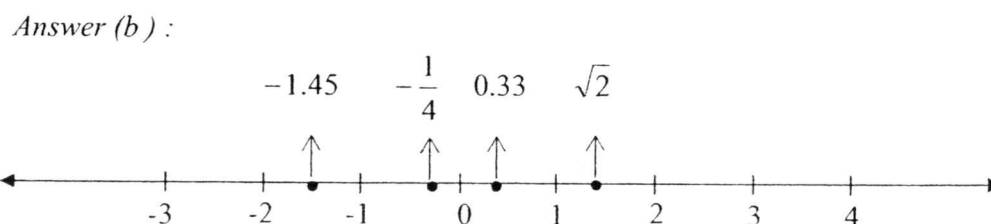
- 2 (a)** Arrange the following numbers in ascending order.

$$-\frac{1}{4}, 0.33, \sqrt{2}, -1.45$$

$$-1.45, -\frac{1}{4}, 0.33, \sqrt{2} \quad [\text{B1}]$$

Answer : (a) $-1.45, -\frac{1}{4}, 0.33, \sqrt{2}$ [1]

- (b)** Represent the numbers in (a) on the given number line. [2]



[-1 for any mistake]

For
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- 3 Kevin cycled at a speed of 8 km/h for 84 minutes for the first part of a journey. He then decided to slow down and continued to cycle for another 13 km at a speed of 5 km/h for the rest of the journey. Calculate
- (a) the distance travelled in the first part of the journey,

$$84 \text{ min} \rightarrow 1.4h$$

$$\text{Distance travelled} = 8 \times 1.4 = 11.2 \quad [\text{B1}]$$

$$\text{Answer : (a)} \quad 11.2 / 11\frac{1}{5} \text{ km} \quad [1]$$

- (b) the average speed for the whole journey.

$$\text{Time travelled for 2}^{\text{nd}} \text{ part} = 2.6h$$

$$\text{Average speed} = \frac{11.2 + 13}{2.6 + 1.4} \quad [\text{M1}]$$

$$= 6.05 \text{ km/h} \quad [\text{A1}]$$

$$\text{Answer : (b)} \quad 6.05 / 6\frac{1}{20} \text{ km/h} \quad [2]$$

- 4 Andy wanted to buy a pair of shoes which costs \$240. The shopkeeper gave Andy a discount and Andy paid \$225 for the pair of shoes instead. Calculate the percentage discount.

$$\begin{aligned} \text{Percentage discount} &= \frac{240 - 225}{240} \times 100\% \quad [\text{M1}] \\ &= 6.25\% \quad [\text{A1}] \end{aligned}$$

$$\text{Answer :} \quad 6.25 / 6\frac{1}{4} \% \quad [2]$$

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[Turn over

For
Examiner's
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Examiner's
Use

5 Showing your workings clearly, evaluate

(a) $-22 - 6 \div (-2),$

$$\begin{aligned} -22 - 6 \div (-2) &= -22 + 3 & [\text{M1}] \\ &= -19 & [\text{A1}] \end{aligned}$$

Answer : (a) -19 [2]

(b) $\left(-\frac{1}{3}\right)^2 - \left(-\frac{4}{9}\right).$

$$\begin{aligned} \left(-\frac{1}{3}\right)^2 - \left(-\frac{4}{9}\right) &= \left(\frac{1}{9}\right) - \left(-\frac{4}{9}\right) & [\text{M1}] \\ &= \frac{5}{9} & [\text{A1}] \end{aligned}$$

Answer : (b) $\frac{5}{9}$ [2]

6 Factorise the following completely.

(a) $9qx - 12x^2$

$$9qx - 12x^2 = 3x(3q - 4x) \quad [\text{B1}]$$

Answer : (a) $3x(3q - 4x)$ [1]

(b) $(2y - 3) + x(3 - 2y)$

$$\begin{aligned} (2y - 3) + x(3 - 2y) &= (2y - 3) - x(2y - 3) & [\text{M1}] \\ &= (2y - 3)(1 - x) & [\text{A1}] \end{aligned}$$

Answer : (b) $(2y - 3)(1 - x)$ [2]

For
Examiner's
UseFor
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Use

7 Solve the following equations.

(a) $5x - 25 = 3(3x + 2)$

$5x - 25 = 9x + 6$ [M1]

$5x - 9x = 25 + 6$ [M1]

$-4x = 31$

$x = -7\frac{3}{4}$ [A1]

Answer : (a)

$x = -7\frac{3}{4}$ [3]

(b) $\frac{x}{3} - \frac{x-1}{6} = 2$

$\frac{2x}{6} - \frac{x-1}{6} = 2$ [M1]

$\frac{2x - (x-1)}{6} = 2$

$2x - (x-1) = 12$

$2x - x + 1 = 12$ [M1]

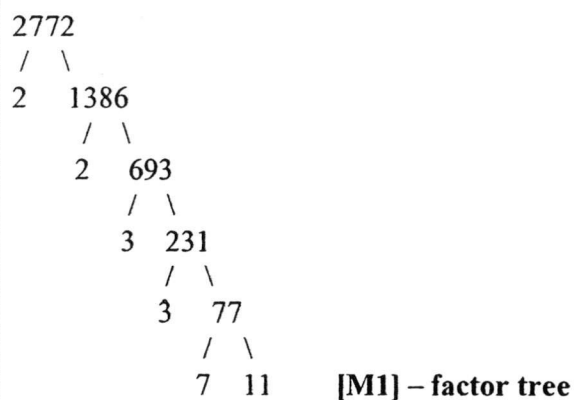
$x = 11$ [A1]

Answer : (b)

$x = 11$ [3]

For
Examiner's
UseFor
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Use

- 8 (a) Find the prime factorization of 2772, expressing your answer in index notation.



$$2772 = 2^2 \times 3^2 \times 7 \times 11 \quad [\text{A1}]$$

$$\text{Answer : (a)} \quad 2772 = 2^2 \times 3^2 \times 7 \times 11 \quad [2]$$

- (b) Given that the prime factorization of 4200 is $2^3 \times 3 \times 5^2 \times 7$, find the highest common factor of 2772 and 4200.

$$\text{HCF} = 84 \quad [\text{B1}]$$

$$\text{Answer : (b)} \quad \text{HCF} = 84 \quad [1]$$

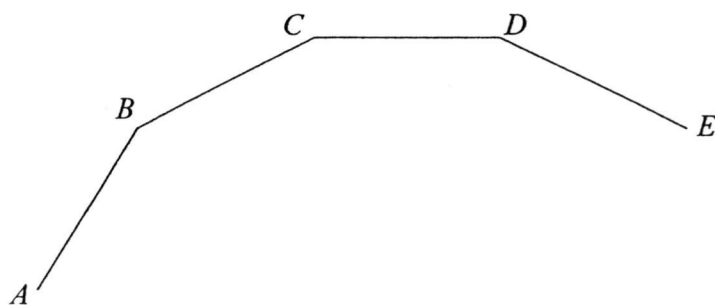
- (c) Find the smallest integer k such that $(2772 \times 4200k)$ is a square number.

$$k = 66 \quad [\text{B1}]$$

$$\text{Answer : (c)} \quad k = 66 \quad [1]$$

For
Examiner's
UseFor
Examiner's
Use

9 The diagram shows part of a regular 16-sided polygon.



Calculate

(a) $\angle BCD$,

$$\begin{aligned} \text{Sum of interior angles} &= (16-2)180^\circ & [\text{M1}] \\ &= 2520^\circ \end{aligned}$$

$$\begin{aligned} \angle BCD &= 2520^\circ \div 16 \\ &= 157.5^\circ & [\text{A1}] \end{aligned}$$

Answer : (a) 157.5° [2]

(b) the size of the exterior angle.

$$\begin{aligned} \text{Exterior angle} &= 360^\circ \div 16 \\ &= 22.5^\circ & [\text{B1}] \end{aligned}$$

Answer : (b) 22.5° [1]

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[Turn over

For
Examiner's
Use

For
Examiner's
Use

10 The first four terms of a sequence are 8, 13, 18, 23.

(a) Write down the 7th term of the sequence.

7th term = 38 **[B1]**

Answer : (a) 38 [1]

(b) Find an expression, in terms of n , for the n th term of the sequence.

n^{th} term = $3 + 5n$ **[B1]**

Answer : (b) $3 + 5n$ [1]

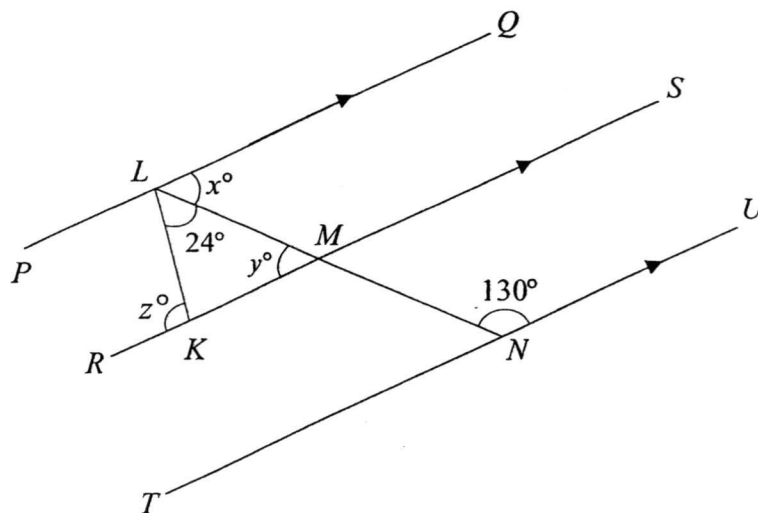
(c) Find the 65th term of the sequence.

65th term = 328 **[B1]**

Answer : (c) 328 [1]

For
Examiner's
Use

- 11 (a) Find the values of x , y and z in the following diagram, stating your reasons clearly.

For
Examiner's
Use

$$130^\circ + x^\circ = 180^\circ \text{ (interior angles)}$$

$$x = 50 \quad [\text{B1}]$$

$$y^\circ = x^\circ \text{ (alternate angles)}$$

$$y = 50 \quad [\text{B1}]$$

$$z^\circ = 24^\circ + y^\circ \text{ (exterior angle of a triangle)}$$

$$z = 74 \quad [\text{B1}]$$

Answer : (a)

$$x = 50 \quad [1]$$

$$y = 50 \quad [1]$$

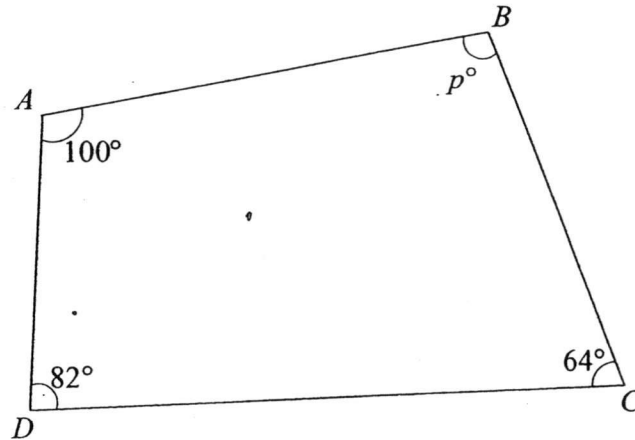
$$z = 74 \quad [1]$$

77 [Turn over

For
Examiner's
Use

For
Examiner's
Use

- (b) $ABCD$ is a quadrilateral. Given that $\angle BAD = 100^\circ$, $\angle ADC = 82^\circ$ and $\angle BCD = 64^\circ$, find the value of p .



$$100^\circ + 82^\circ + p^\circ + 64^\circ = 360^\circ \text{ (angle sum of quad.)} \quad [\text{M1}]$$

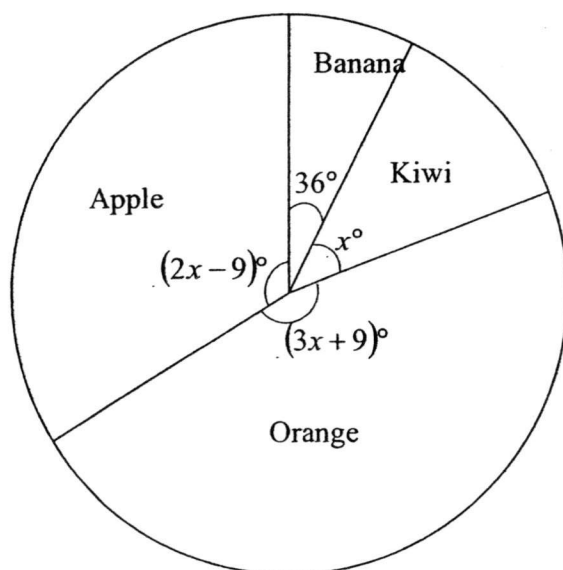
$$p = 114 \quad [\text{A1}]$$

Answer : (b)

$$p = 114$$

[2]

- 12 The pie chart below represents the favourite fruits of students in a class.



- (a) Find the value of x .

$$(2x - 9) + (3x + 9) + 36 + x = 360 \quad [\text{M1}]$$

$$x = 54 \quad [\text{A1}]$$

Answer : (a) $x = 54$ [2]

- (b) Find the percentage of students whose favourite fruit is apple.

$$\text{Percentage of students} = \frac{99}{360} \times 100\% \quad [\text{M1}]$$

$$= 27.5\% \quad [\text{A1}]$$

Answer : (b) 27.5% [2]

- (c) Given that there are a total of 40 students in the class, find the number of students whose favourite fruit is orange.

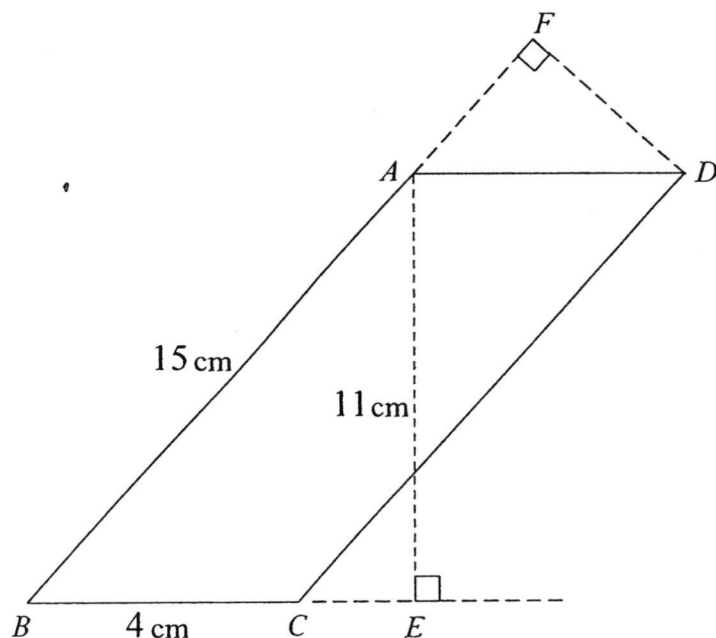
$$\text{Number of students} = \frac{171}{360} \times 40 \quad [\text{M1}]$$

$$= 19 \quad [\text{A1}]$$

Answer : (c) 19 [2]

For
Examiner's
UseFor
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Use

- 13 (a) In the diagram, $ABCD$ is a parallelogram. $AB = 15$ cm, $BC = 4$ cm and $AE = 11$ cm. AE is perpendicular to BE and DF is perpendicular to BF .



- (i) Find the area of parallelogram $ABCD$.

$$\begin{aligned} \text{Area of parallelogram} &= 4 \times 11 \\ &= 44 \text{ cm}^2 \end{aligned} \quad [\text{B1}]$$

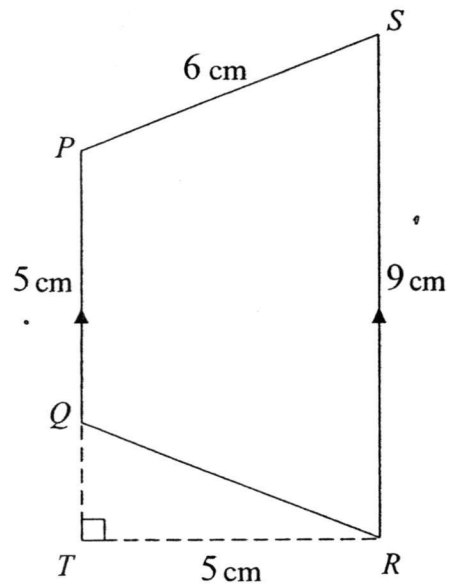
Answer : (a) (i) 44 cm^2 [1]

- (ii) Find the length of DF .

$$\begin{aligned} DF &= 44 \div 15 \quad [\text{M1}] \\ &= 2 \frac{14}{15} \text{ cm} \quad [\text{A1}] \end{aligned}$$

Answer : (a) (ii) $2 \frac{14}{15} \text{ cm}$ [2]

- (b) In the diagram, $PQRS$ is a quadrilateral. $PQ = 5$ cm, $RS = 9$ cm, $PS = 6$ cm, $TR = 5$ cm and QP is parallel to RS .



- (i) State the special name of quadrilateral $PQRS$.
 (ii) Find the area of quadrilateral $PQRS$.

(i) Trapezium [B1]

(ii) Area of quadrilateral $PQRS = \frac{1}{2}(5 + 9)(5)$ [M1]
 $= 35 \text{ cm}^2$ [A1]

Answer : (b) (i) Trapezium [1]

(ii) 35 cm^2 [2]

~ End of Paper ~

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**BEATTY SECONDARY SCHOOL
END-OF-YEAR EXAMINATION 2015**

SUBJECT : Mathematics

LEVEL : Sec 1 Express

PAPER : 2

DURATION : 1 hour 30 minutes

SETTER : Ms Yuen Shu Yan

DATE : 9 October 2015

CLASS :	NAME :	REG NO :
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READ THESE INSTRUCTIONS FIRST

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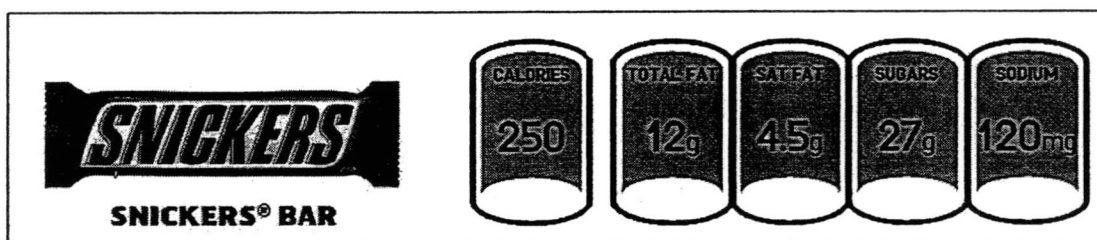
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80 [Turn over

- 1 Subtract $11x^2 - 5$ from $8x^2 + 3x - 1$. [2]
- 2 Simplify $\frac{3a+4b}{6} - \frac{5b-a}{5} + b$. [3]
- 3 Buses for service number 231, 235 and 238 leave Toa Payoh bus interchange every 8 minutes, 3 minutes and 6 minutes respectively. If buses for all three service numbers left the interchange at 1900 hour, what is the next time when buses for all three service numbers leave the interchange at the same time again? [3]
- 4 If $\frac{1}{R} = \frac{1}{P} + \frac{1}{Q}$, find the value of P when $R = 5$ and $Q = \frac{2}{5}$. [3]
- 5 Solve the equation $\frac{2x+1}{x-3} = 2\frac{1}{3}$. [3]
- 6 Factorise $a(5x-1) - b(5x-1)$.
Hence, find the value of $20 \times 99 - 10 \times 99$. [3]
- 7 An interior angle of a regular polygon is five times its exterior angle. Find the number of sides of the polygon. [3]

- 8 The nutritional information of a Snickers bar is shown in the diagram below.



- (a) Find the ratio in mass of Total Fat : Sat(urated) Fat : Sugars. [2]
- (b) Calculate the percentage of the mass of sodium in one bar of Snickers. [2]
- (c) If a student burns 30 calories by walking to school in 15 minutes, calculate the time taken, in hours, he will need to burn all the calories in one bar of Snickers. [2]

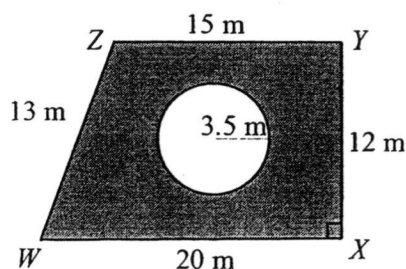
Answer the whole question on a blank piece of paper provided.

- 9 Draw a quadrilateral $ABCD$ given that $AB = 8.6$ cm, $AD = 4.4$ cm $\angle ADC = 120^\circ$, $\angle BAD = 70^\circ$ and $\angle ABC = 100^\circ$. [3]
- (a) Construct the angle bisector of $\angle BCD$. [1]
- (b) Construct the perpendicular bisector of CD . [1]
- (c) Label the point X where the angle bisector and the perpendicular bisector meet.
Construct a circle with centre X which passes through points C and D . [1]
- (d) Write down the radius of the circle. [1]

[Turn over

- 10 The diagram below shows a cross-section of a solid prism with a hole of radius 3.5 m drilled through it. $WXYZ$ is a trapezium, where $WX = 20$ m, $XY = 12$ m, $YZ = 15$ m, $WZ = 13$ m and $\angle WXY = 90^\circ$.

The length of the solid is 24 m.



Find

- (a) the area of the cross-section, leaving your answer in terms of π , [3]
- (b) the volume of the solid, [2]
- (c) the total surface area of the solid. [3]

Answer the whole of this question on a sheet of graph paper.

- 11 The table below shows some values of x and the corresponding values of y for the function $6y + 2x = 5$.

x	-5	-2	1	4
y	2.5	p	0.5	-0.5

- (a) Calculate the value of p . [1]
- (b) Using a scale of 2 cm to 1 unit on the x -axis for $-5 \leq x \leq 4$ and 4 cm to 1 unit on the y -axis for $-1 \leq y \leq 3$, draw the graph of $6y + 2x = 5$. [3]
- (c) Find the gradient of the line. [1]
- (d) From the graph, find
 - (i) the value of x when $y = 2$, [1]
 - (ii) the value of y when $x = -1$. [1]
- (e) Draw and label the graph of $x = 2$. Hence, state the co-ordinates of point of intersection of the two graphs. [2]

~ End of Paper ~

Answers

1 $-3x^2 + 3x + 4$

2 $\frac{21a + 20b}{30}$

3 24 min, 1924 h

4 $-\frac{10}{23}$

5 24

6 $(5x - 1)(a - b)$, 990

7 12

8(a) 8 : 3 : 18

(b) 0.275 %

(c) $12\frac{1}{12}$ hours

9(d) 5 cm

10(a) $210 - 12.25\pi \text{ m}^2$

(b) 4120 m^3

(c) 2310 m^2

11(a) $p = 1.5$

(c) $-\frac{1}{3}$

(d)(i) $x = -3.5$

(ii) $y = 1.15$

(e) (2, 0.15)



BEATTY SECONDARY SCHOOL
END-OF-YEAR EXAMINATION 2015

MARKING SCHEME

SUBJECT : Mathematics

LEVEL : Sec 1 Express

PAPER : 2

DURATION : 1 hour 30 minutes

SETTER : Ms Yuen Shu Yan

DATE : 9 October 2015

CLASS :	NAME :	REG NO :
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READ THESE INSTRUCTIONS FIRST

Write your name, class and index number in the spaces on the top of this page.

Write in dark blue or black pen.

You may use a pencil for any diagrams or graphs.

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.

You are expected to use a scientific calculator to evaluate explicit numerical expressions.

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 your calculator value or 3.142, unless the question requires the answer in terms of π .

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 50.

For Examiner's Use
50

- 1 Subtract $11x^2 - 5$ from $8x^2 + 3x - 1$.

[2]

$$(8x^2 + 3x - 1) - (11x^2 - 5) = 8x^2 + 3x - 1 - 11x^2 + 5$$

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

M1

A1

- 2 Simplify $\frac{3a+4b}{6} - \frac{5b-a}{5} + b$.

[3]

$$\frac{3a+4b}{6} - \frac{5b-a}{5} + b = \frac{5(3a+4b) - 6(5b-a) + 30b}{30}$$

$$= \frac{15a + 20b - 30b + 6a + 30b}{30}$$

$$= \frac{21a + 20b}{30}$$

M1

M1

A1

- 3 Buses for service number 231, 235 and 238 leave Toa Payoh bus interchange every 8 minutes, 3 minutes and 6 minutes respectively. If buses for all three service numbers left the interchange at 1900 hour, what is the next time when buses for all three services numbers leave the interchange at the same time again?

[3]

$$8 = 2^3$$

$$3 = 1 \times 3$$

M1

$$6 = 2 \times 3$$

$$\text{LCM} = 2^3 \times 3$$

$$= 24$$

M1

Next time when buses of all three services leave = 1924 hour or 7.24 pm.

A1

- 4 If $\frac{1}{R} = \frac{1}{P} + \frac{1}{Q}$, find the value of P when $R = 5$ and $Q = \frac{2}{5}$.

[3]

When $R = 5$, $Q = \frac{2}{5}$,

$$\frac{1}{5} = \frac{1}{P} + \frac{1}{\left(\frac{2}{5}\right)}$$

M1

$$\frac{1}{P} = -\frac{23}{10}$$

M1

$$P = -\frac{10}{23}$$

A1

- 5 Solve the equation $\frac{2x+1}{x-3} = 2\frac{1}{3}$. [3]

$\frac{2x+1}{x-3} = \frac{7}{3}$	
$3(2x+1) = 7(x-3)$	M1
$6x+3 = 7x-21$	M1
$x = 24$	A1

- 6 Factorise $a(5x-1) - b(5x-1)$.

Hence, find the value of $20 \times 99 - 10 \times 99$.

[3]

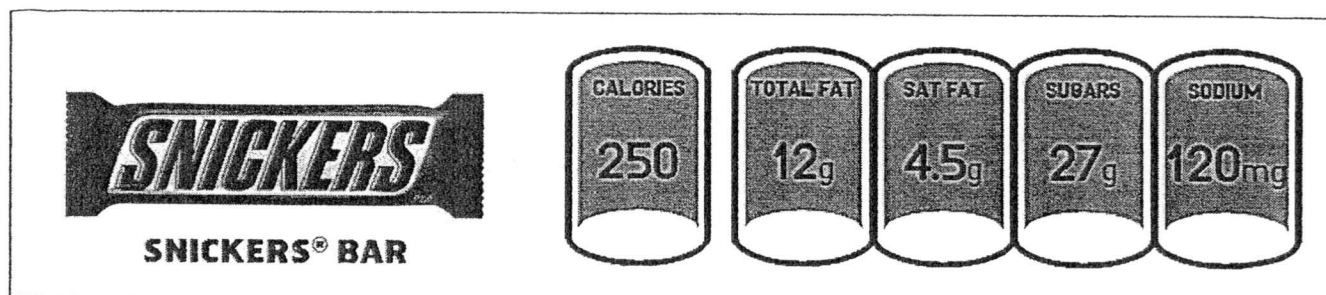
$(5x-1)(a-b)$	B1	
Let $x = 20, a = 20, b = 10$,		
$20 \times 99 - 10 \times 99 = [5(20) - 1][20 - 10]$	M1	$20 \times 99 - 10 \times 99 = 99(20 - 10)$ $= 99 \times 10$ $= 990$
$= (100 - 1)(10)$		
$= 99 \times 10$		
$= 990$	A1	

- 7 An interior angle of a regular polygon is five times its exterior angle. Find the number of sides of the polygon.

[3]

$\frac{(n-2) \times 180}{n} = \frac{360}{n} \times 5$	M1
$\frac{180n - 360}{n} = \frac{1800}{n}$	
$180n - 360 = 1800$	M1
$180n = 2160$	
$n = 12$	A1

- 8 The nutritional information of a Snickers bar is shown in the diagram below.

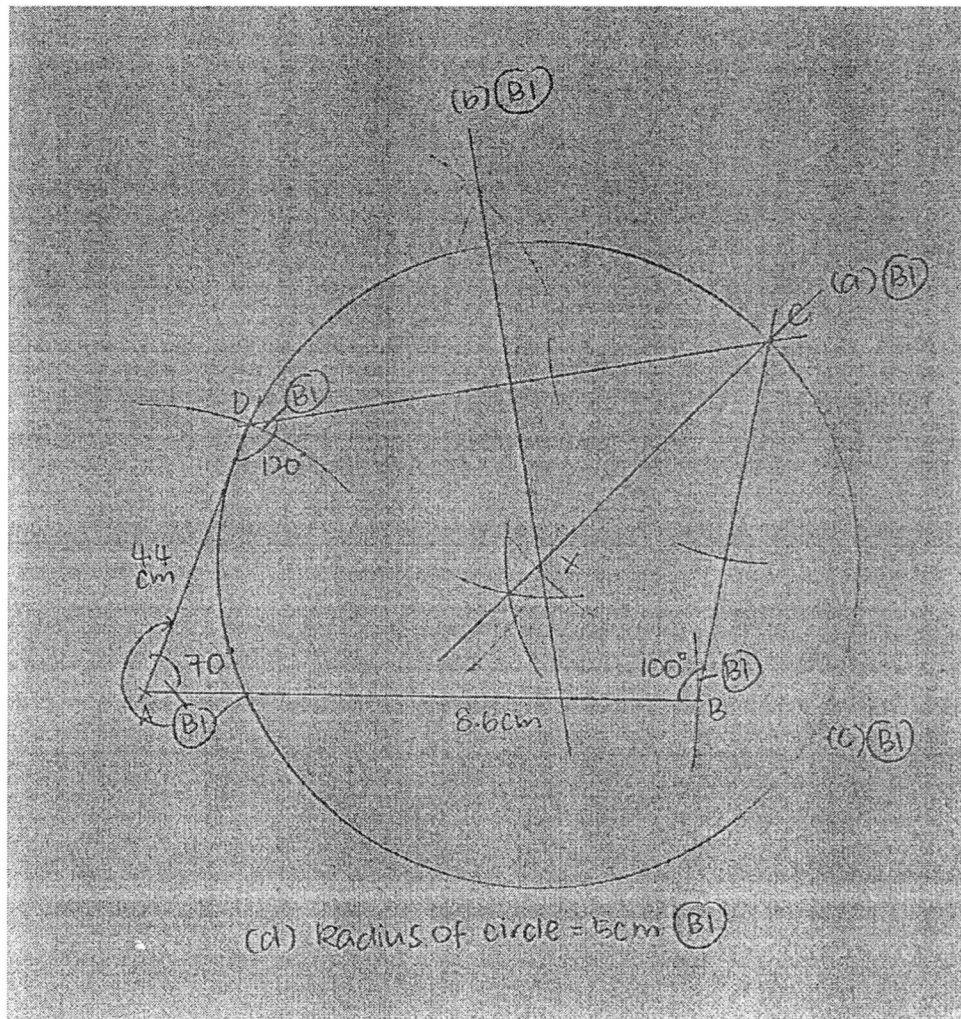


- (a) Find the ratio in mass of Total Fat : Sat(urated) Fat : Sugars. [2]
 (b) Calculate the percentage of the mass of sodium in one bar of Snickers. [2]
 (c) If a student burns 30 calories by walking to school in 15 minutes, calculate the time taken, in hours, he will need to burn all the calories in one bar of Snickers. [2]

(a)	Ratio of Total Fat, Sat Fat and Sugars	$= 12 : 4.5 : 27$	M1
		$= 8 : 3 : 18$	A1
(b)	Percentage of mass of sodium	$= \frac{0.12}{12 + 4.5 + 27 + 0.12} \times 100\%$	M1
		$= 0.275\%$	A1
(c)	Time required $= \frac{15}{30} \times 250$	M1	
	$= 125 \text{ minutes}$		
	$= 2 \frac{1}{12} \text{ hours}$	A1	

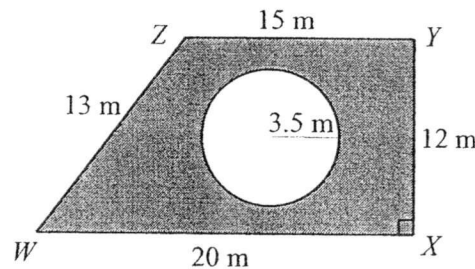
Answer the whole question on a blank piece of paper provided.

- 9 Draw a quadrilateral $ABCD$ given that $AB = 8.6$ cm, $AD = 4.4$ cm $\angle ADC = 120^\circ$, $\angle BAD = 70^\circ$ and $\angle ABC = 100^\circ$. [3]
- (a) Construct the angle bisector of $\angle BCD$. [1]
- (b) Construct the perpendicular bisector of CD . [1]
- (c) Label the point X where the angle bisector and the perpendicular bisector meet. Construct a circle with centre X which passes through points C and D . [1]
- (d) Write down the radius of the circle. [1]



- 10 The diagram below shows a cross-section of a solid prism with a hole of radius 8 m drilled through it. $WXYZ$ is a trapezium, where $WX = 26$ m, $XY = 12$ m, $YZ = 15$ m, $WZ = 13$ m and $\angle WXY = 90^\circ$.

The length of the solid is 24 m.



Find

- (a) the area of the cross-section, leaving your answer in terms of π , [3]
 (b) the volume of the solid. [2]
 (c) the total surface area of the solid [3]

(a)	Area of trapezium	$= \frac{1}{2}(12)(15 + 20)$	M1
		$= 210\text{m}^2$	
	Area of circle	$= \pi(3.5)^2$	M1
		$= 12.25\pi\text{ m}^2$	
	Area of cross-section	$= (210 - 12.25\pi)\text{ m}^2$	A1
(b)	Volume of solid	$= (210 - 12.25\pi) \times 24$	M1
		$= 4120\text{m}^3$ (to 3 sig fig)	A1
(c)	Surface area of trapezium	$= 2(210 - 12.25\pi) + (20 + 12 + 15 + 13) \times 24$	M1
		$= 2(210 - 12.25\pi) + 1440\text{m}^2$	
	Curved surface area of hole	$= 2\pi(3.5) \times 24$	M1
		$= 168\pi\text{ m}^2$	
	Total surface area	$= [2(210 - 12.25\pi) + 1440] + 168\pi$	
		$= 2310\text{ m}^2$ (to 3 sig fig)	A1

Answer the whole of this question on a sheet of graph paper.

- 11 The table below shows some values of x and the corresponding values of y for the function $6y + 2x = 5$.

x	-5	-2	1	4
y	2.5	p	0.5	-0.5

- (a) Calculate the value of p . [1]
- (b) Using a scale of 2 cm to 1 unit on the x -axis for $-5 \leq x \leq 4$ and 4 cm to 1 unit on the y -axis for $-1 \leq y \leq 3$, draw the graph of $6y + 2x = 5$. [3]
- (c) Find the gradient of the line. [1]
- (d) From the graph, find
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- (e) Draw and label the graph of $x = 2$. Hence, state the co-ordinates of point of intersection of the two graphs. [2]

Name _____ Index No. _____

Subject _____ Class _____ Date _____

(11) Graph of $6y + 2x = 5$

Table of $6y + 2x = 5$

x	-5	-2	1	4
y	2.5	1.5	0.5	-0.5

Scale: x-axis : 2cm to 1 unit

y-axis : 4cm to 1 unit

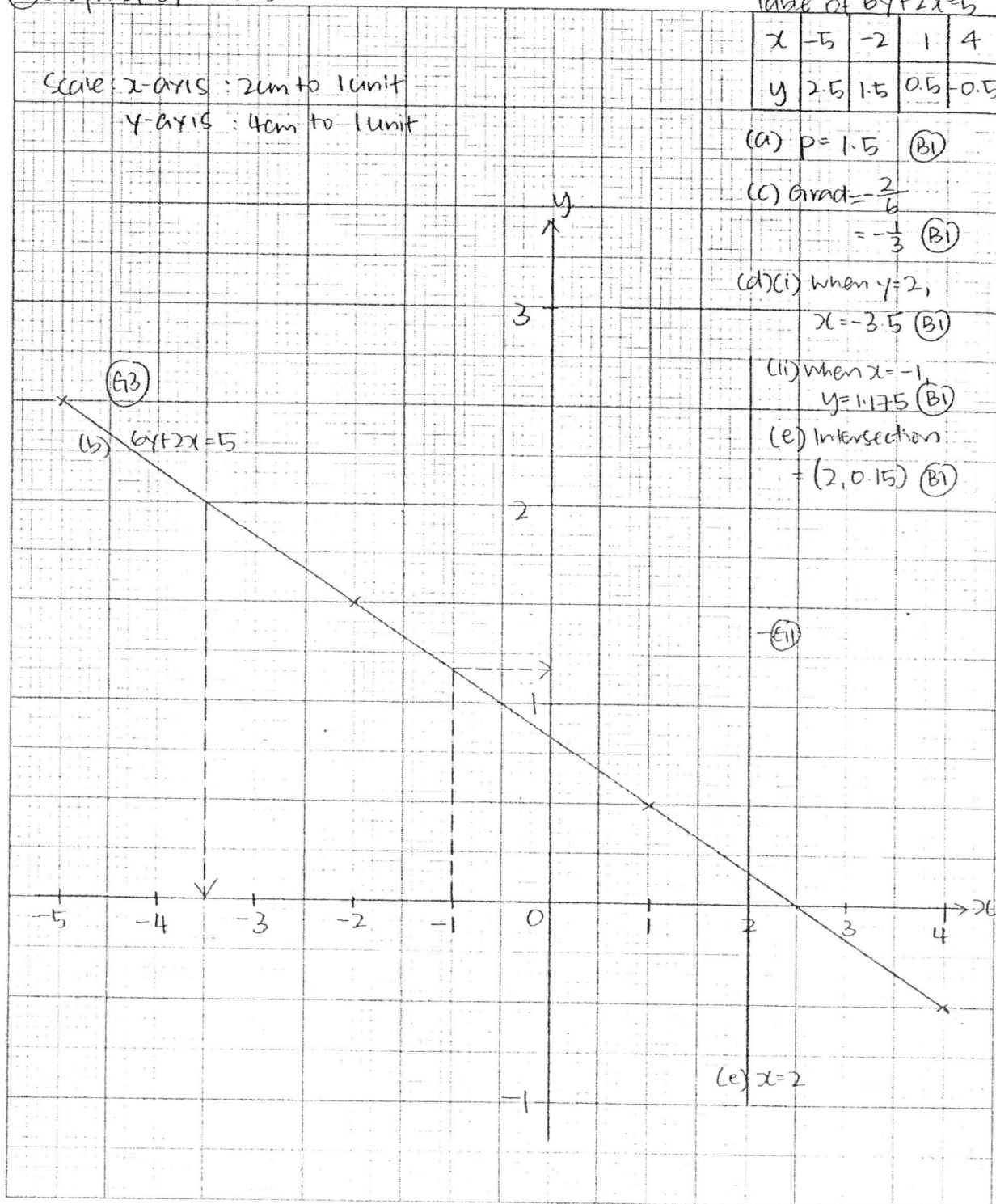
(a) $p = 1.5$ (B1)

(c) $\text{grad} = -\frac{2}{6}$
 $= -\frac{1}{3}$ (B1)

(d)(i) when $y = 2$,
 $x = -3.5$ (B1)

(ii) when $x = -1$,
 $y = 1.175$ (B1)

(e) Intersection
 $= (2, 0.5)$ (B1)



20 cm x 24 cm

eais