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Answer **all** the questions.

- 1 By writing each value correct to 1 significant figure, **estimate** the value of

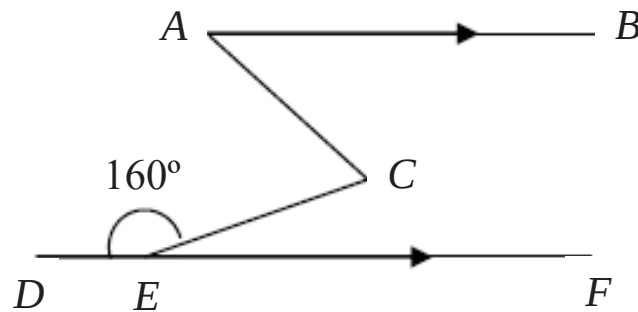
$$\frac{2.92^3 \times 3.35}{25.1 - 10.3}.$$

You must show your working.

For
Examiner's
Use

Answer [2]

- 2 In the diagram, AB is parallel to DEF and $\angle BAC = 2\angle FEC$.



- (a) Calculate reflex $\angle ACE$.

Answer (a) $^{\circ}$ [2]

- (b) If $AC = EC = 10$ cm, calculate the area of triangle ACE .

Answer (b) cm^2 [2]

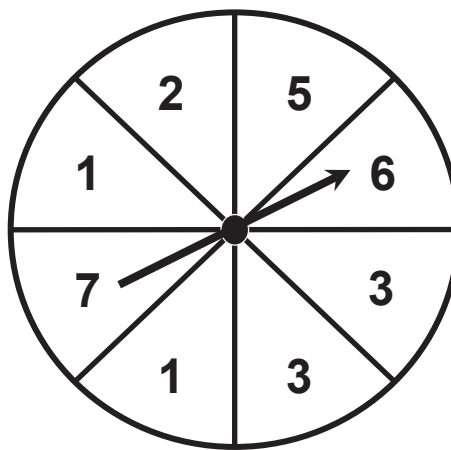
- 3 (a) Solve $5a - 12 = 8 + 2a$.

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

- (b) Given that x is an integer, $2x \geq 5$ and $x < 5$, write down all possible values of x .

Answer (b) $x = \dots\dots\dots$ [2]

4



A fair circular spinner labelled 1, 2, 3, 5, 6 and 7 is spun once.
Find the probability that it lands on

- (a) a number greater than 3,

Answer (a) $\dots\dots\dots$ [1]

- (b) a prime number.

Answer (b) $\dots\dots\dots$ [1]

5

8, 13, 18, 23, 28, ...

- (a) Find an algebraic expression for the n th term in the sequence.

Answer (a) [1]

- (b) Explain, with a reason, why 255 is not in the sequence.

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

6 Given the formula

$$T = \frac{5(h - 32)}{9}$$

- (a) Find T when $h = 77$.

Answer (a) [1]

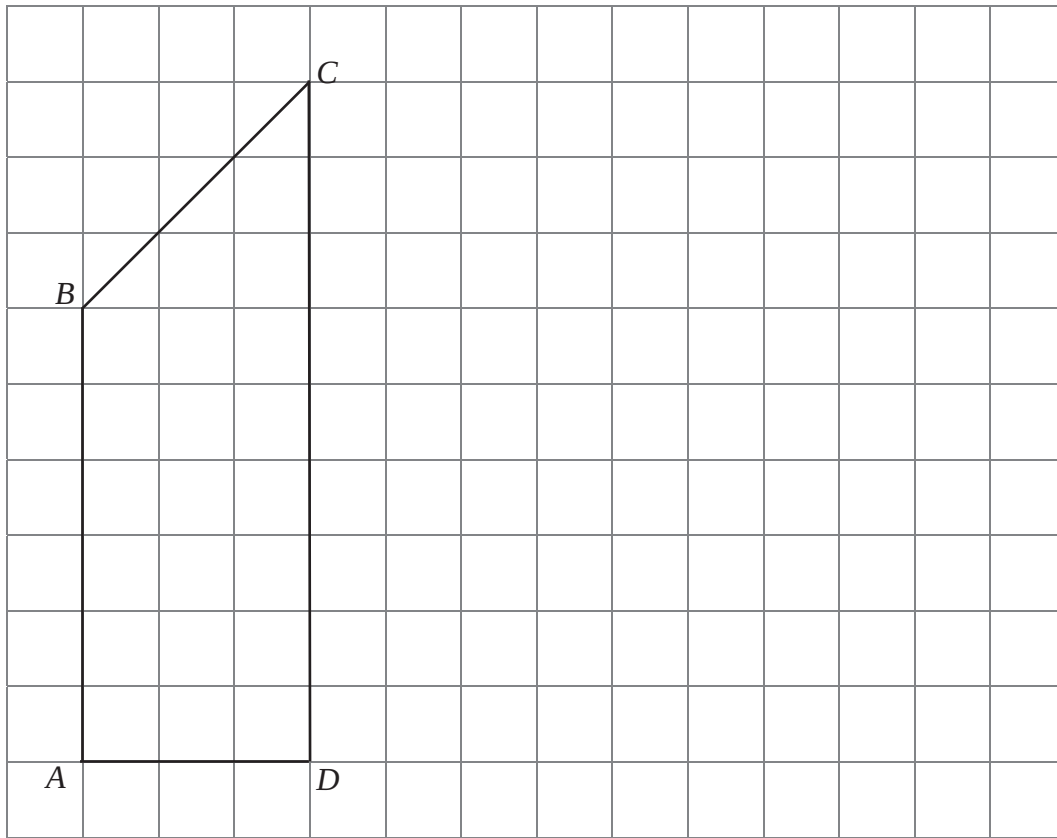
- (b) Make h the subject of the formula.

Answer (b) [2]

- 7 Draw a reduction of this trapezium using a scale factor of $\frac{1}{3}$.

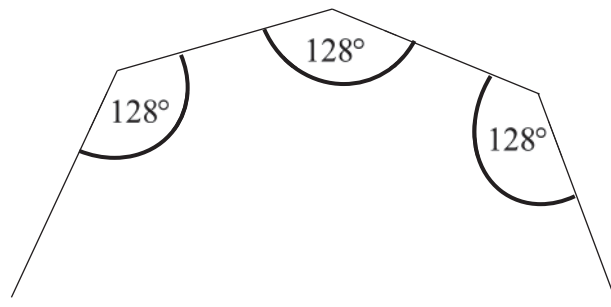
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Answer



[2]

8



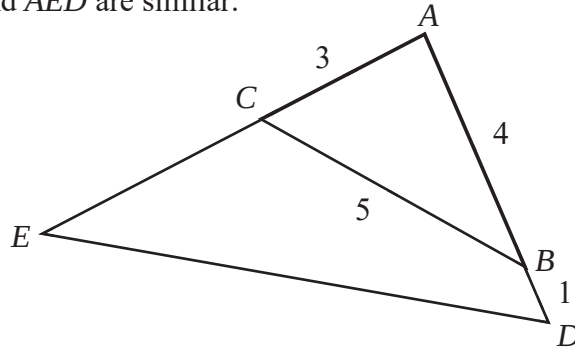
Adrian says that this diagram shows part of a regular polygon.

Is he correct?
Show your working.

Answer

[2]

- 9 In the diagram $AB = 4$ cm, $AC = 3$ cm, $BC = 5$ cm and $BD = 1$ cm. Triangles ABC and AED are similar.



Calculate

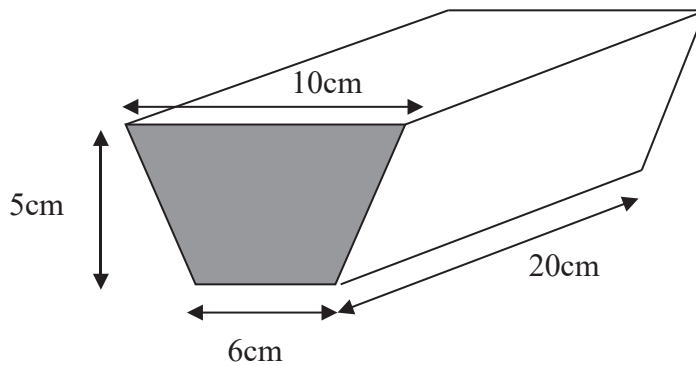
- (a) DE ,

Answer (a)cm [2]

- (b) CE .

Answer (b)cm [2]

- 10 The diagram shows an iron bar in the shape of a trapezoidal prism.



Calculate the volume of the prism.

Answercm³ [3]

- 11** The stem-and-leaf diagram shows the number of words written by 21 students in a journal entry.

Key	
4 7	represents 47 words

2	6 8 9
3	1 1 3 7 7 9 9
4	0 1 2 7 8
5	0 2 3 3 3 4

- (a) Find the range.

Answer (a) [1]

- (b) Find the median.

Answer (b) [1]

- (c) Alan handed in his journal late. The number of words written by him would decrease the median and increase the range by 1.
How many words did Alan write? Explain your answer.

Answer (c) words [1]

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

- 12** Solve these simultaneous equations.

$$2x + y = 6$$

$$2y = x + 3$$

Answer $x =$

$y =$ [3]

- 13** An area of 1250 km^2 is represented on a map by an area of 50 cm^2 .

Find

- (a) the scale of the map in the form of $1 : n$,

Answer (a) : [2]

- (b) the length of a road on the map with an actual distance of 27 km.

Answer (b)cm [2]

- 14** (a) $x^2 + 6x + 6$ can be expressed in the form $(x + a)^2 + b$.

Find a and b .

Answer (a) $a =$

$b =$ [2]

- (b) Hence solve $x^2 + 6x + 6 = 0$.
Give your answers correct to 2 decimal places.

Answer (b) $x =$ or [2]

15 (a) Simplify $\frac{5x^3}{4y^2} \div \frac{35x}{6y^3}$.

Answer (a) [2]

(b) Write as a single fraction in its simplest form $\frac{2}{x^2 - 16} - \frac{1}{x - 4}$.

Answer (b) [3]

16 (a) Find a fraction which is exactly halfway between $\frac{3}{5}$ and $\frac{5}{6}$.

Answer (a) [2]

(b) Express the value of this fraction as a decimal, giving your answer as a recurring decimal.

Answer (b) [1]

- 17 (a)** Express 240 as a product of its prime factors.

Answer (a) [1]

- (b)** Find the highest common factor of 240 and 2750.

Answer (b) [2]

- (c)** Find the smallest positive integer k for which $240k$ is a multiple of 2750.

Answer (c) $k =$ [2]

- 18** Liam invested some money for 2 years at 2% compound interest per year.
At the end of 2 years, it was worth \$8323.20.

How much did he invest?

Answer \$ [2]

- 19** m is inversely proportional to the cube of p . When p has a certain value, $m = 9$.

Find the value of m when this value of p is tripled.

Answer $m = \dots\dots\dots$ [2]

- 20 (a)** Write these numbers in order of size, starting with the smallest.

$$3^{-2} \quad 3^{\frac{1}{2}} \quad 3^0 \quad \frac{1}{3^{-1}} \quad 3^2$$

Answer (a) $\dots\dots, \dots\dots, \dots\dots, \dots\dots, \dots\dots$ [1]

- (b)** Simplify $3a^3 \div (9a^4)^{\frac{1}{2}}$.

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

- (c)** It is given that $3^{1003} + 3^{1003} + 3^{1003} = 3^x$.
Find the value of x .

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

21 The equation of the line l is $3x + 4y = 24$.

(a) (i) State the gradient of the line.

Answer (a)(i) [1]

(ii) Given that line l crosses the x -axis and y -axis at points A and B respectively, find the coordinates of the points A and B .

Answer (a)(ii) A (..... ,)
 B (..... ,) [2]

(b) Find the area of the triangle AOB .

Answer (b) units² [1]

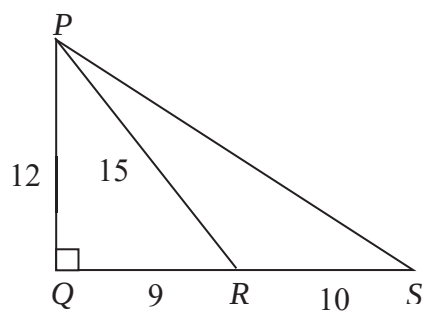
(c) (i) Given that the gradient of another line h is 0.75 and it passes through the point $C(2, 5)$, find the equation of line h .

Answer (c)(i) [2]

(ii) Find the length of BC .

Answer (c)(ii) units [2]

- 22** In the diagram below, QRS is a straight line and $\angle PQR = 90^\circ$.
 $PQ = 12$ cm, $QR = 9$ cm, $PR = 15$ cm and $RS = 10$ cm.



- (a)** Find the length of PS .

Answer (a) cm [1]

- (b)** Write as a fraction

- (i)** $\tan \angle QSP$,

Answer (b)(i) [1]

- (ii)** $\sin \angle QPR$,

Answer (b)(ii) [1]

- (ii)** $\cos \angle PRS$.

Answer (b)(iii) [1]

- 23** $ABCD$ is a quadrilateral.
 $AB = 9$ cm, $\angle ABC = 70^\circ$, $BC = 4.5$ cm, $AD = 7$ cm and $BD = 8.5$ cm.
 AB is drawn below.

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use

Answer (a) (b) (c)



- | | |
|--|-----|
| (a) Complete the quadrilateral. | [2] |
| (b) Construct the perpendicular bisector of AB . | [1] |
| (c) Construct the bisector of angle BAD . | [1] |

END OF PAPER

Section A (52 marks)

Answer **all** the questions in this section.

- 1** Alisha travelled in a car at a speed of 90 km/h for 2 hours and 15 minutes for the first part of the journey. After taking a break for 45 minutes, she then travelled at a speed of 80 km/h for a further 208 km, for the second part of the journey.

(a) Calculate

(i) the distance travelled in the first part of the journey, in kilometres, [1]

(ii) the time taken for the second part of the journey, in hours and minutes, [1]

(iii) the average speed for the whole journey, in kilometres per hour. [2]

(b) Alisha's car consumed 37 litres of petrol for the whole journey.
Given that 1 gallon is equivalent to 3.79 litres and 1 gallon of petrol costs \$2.59, calculate the cost of petrol for the whole journey, to the nearest cent. [2]

- 2 (a)** Which of these ratios are equivalent to the ratio $x : y$?

$y^{-1} : x^{-1}$ $x - 1 : y - 1$ $x^2 : y^2$ $\frac{1}{3}x : \frac{1}{3}y$ [2]

(b) A ribbon of length p metres is cut into two parts in the ratio $a : b$, where $a > b$.

Find an expression, in terms of a , b and p , for the difference in length between the two parts. [2]

- 3 (a)** Factorise completely

(i) $8x^2 - 50$ [2]

(ii) $5st - 15su - 3rt + 9ru$ [2]

(iii) $2y^2 - 3y - 2$ [1]

(b) Simplify $-2(3x - 2) + 3x$ [1]

- 4 A storage tank has a capacity of 80 m^3 .

Pump A and Pump B are used to fill up the storage tank.

Pump A can fill the tank at the rate of $x \text{ m}^3$ per minute while Pump B fills at the rate of $(x - 0.5) \text{ m}^3$ per minute.

- (a) Write down the time taken for using only Pump A to fill the tank. [1]
- (b) Write down the time taken for using only Pump B to fill the tank. [1]
- (c) Given that Pump B takes 4 minutes more than Pump A to fill the tank, form an equation in x and show that it reduces to $2x^2 - x - 20 = 0$. [2]
- (d) Solve the equation $2x^2 - x - 20 = 0$. [2]
- (e) On a particular day, both pumps are used to fill the tank. Find the time taken to fill the tank completely, correct to the nearest second. [2]
-

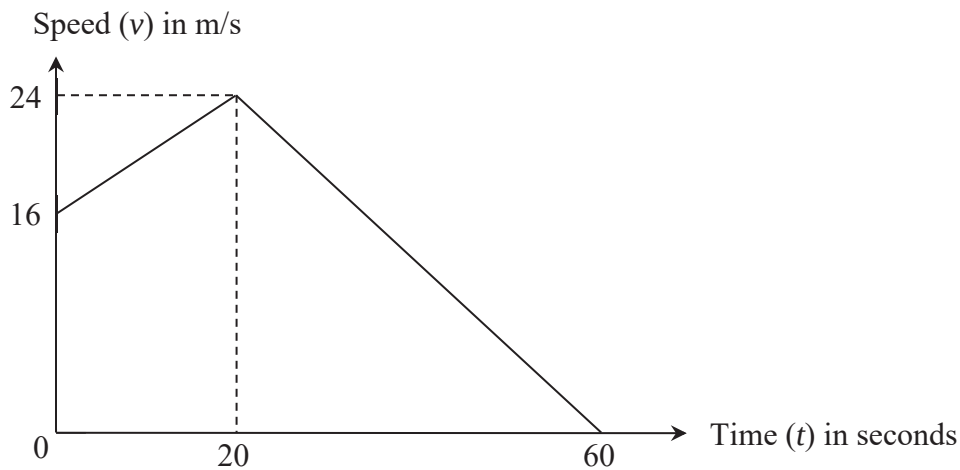
- 5 Answer the whole of this question on a single sheet of graph paper.

The table below is for $y = x^3 - 9x$.

x	-4	-3	-2	-1	0	1	2	3	4
y	-28	p	10	8	0	-8	q	0	28

- (a) Calculate the value of p and the value of q . [1]
- (b) Using a scale of 2 cm to represent 1 unit on the x -axis and 2 cm to represent 10 units on the y -axis, draw the graph of $y = x^3 - 9x$ for $-4 \leq x \leq 4$. [3]
- (c) Use your graph to find the values of x when $y = 5$. [2]
- (d) By drawing a tangent, find the gradient of $y = x^3 - 9x$ when $x = 2.5$. [2]
-

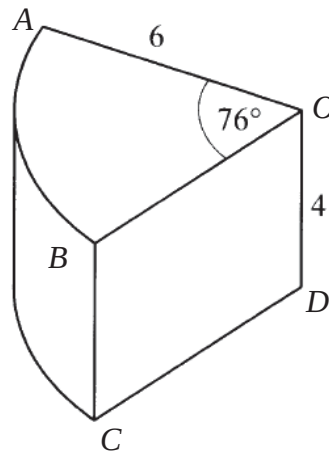
- 6 The diagram shows the speed-time graph of a particle over a period of 60 seconds.



Calculate

- (a) the acceleration of the particle in the first 20 seconds, [2]
- (b) the speed of the particle at $t = 45$, [2]
- (c) the total distance travelled by the particle for the whole journey. [2]

7



A prism has a cross-section OAB .
 $OA = 6$ cm, $OB = 4$ cm and angle $AOB = 76^\circ$

Calculate

- (a) the area of the cross-section, [2]
- (b) the total surface area of the prism. [4]

- 8 The table below shows the income tax rate for Singapore residents in a particular year.

Chargeable Income (\$)		Tax rate (%)	Gross Tax Payable (\$)
On the first	20 000	0	0.00
On the next	10 000	2	200.00
On the first	30 000	-	200.00
On the next	10 000	3.5	350.00
On the first	40 000	-	550.00
On the next	40 000	7	2800.00
On the first	80 000	-	3350.00
On the next	40 000	11.5	4600.00

- (a) In the past, Jason earned a gross yearly income of \$80 000 and paid \$3350 for his income tax. Calculate his income tax payable this year if he earns \$100 000. [2]

Jason wishes to purchase a car now which costs \$120 000 and plans to take a loan from the car company. The loan scheme is shown in the table below.

Loan Scheme
30% down-payment
Remaining amount at a simple interest of 2.78% per annum.
Loan Period: 7 years

- (b) Calculate the monthly instalment Jason has to pay if he takes up a 7 years-loan. [3]

Jason made an estimate of the extra costs associated with owning a car each year. The costs are shown below.

Additional Costs	
Motor Insurance	\$1700
Parking and road pricing charges	\$1250
Road Tax	\$1214
Petrol	\$2800
Servicing and maintenance	\$1500

Jason's monthly household expenses are also given:

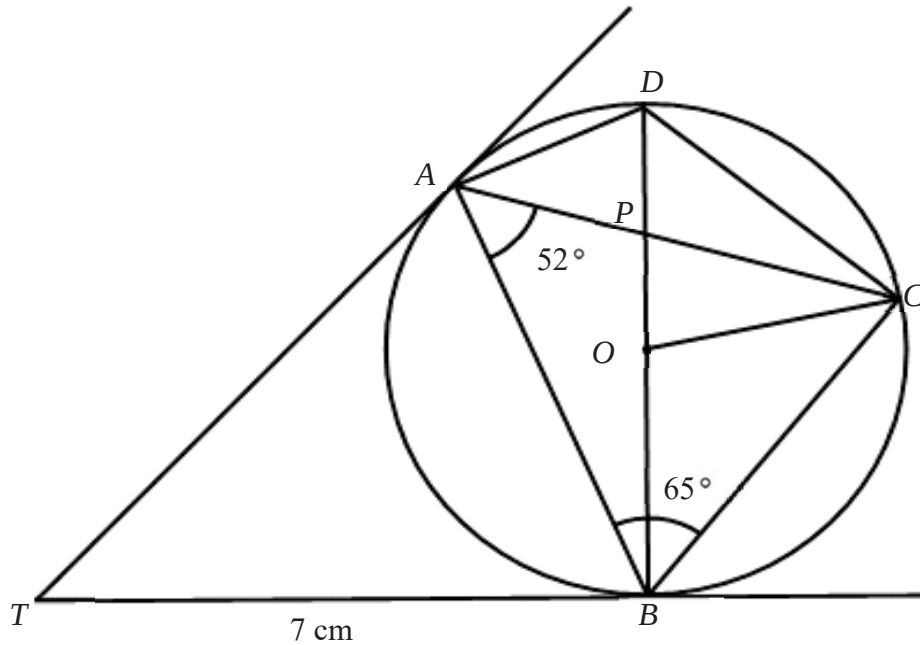
Monthly Household Expenses	
Food	\$1450
Housing Loan	\$1100
Insurance Premium	\$1250
Utilities	\$450
Groceries and shopping	\$1200
Leisure Activities	\$500
Public Transport and Taxi	\$450

- (c) Assuming no other expenses, would it be possible for Jason to purchase the car based on his yearly income of \$100 000? Show working to support your answer. [3]

Section B (8 marks)

Answer **one** question from this section. Each question carries 8 marks.

9

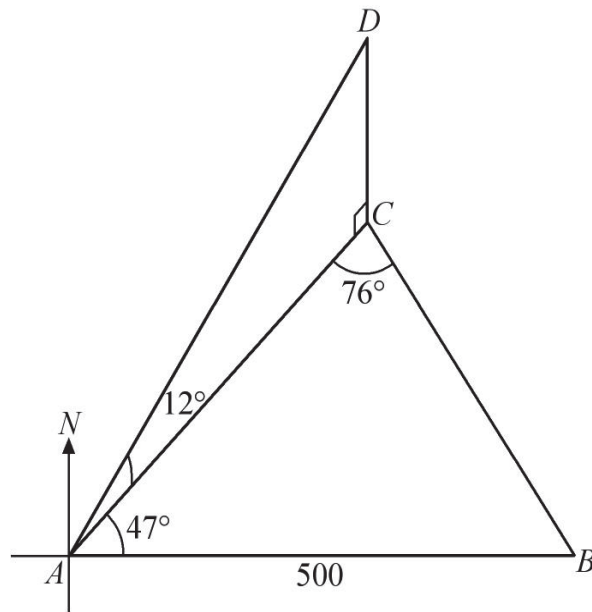


A, B, C and D are points on the circle centre O .
 AT and BT are tangents to the circle at A and B respectively.
 Angle $BAC = 52^\circ$ and angle $ABC = 65^\circ$.

(a) Find, stating the reasons,

- | | |
|---------------------|-----|
| (i) angle ADC , | [1] |
| (ii) angle BOC , | [1] |
| (iii) angle ATB . | [2] |

(b)

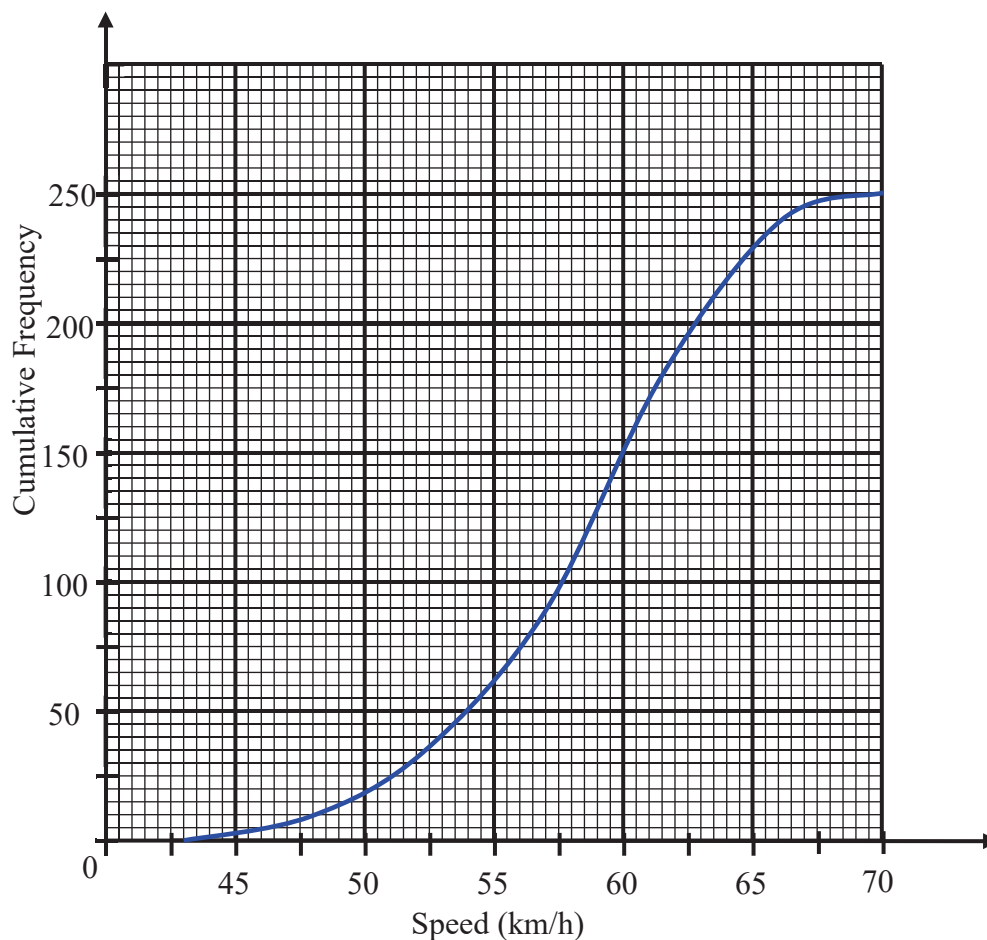


In the diagram, A , B and C represent three markers on a horizontal field.
 B is due east of A and CD is a building at point C .
 Angle $ACB = 76^\circ$, angle $BAC = 47^\circ$ and $AB = 500$ m.
 The angle of elevation of the top of building from A is 12° .

Calculate

- (i) the distance AC , [3]
- (ii) the height of the building CD . [1]

- 10 (a)** The speeds, in km/h, of 250 cars travelling along a road were measured. The cumulative frequency curve summarises the results.



- (i) Find the median speed. [1]
- (ii) Find the interquartile range. [2]
- (iii) Find the speed limit, in km/h, if 8% of the cars were found speeding. [2]
- (b)** A bag contains 5 red balls, 6 blue balls and 1 green ball. Two balls are drawn from the bag, one after the other, without replacement. Calculate the probability that the two balls have
- (i) the same colour, [2]
- (ii) different colours. [1]

END OF PAPER

4NA Prelim 2017 P1 Marking Scheme

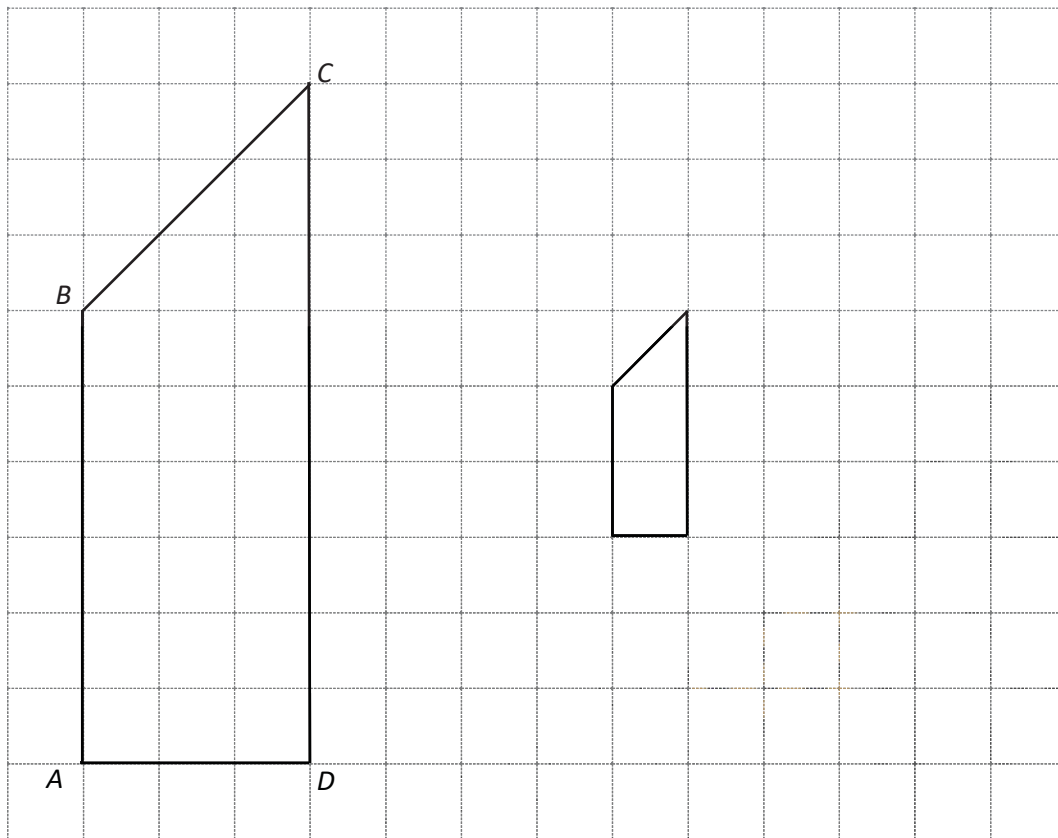
1	$\frac{2.92^3 \times 3.35}{25.1 - 10.3} = \frac{3^3 \times 3}{30 - 10}$ = 4.05	M1 A1	2a	$\angle ACE = 60^\circ$ $\text{reflex} \angle ACE = 360^\circ - 60^\circ = 300^\circ$	M1 A1
2b	$\text{Area} = \frac{1}{2} \times 10 \times 10 \times \sin 60^\circ$ = 43.301 $\approx$ 43.3cm ²	M1 A1	3a	$a = 6\frac{2}{3}$ or 6.67.	B1
3b	$2x \geq 5$ $x \geq 2\frac{1}{2}$ and $x < 5$ Possible values of $x = 3, 4$	M1 A1	4a	Probability = $\frac{3}{8}$	B1
			4b	Probability = $\frac{5}{8}$	B1
5a	$5n + 3$	B1	6a	$T = 25$	B1
5b	The last digit of 255 is not 3 or 8. Or $255 - 3 = 252$ 252 is not a multiple of 5.	B1	6b	$\frac{9}{5}T = h - 32$ $h = \frac{9T}{5} + 32$ Accept $h = \frac{9T + 160}{5}$	M1 A1
7	See attached diagram		8	Exterior angle = $180^\circ - 128^\circ = 52^\circ$ $360^\circ \div 52^\circ = 6.92$ As the answer above is not a whole number, the polygon cannot be a regular one.	M1 A1
9a	$\frac{DE}{5} = \frac{5}{3}$ $FE = \frac{5}{3} \times 5$ = $8\frac{1}{3}$ cm or 8.33cm	M1 A1	9b	$AE = \frac{5}{3} \times 4$ = $6\frac{2}{3}$ cm $CE = 6\frac{2}{3} - 3 = 3\frac{2}{3}$ cm or 3.67 cm	M1 A1

10	$\text{Area of cross-section} = \frac{1}{2} \times (10 + 6) \times 5$ $= 40\text{cm}^2$ $\text{Volume of prism} = 40 \times 20$ $= 800\text{ cm}^3$	M1 M1 A1	11a 11b 11c	$\text{Range} = 54 - 26 = 28$ Median = 40 For the range to increase by 1, Alex would have written either 25 words or 55 words. If he has written 25 words, median will be 39.5 (Decrease in median) Thus he wrote 25 words.	B1 B1 M1 A1
12	$y = 6 - 2x$ $2(6 - 2x) = x + 3$ $12 - 4x = x + 3$ $5x = 9$ $x = 1\frac{4}{5}$ $y = 6 - 2(1\frac{4}{5}) = 2\frac{2}{5}$ Accept Elimination method	M1 A1 A1	13a 13b	$50\text{cm}^2 : 1250\text{km}^2$ $1\text{cm}^2 : 25\text{km}^2$ $1\text{cm} : 5\text{km}$ $1\text{cm} : 500000\text{km}$ $1 : 500000$ $1\text{cm} : 5\text{ km}$ $\frac{27}{5}\text{cm} : 27\text{km}$ $\frac{27}{5}\text{cm} = 5\frac{2}{5} = 5.4\text{cm}$	M1 A1 M1 A1
14a 14b	$x^2 + 6x + 6 = x^2 + 6x + (\frac{6}{2})^2 - (\frac{6}{2})^2 + 6$ $= (x + 3)^2 - 3$ $a = 3, b = -3$ Accept comparing coefficient method. $(x + 3)^2 - 3 = 0$ $x = \pm\sqrt{3} - 3$ $x = -1.27 \text{ or } -4.73$ Do not accept formula method.	B2 B2	15a 15b	$\frac{5x^3}{4y^2} \div \frac{35x}{6y^3}$ $= \frac{5x^3}{4y^2} \times \frac{6y^3}{35x}$ $= \frac{3x^2y}{14}$ $\frac{2}{x^2 - 16} - \frac{1}{x - 4}$ $= \frac{2}{(x - 4)(x + 4)} - \frac{1}{x - 4}$ $= \frac{2 - (x + 4)}{(x - 4)(x + 4)}$ $= \frac{-x - 2}{(x - 4)(x + 4)}$	M1 A1 M1 M1 A1

16a	$\left(\frac{5}{6} - \frac{3}{5}\right) \div 2 + \frac{5}{6}$ $= \frac{43}{60}$	M1 A1	16b	$\frac{43}{60} = 0.71\dot{6}$	B1
17a	$240 = 2^4 \times 3 \times 5$	B1	18	$P\left(1 + \frac{2}{100}\right)^2 = 8323.20$	M1
17b	Use of long division or prime factorisation of 2750 to find HCF HCF of 240 and 2750 = $2 \times 5 = 10$	M1 A1		$P(1.0404) = 8323.20$ $P = \$8000$	A1
17c	$240k = \text{LCM of } 240 \text{ and } 2750$ $= 2^4 \times 3 \times 5^3 \times 11$ $= (2^4 \times 3 \times 5) \times 5^2 \times 11$ $k = 5^2 \times 11 = 275$	M1 A1			
19	$m = \frac{k}{p^3}$ $9 = \frac{k}{p^3}$ $k = 9p^3$ $m = \frac{k}{(3p)^3}$ $m = \frac{9p^3}{27p^3} = \frac{1}{3}$	M1 A1	20a	$3^{-2}, 3^0, 3^{\frac{1}{2}}, \frac{1}{3^{-1}}, 3^2$	B1
			20b	$\cancel{3a^3} \div (9a^4)^{-\frac{1}{2}}$ $= 3a^3 \div \frac{1}{\sqrt{9a^4}}$ $= 3a^3 \times 3a^2$ $= 9a^5$	M1 A1
20c	$3^{1003} + 3^{1003} + 3^{1003} = 3^x$ $3(3^{1003}) = 3^x$ $3^{1004} = 3^x$ $x = 1004$	M1 A1			

21a i	$3x + 4y = 24$ $4y = -3x + 24$ $y = -\frac{3}{4}x + 6$ $\text{Gradient} = -\frac{3}{4}$	B1	21aii	$3x + 4y = 24$ $x = 0,$ $4y = 24$ $y = 6$ $y = 0$ $3x = 24$ $x = 8$ $A(8,0) \ B(0,6)$	M1 A1
21b	Area of triangle ABO $= \frac{1}{2} \times 8 \times 6 = 24 \text{ units}^2$	B1 M1	21ci	$y = \frac{3}{4}x + c$ $5 = \frac{3}{4}(2) + c$ $c = \frac{7}{2}$ $y = \frac{3}{4}x + \frac{7}{2}$	M1 A1
21c ii	Length of BC $= \sqrt{(5-6)^2 + (2-0)^2}$ $= 2.24 \text{ units}$	M1 A1			
22a	$PS = \sqrt{12^2 + 19^2}$ $= 22.5 \text{ cm}$	B1	22b	$\tan \angle QSP = \frac{12}{19}$	B1
22c	$\sin \angle QPR = \frac{9}{15} = \frac{3}{5}$	B1	22c	$\cos \angle PRQ = \frac{9}{15} = \frac{3}{5}$ $\cos \angle PRS = -\frac{3}{5}$	B1
23	See attached diagram				

7



Deduct 1 mark for any error.

4NA Prelim 2017 P2 Marking Scheme

1ai	$90 \times 2 \frac{1}{4} = 202.5 \text{ km}$	B1	1aii	$\frac{208}{80} = 2.6 \text{ hr} = 2 \text{ hr } 36 \text{ min}$	B1
1aiii	Total Distance $= 202.5 + 208 = 410.5 \text{ km}$ $\text{Average speed} = \frac{410.5}{2 \frac{1}{4} + \frac{3}{4} + 2 \frac{3}{5}}$ $= 73.303 = 73.3 \text{ km/h}$	M1 A1	1b	$\frac{37}{3.79} = 9.7625 \text{ gallons}$ Cost = $2.59 \times 9.7625 = \$25.28$	M1 A1
2a	$y^{-1} : x^{-1}$ $\frac{1}{3}x : \frac{1}{3}y$	B1 B1	2b	$p\left(\frac{a}{a+b}\right) - p\left(\frac{b}{a+b}\right)$ $= p\left(\frac{a-b}{a+b}\right)$	M1 A1
3ai	$8x^2 - 50$ $= 2(4x^2 - 25)$ $= 2(2x - 5)(2x + 5)$	M1 A1	3aii	$5st - 15su - 3rt + 9ru$ $= 5s(t - 3u) - 3r(t - 3u)$ $= (5s - 3r)(t - 3u)$	M1 A1
3aiii	$2y^2 - 3y - 2$ $= (2y + 1)(y - 2)$	B1	3b	$-2(3x - 2) - 3x$ $= -3x + 4$	B1
4a	$\frac{80}{x} \text{ min}$	B1	4b	$\frac{80}{x - 0.5} = \frac{160}{2x - 1}$ Accept $\frac{80}{x - 0.5}$	B1
4c	$\frac{160}{2x - 1} + \frac{80}{x} = 4$ $\frac{160x}{x(2x - 1)} + \frac{80(2x - 1)}{x(2x - 1)} = 4$ $\frac{160x - 160x + 80}{x(2x - 1)} = 4$ $80 = 8x^2 - 4x$ $8x^2 - 4x - 80 = 0$ $2x^2 - x - 20 = 0$	M1 A1	4d	$x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4(2)(-20)}}{2(2)}$ $= 3.4221 \text{ or } -2.9221$ $= 3.42 \text{ or } -2.92$	A2
4e	Combined flow rate = $3.4221 - 0.5 + 3.4221 = 6.3443 \text{ cm}^3$ Time taken = $\frac{80}{6.3443}$ $= 12.610 \text{ min} = 12 \text{ min } 37 \text{ sec}$	M1 A1	5a 5b	$p = 0$ $q = -10$ (Both must be correct for mark to be obtained). See attached graph	B1

5c	$x = 3.2 \pm 0.1$ $= -0.5 \pm 0.1$ $= -2.7 \pm 0.1$ Deduct 1 mark for each missing or wrong answer	B2	5d	Drawing a tangent and using 2 points on tangent to find gradient Gradient $= 9.75 \pm 0.5$	M1 A1
6a	$\text{Acceleration} = \frac{24 - 16}{20}$ $= 0.4 \text{ m/s}^2$	M1 A1	7a	Area of cross-section $= \frac{76}{360} \times \pi(6)^2$ $= 23.876 \approx 23.9 \text{ cm}^2$	M1 A1
6b	$\frac{x}{24} = \frac{15}{40}$ $x = \frac{15}{40} \times 24 = 9 \text{ m/s}$	M1 A1	7b	Arc length $= \frac{76}{360} \times 2\pi(6) = 7.9587 \text{ cm}$	M1
6c	Total Distance travelled $= \frac{1}{2}(16 + 24)(20) + \frac{1}{2}(40)(24)$ $= 880 \text{ m}$	M1 A1		Area of curved surface $= 7.9587 \times 4 = 31.835 \text{ cm}^2$ Total surface area $= 23.876 \times 2 + 2 \times 6 \times 4 + 31.835$ $= 127.587 \approx 128 \text{ cm}^2$	M1 M1 A1
8a	Income tax payable $= 3350 + 0.115 \times 20000$ $= \$5650$	M1 A1	8b	Loan amount $= 120000 \times 0.70 = \$84000$ Total Interest $= \frac{84000 \times 2.78 \times 7}{100} = \16346.40 Monthly instalment $= \frac{(16346.40 + 84000)}{12 \times 7} = \1194.60	M1 M1 A1
8c	Monthly salary $= \frac{100000}{12} = \$8333.33$ Monthly Expenses $= 1450 + 1100 + 1250 + 450$ $+ 1200 + 500 + 450 = \$6400$	 M1			

	Monthly extra costs of owning a car $= (1700 + 1250 + 1214 + 2800 + 1500) / 12 = \705.33 Total costs per month $= 705.33 + 1194.60 + 6400 + \frac{5650}{12} = \$8770.76 > \$8333.33$ It is not possible for Jason to purchase the car.	M1 A1			
9ai	$\angle ADC = 180^\circ - 65^\circ = 115^\circ$ (Opp angles of cyclic quad)	B1			
9aii	$\angle BOC = 52^\circ \times 2 = 104^\circ$ (Angle at centre = twice angle at circumference)	B1			
9aiii	$\angle OBC = (180^\circ - 104^\circ) \div 2 = 38^\circ$ (Base angles of Isos triangle) $\angle DBA = 65^\circ - 38^\circ = 27^\circ$ $\angle ABT = 90^\circ - 27^\circ = 63^\circ$ $\angle ATB = 180^\circ - 63^\circ - 63^\circ = 54^\circ$	M1 A1			
9bi	$\angle ABC = 180^\circ - 47^\circ - 76^\circ = 57^\circ$ $\frac{AC}{\sin 57^\circ} = \frac{500}{\sin 76^\circ}$ $AC = 432.17 \text{ m}$ $= 432 \text{ m (3.s.f)}$	M1 A1	9bii	$\tan 12^\circ = \frac{CD}{432.17}$ $CD = 432.17 \times \tan 12^\circ$ $= 91.861 \approx 91.9 \text{ m}$	B1

10ai	Median speed $= 59 \text{ km/h}$	B1	10bi	Probability(same colours) $= \frac{5}{12} \times \frac{4}{11} + \frac{6}{12} \times \frac{5}{11}$ $= \frac{25}{66}$	M1
10aii	Interquartile Range $= 62 - 55$ $= 7$	M1 A1	10bii	P(different colours) $= 1 - \frac{25}{66} = \frac{41}{66}$	A1
10aii i	$\frac{8}{100} \times 250 = 20$ cars found speeding 230 cars below speed limit From graph, speed limit $= 65 \text{ km/h}$	M1 A1			B1