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Answer **all** the questions.

- 1 (a) Arrange the following numbers in descending order

$$-0.23, \quad -\frac{6}{25}, \quad -0.232, \quad -0.2\dot{3}.$$

- (b) Evaluate $\frac{\frac{1}{3} + \sqrt{88.4}}{6.75 - 2.11}$, giving your answer correct to 2 decimal places.

For
Examiner
Use

Answer (a) [1]

(b) [1]

- 2 Expressed as a product of its prime factors, $56 = 2^3 \times 7$.

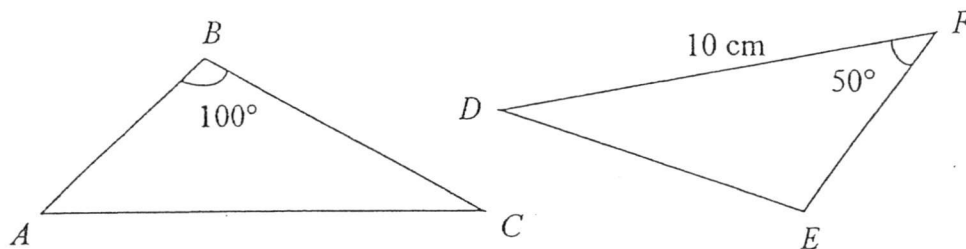
- (a) Express 126 as a product of its prime factors.
(b) Write down the highest common factor of 56 and 126.

Answer (a) $126 =$ [1]

(b) [1]

- 3 In the diagram below, $\triangle ABC$ is congruent to $\triangle DEF$.

For
Examiner
Use



Find

- (a) the length of AC ,
- (b) $\angle FDE$

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

(b) $\angle FDE = \dots\dots\dots^\circ$ [1]

- 4 Ms Seri wants to send a parcel weighing 1.52 kg to her friend in Indonesia. A courier company charges \$17 for the first 200 g and \$4 for every subsequent 100 g or part thereof for every parcel sent to Indonesia. How much must she pay the courier company?

Answer \$..... [2]

5 (a) (i) Solve the inequality $2 + 3x > 25$.

(ii) Hence write down the smallest integer value of x that satisfies the inequality $2 + 3x > 25$.

(b) Given that $v = \sqrt{u^2 + 2as}$, find the value of v when $u = 8$, $a = 4$ and $s = 10$.

For
Examiner
Use

Answer (a) (i) [1]

(ii) [1]

(b) $v =$ [1]

6 A map of Punggol Park is drawn to a scale of 1 : 20 000.

(a) Find the actual distance of a running track, in km, represented by 20 cm on the map.

(b) The area of a pond measures 0.05 km^2 .
Calculate the area representing the pond on the map, giving your answer in cm^2 .

Answer (a) km [1]

(b) cm^2 [2]

7

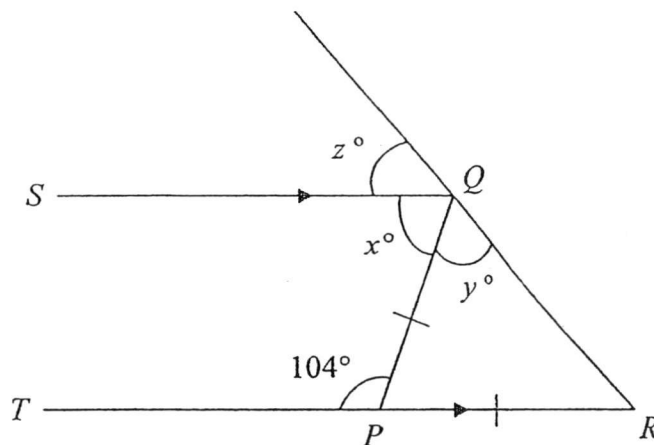
Solve the simultaneous equations

$$3x + 7y = 16,$$

$$3x - 5y = 4.$$

For
Examiner
UseAnswer $x = \dots\dots\dots$ $y = \dots\dots\dots$ [3]

8



In the diagram above, $\triangle PQR$ is an isosceles triangle where $PQ = PR$.

Given that SQ is parallel to TP , find the values of x , y and z .

State all the reasons clearly.

Answer $x = \dots\dots\dots$ [1] $y = \dots\dots\dots$ [1] $z = \dots\dots\dots$ [1]

- 9
- (a) Given that $p^2 + q^2 = 25$ and $pq = 8$, find the value of $2(p + q)^2$.
- (b) Expand and simplify $(4r - 1)^2 - 2r + 5$.

For
Examiner
Use

Answer (a) [2]

(b) [2]

- 10
- (a) Expand and simplify $2(5m + n) + m - 7n$.
- (b) Solve the equation $12 - 3x = x + 4$.

Answer (a) [2]

(b) $x =$ [2]

- 11 Each figure in the sequence below consists of a number of diamonds.

For
Examiner
Use



Figure 1



Figure 2



Figure 3

- (a) Complete the table below.

[1]

Answer (a)

Figure number	1	2	3	4	5
Number of diamonds	5	7	9		

- (b) Write down an expression, in terms of n , for the number of diamonds in Figure n .
- (c) Is it possible for a figure to have 118 diamonds? Explain clearly.

Answer (b) [1]

(c) [1]

- 12 (a) In the diagram, O is the origin and A is the point $(-3, 0)$. Mark the point $C(3, 4)$ on the axes given below.

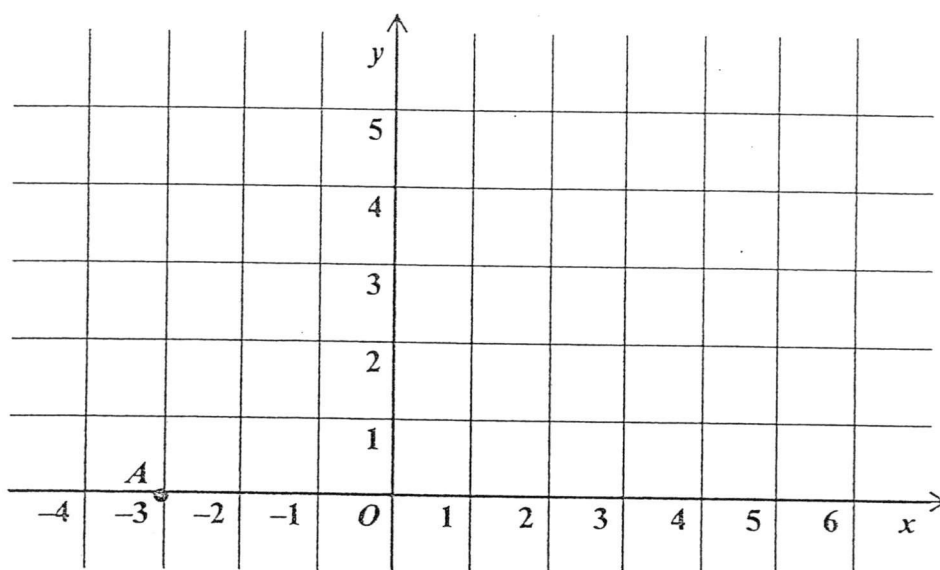
- (b) (i) On the same diagram, mark and label the point B for $OABC$ to be a parallelogram.

- (ii) Write down the coordinates of point B .

- (c) Find the area of the parallelogram.

Answer (a), (b)(i)

[2]

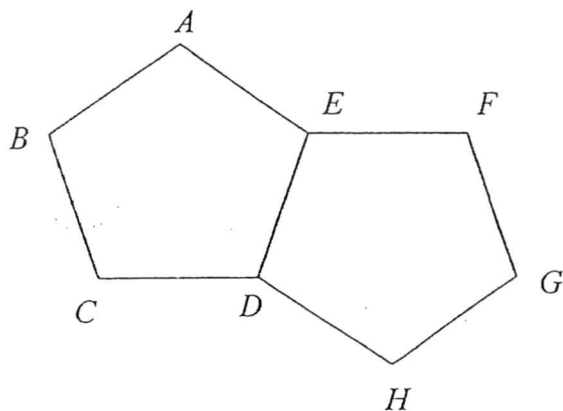


Answer (b) (ii) B (.....,) [1]

(c) units² [1]

- 13 The diagram shows 2 regular pentagons.

For
Examiner
Use



Calculate

- (a) $\angle ABC$,
(b) $\angle DCH$.

Answer (a) $\angle ABC = \dots\dots\dots^\circ$ [2]

(b) $\angle DCH = \dots\dots\dots^\circ$ [2]

A box contains 4 red balls, 5 green balls and 2 blue balls.
A ball is drawn at random from the box.

For
Examiner
Use

(a) Find the probability that the ball drawn is

(i) green,

(ii) not green,

(iii) yellow.

(b) A number of blue balls are added into the box.

Now, the probability that a blue ball is drawn is $\frac{4}{7}$.

Find the number of blue balls that are added.

Answer (a) (i) [1]

(ii) [1]

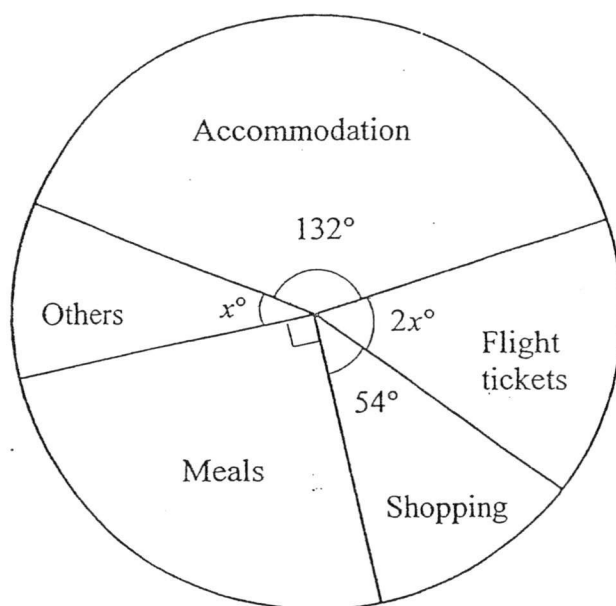
(iii) [1]

(b) [2]

15

Clara spent \$9270 for her holiday.
The pie chart below shows her total expenses spent.

For
Examiner
Use



- How much did she spend on shopping?
- Find the value of x .
- Find the percentage of her expenses spent on accommodation.

Answer (a) \$ [1]

(b) $x =$ [2]

(c)% [2]

16

In quadrilateral $PQRS$, $PQ = 6.5$ cm, $RS = 8.5$ cm and $QR = 4.8$ cm.
 $\angle PQR = 75^\circ$ and $\angle QRS = 98^\circ$.

For
Examiner
Use

- (a) Construct quadrilateral $PQRS$. [3]
 The line PQ is drawn in the answer space below.

- (b) Construct and label

- (i) the perpendicular bisector of RS , [1]

- (ii) the angle bisector of $\angle PSR$. [1]

Answer (a), (b)

P

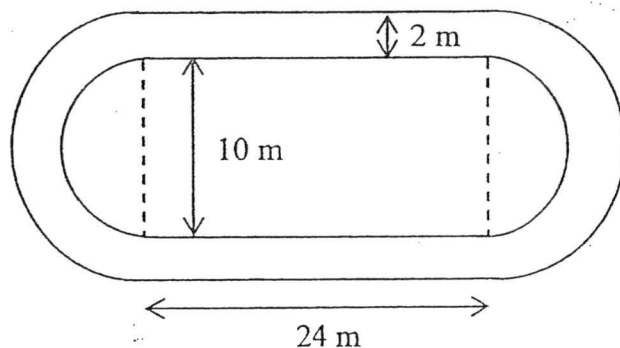
Q

17

The figure below shows a top view of a swimming pool surrounded by a 2 m-wide pathway.

The pool is made up of a rectangular portion 24 m by 10 m and two semi-circular areas at both ends.

[Take $\pi = 3.142$ and give all answers correct to the nearest whole number.]



Find

- the area of swimming pool,
- the area of pathway,
- the cost of tiling the pathway if it costs \$5 per square metre to tile the pathway.

Answer (a) m^2 [2]

(b) m^2 [2]

(c) \$ [2]

- End of Paper -

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131131

13(a)	$\angle ABC = \frac{(n-2) \times 180^\circ}{n}$ $= \frac{(5-2) \times 180^\circ}{5}$ $= \frac{3 \times 180^\circ}{5}$ $= \frac{540^\circ}{5}$ $= 108^\circ$	B1	
13(b)	$\angle CDH = 360^\circ - 2(108^\circ) = 144^\circ$ $\angle DCH = \frac{180^\circ - 144^\circ}{2} = 18^\circ$	M1	
14(a)(i)	$P(\text{a green ball}) = \frac{5}{11}$	A1	
14(a)(ii)	$P(\text{not a green ball}) = 1 - \frac{5}{11} = \frac{6}{11}$	B1	
14(a)(iii)	$P(\text{a yellow ball}) = 0$	B1	
14(b)	$P(\text{a blue ball}) = \frac{4}{7}$ $P(\text{not a blue ball}) = 1 - \frac{4}{7} = \frac{3}{7}$ Let x represents a ball that is not blue. $3x = 9$ $x = 3$ $4x = 12$ No. of blue balls = $12 - 2 = 10$ <u>Alternative</u> 3 units represent 9 balls 1 unit represent 3 balls 4 units represent 12 balls No. of blue balls = $12 - 2 = 10$	M1	
15(a)	Shopping expenses $= \frac{54}{360} \times \9270 $= \$1390.5$	A1	
15(b)	$3x = 360 - 132 - 54 - 90$ $3x = 84$ $x = 28$	M1	
15(c)	Percentage of expenses spent on accommodation $= \frac{132}{360} \times 100\%$ $= 36\frac{2}{3}\%$	A1	

16			16(a): Award marks First 2 measurements [B1] Next 2 measurements [B1] Visible arcs [B1] Inaccuracy [-1]
17(a)	Area of swimming pool $= \text{Area of 2 semi-circle} + \text{Area of rectangle}$ $= \pi r^2 + (\text{length} \times \text{breadth})$ $= (3.142)(5)^2 + (24)(10)$ $= 78.55 + 240$ $= 318.55$ $\approx 319 \text{ m}^2$	M1	
17(b)	Area of pathway $= \text{Area of figure} - \text{Area of swimming pool}$ $= \pi r^2 + (\text{length} \times \text{breadth}) - 318.55$ $= (3.142)(7)^2 + (24)(14) - 318.55$ $= 153.958 + 336 - 318.55$ $= 171.408$ $\approx 171 \text{ m}^2$	M1	
17(c)	Cost of tiling $= \$5 \times 171.408$ $= \$857.04$ $\approx \$857$	A1	

Answer all the questions.

- 1 A class of 20 students sat for a Geography test.

The list below shows the marks scored in the test.

52	24	59	23	9	22	43	45	27	36
18	35	11	26	24	34	31	24	39	40

- (a) Draw an ordered stem and leaf diagram to show the distribution of marks. [2]
 (b) Find
 (i) the modal mark, [1]
 (ii) the median mark. [1]
 (c) 45% of the students failed the test.
 Find the passing mark for the test. [1]

- 2 Alfred has x books. Betty has 5 more books than Alfred.

Caroline has twice as many books as Betty.

- (a) Write down, in its simplest form, an expression in terms of x , for
 (i) the number of books Betty has, [1]
 (ii) the number of books Caroline has. [1]
 (b) Given that the mean number of books that Alfred, Betty and Caroline have is 13,
 show that

$$\frac{4x+15}{3} = 13.$$
 [1]
 (c) Solve the equation to find the value of x . [2]

- 3 (a) Flavoured sugar is sold at a specialty food shop for x cents per gram.
 Find an expression for the cost, in dollars, for y grams of sugar. [1]
 (b) In July 2007, Goods and Service Tax (GST) was raised from 5% to 7%.
 (i) The price of a camera without GST was \$950.
 Calculate the increase in the price of the camera due to the increase in GST. [3]
 (ii) In 2008, the price of a computer including GST was \$1200.
 Calculate the GST payable for the computer.
 Give your answer correct to the nearest dollar. [2]

- 4 (a) A motorcycle travels at 72 km/h for 50 minutes.
 Calculate the distance travelled. [2]
 (b) The motorcycle then travels 100 km at 80 km/h.
 Find the time taken, in hours and minutes, for this part of the journey. [2]
 (c) Calculate the average speed of the motorcycle, in km/h, over the whole journey. [2]

- 5 It is given that y is directly proportional to the square of x .
 It is given that $x = 3$ when $y = 72$.
 (a) Find an equation connecting x and y . [2]
 (b) Find the values of x when $y = 128$. [2]
 (c) If x is increased by 50%, find the percentage increase in y . [2]

6 (a) Simplify $\frac{5a^4b}{6cd^2} + \frac{50a^3b^2}{12d}$. [2]

(b) Factorise

(i) $3px - 6py - qx + 2qy$, [2]

(ii) $49a^2 - 121b^2$. [1]

(c) Express

$$\frac{x+4}{3} + \frac{3x-2}{5}$$

as a single fraction in its simplest form. [2]

7 Answer the whole of this question on single piece of graph paper.

The variables x and y are connected by the equation $y = 3 - 2x$.

The corresponding values of x and y are given in the following table.

x	-2	0	1	3
y	a	3	1	-3

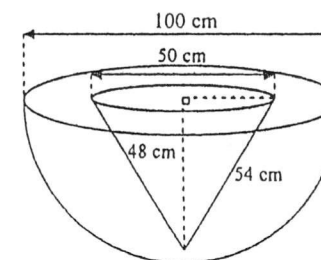
(a) Find the value of a . [1]

(b) Using a scale of 2 cm to 1 unit on both axes, draw the graph of $y = 3 - 2x$ for $-2 \leq x \leq 3$. [3]

(c) Use your graph to find the value of x when $y = 4$. [1]

(d) (i) Draw the line $y = 2$ on the same axes. [1]

(ii) Write down the coordinates of the point where the two lines meet. [1]



For this question, take $\pi = 3.142$.

A metal sculpture is made from cutting out a cone from a solid hemisphere of diameter 100 cm.

The diameter of the cone is 50 cm, the height of the cone is 48 cm and the slant height of the cone is 54 cm.

(a) Find

(i) the volume of the metal sculpture, [3]

(ii) the total surface area of the metal sculpture. [3]

(b) The metal sculpture is melted down to produce identical solid cylinders of height 5 cm and radius 2 cm.

Find the number of cylinders that can be produced. [2]

- End of Paper -

Answer Scheme

1a)	$\begin{array}{c} 0 \quad 9 \\ 1 \quad 1 \quad 8 \\ 2 \quad 2 \quad 3 \quad 4 \quad 4 \quad 6 \quad 7 \\ 3 \quad 1 \quad 4 \quad 5 \quad 6 \quad 9 \\ 4 \quad 0 \quad 3 \quad 5 \\ 5 \quad 2 \quad 9 \end{array}$ Key 1 0 means 10	B2	- Award B2 for all correct entires - Award B1 for between 1 to 2 errors - No marks awarded for more than 2 errors
1bi)	Modal mark = 24	B1	
1bii)	Median mark = 29	B1	
1c)	Passing mark = 27	B1	
2ai)	$x + 5$	B1	
2aai)	$2x + 10$	B1	o.e.
2b)	$\frac{x + x + 5 + 2x + 10}{3} = 13$ $\frac{4x + 15}{3} = 13 \text{ (shown)}$	B1	Need to show prior working to get B1
2c)	$4x + 15 = 39$ $x = 6$	M1 A1	
3a)	$\$ \left(\frac{xy}{100} \right)$ or $\$0.01xy$	B1	
3bi)	100% of original price = \$950 1% of original price = \$9.50 105% of original price = \$997.50 (with 5% GST) 107% of original price = \$1016.50 (with 7% GST) Increase in price = \$(1016.50 - 997.50) = 19	M1 M1 A1	o.e. o.e.
3bii)	107% of price = \$1200 Price after increase = $\$ \left(\frac{1200}{107} \times 7 \right)$	M1	o.e.

	$= \$78.504$ $\approx \$79$ (to nearest dollar)	A1	
4a)	Dist. $= 72 \times \frac{50}{60}$ $= 60 \text{ km}$	M1 A1	M1 for conversion to hour
4b)	Time taken $= 100 \div 80$ $= 1 \frac{1}{4} \text{ h}$ $= 1 \text{ h } 15 \text{ min}$	M1 A1	
4c)	Ave. speed $= (60 + 100) \div \left(\frac{5}{6} + 1 \frac{1}{4} \right)$ $= 76.8 \text{ km/h or } 76 \frac{4}{5} \text{ km/h}$	M1 A1	
5a)	$72 = k(3)^2$ $k = 8$ $y = 8x^2$	M1 A1	
5b)	$128 = 8x^2$ $x^2 = 16$ $x = \pm 4$	M1 A1	A1 for both answers
5c)	$y = 8x^2$ $Y = 8 \left(\frac{3}{2}x \right)^2$ $Y = 8 \left(\frac{9}{4}x^2 \right)$ $Y = 18x^2$ Increase = $18x^2 - 8x^2 = 10x^2$ $\frac{10x^2}{8x^2} \times 100\% = 125\%$	M1 B1	o.e.
6a)	$\frac{5a^4b}{6cd^2} \times \frac{12d}{50a^3b^2}$ $= \frac{a}{5bcd}$	M1 A1	

Qn	Answer	Mark	Remarks
6bi)	$(3px - 6py) - (qx - 2qy)$ $= 3p(x - 2y) - q(x - 2y)$ $= (x - 2y)(3p - q)$	M1 A1	
6bii)	$(7a + 11b)(7a - 11b)$	B1	
6c)	$\frac{5(x+4) + 3(3x-2)}{15}$ $= \frac{14x+14}{15}$	M1 A1	M1 for combining to a single fraction
7a)	$a = 7$	B1	
7b)	Refer to attached graph paper		
7c)	$x = -0.5$	B1	
7di)	Refer to attached graph paper		
7dii)	$(0.5, 2)$	B1	
8ai)	Vol. of hemisphere $= \frac{4}{3}(3.142)(50)^3 + 2$ $= 261833.33 \text{ cm}^3$ Vol. of cone $= \frac{1}{3}(3.142)(25)^2(48)$ $= 31420 \text{ cm}^3$ Vol. of container $= 261833.33 - 31420$ $= 230413.33$ $\approx 230000 \text{ cm}^3$ (to 3 s.f)	M1 M1 A1	

Qn	Answer	Mark	Remarks
8aii)	Curved surface area of hemisphere $= 2(3.142)(50)^2$ $= 15710 \text{ cm}^2$ Curved surface area of cone $= (3.142)(25)(54)$ $= 4241.7 \text{ cm}^2$ Area of ring $= (3.142)(50^2) - (3.142)(25^2)$ $= 5891.25 \text{ cm}^2$ Total surface area $= 15710 + 4241.7 + 5891.25$ $= 25842.95 \text{ cm}^2$	M1 M1 A1	M1 for either one Only accept exact answer
8b)	Vol. of cylinder $= 3.142(2)^2(5)$ $= 62.84 \text{ cm}^3$ No. of cylinders $= 230413.33 \div 62.84$ $= 3666.66$ ≈ 3666	M1 A1	

Updated as of 13 Oct 2013