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**BEATTY SECONDARY SCHOOL
END OF YEAR EXAMINATION 2018**

SUBJECT : Mathematics

LEVEL : Sec 2 Normal (A)

PAPER : 1

DURATION : 1 hour 15 minutes

SETTER : Ms Estella Chin

DATE : 8 October 2018

CLASS :	NAME :	REG NO :
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READ THESE INSTRUCTIONS FIRST

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The total number of marks for this paper is **50**.

For Examiner's Use
50

*Mathematical Formulae**Mensuration*

Curved surface area of a cone = $\pi r l$

Surface area of a sphere = $4\pi r^2$

Volume of a cone = $\frac{1}{3}\pi r^2 h$

Volume of a sphere = $\frac{4}{3}\pi r^3$

1 Simplify

(a) $\frac{8ab^2}{10a^2b}$,

Answer [1]

(b) $\frac{3(t+1)}{2} - \frac{5t}{3}$.

Answer [2]

2 (a) Solve the inequality $16 - 3x \leq 5$.

Answer [2]

(b) Draw a number line to represent the solution of the inequality found in (a).

Answer

[2]

(c) Hence, state the minimum integer value of x .

Answer [1]

- 3 (a) Factorise $6r^2 - 7r - 5$.

Answer _____ [2]

- (b) Given that $r = 3$, evaluate the factors found in part (a).

Answer _____ and _____ [2]

- 4 (a) Factorise $xy - yz$.

Answer _____ [1]

- (b) Hence, evaluate $143 \times 98 - 98 \times 43$, without the use of a calculator.

Answer _____ [2]

[Turn over]

5 An area of 4 cm^2 on a map represents an actual area of 9 km^2 .

- (a) If the actual area of a theme park is 13.5 km^2 , find the area, in cm^2 , of the theme park on the map.

Answer _____ cm^2 [2]

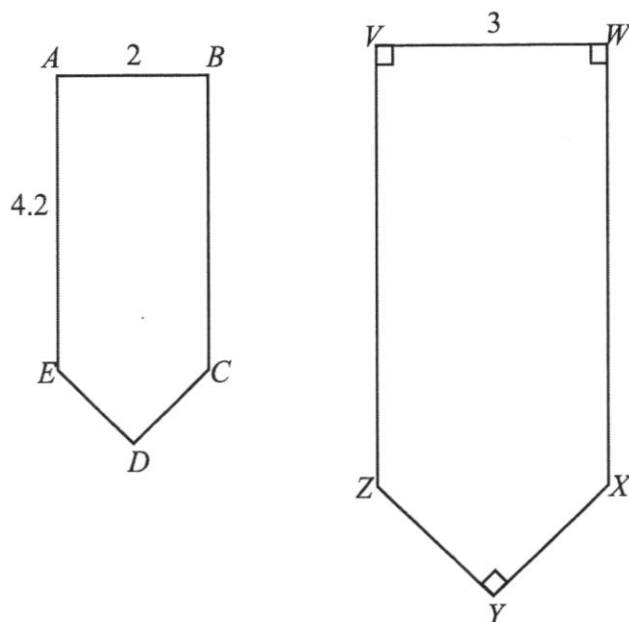
- (b) Find the scale of the map in the form $1 : r$.

Answer _____ : _____ [2]

- (c) If the distance between two buildings on the map is 5 cm , calculate the actual distance, in km , between the two buildings.

Answer _____ km [2]

- 6 In the diagram below, pentagons $ABCDE$ and $VWXYZ$ are similar. $AB = 2$ cm, $AE = BC = 4.2$ cm, $VW = 3$ cm, $\angle ZVW = \angle VWX = \angle XYZ = 90^\circ$ and $XY = YZ$.



Find

- (a) $\angle VZY$,

Answer _____ [2]

- (b) the length of WX .

Answer _____ cm [2]

[Turn over]

- 7 Elle wanted to organise a party for x number of people. She bought one cup of ice cream per person, and a total of $(2x+10)$ chicken wings and $(3x-15)$ fishballs.
- (a) Write an expression in terms of x , for the total number of items Elle bought for the party. Simplify your answer.

Answer [1]

- (b) 3 people did not attend the party. Elle distributed the items equally among the people at the party and found that each of them received 7 items.
- (i) Using the information provided, form an algebraic equation in terms of x .

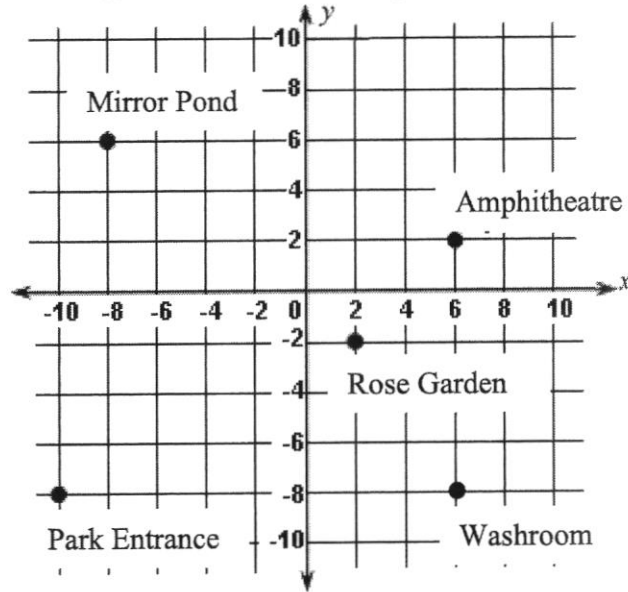
Answer

[1]

- (ii) Solve the equation in (b)(i) and find the number of people who attended the party.

Answer [3]

- 8 The Cartesian coordinate plane below shows the positions of four locations in a park.



- (a) Write down the coordinates of the Amphi theatre.

Answer (,) [1]

- (b) Write down the name of the place at $(6, -8)$.

Answer [1]

- (c) Mark the origin on the given axes. Label the origin O .

[1]

- (d) Calculate the gradient of the line formed between the coordinates representing the Park Entrance and the Mirror Pond.

Answer [1]

- (e) Roy is standing at the Park Entrance. He wants to visit the Rose Garden. Calculate the shortest distance (in units) that he would need to walk.

Answer [2]

- 9 The total number of hours spent using the computer in a week by 12 students are shown in the stem-and-leaf diagram below.

Stem	Leaf
0	8
1	2 4 4 k 8
2	5 5
3	0 8
4	1 9

Key: 1 | 2 means 12 hours

- (a) Given that the mode is 14 hours, find the value of k .

Answer $k =$ _____ [1]

- (b) Find

- (i) the mean number of hours,

Answer _____ hours [2]

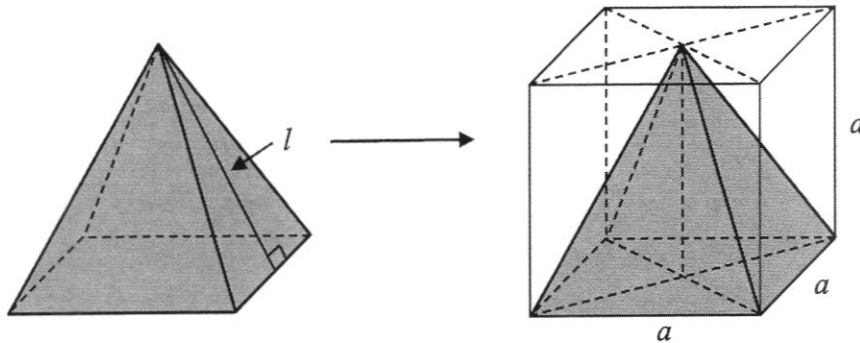
- (ii) the median number of hours.

Answer _____ hours [1]

- (c) A teacher selects one student at random to do a project on cyber wellness. Calculate the probability that the student selected spent more than 35 hours using the computer in that week.

Answer _____ [2]

- 10 A solid square pyramid toy, which has a slant height l , fits exactly into a cubic gift box, measuring a cm by a cm by a cm, as shown in the diagram.



- (a) State the ratio of the volume of the pyramid toy to the volume of the cubic gift box.

Answer _____ : _____ [1]

- (b) Given that the volume of the pyramid toy is 1125 cm^3 , show that the value of a is 15.

Answer

- (c) (i) Calculate the slant height, l , of the pyramid toy.

Answer $l =$ _____ cm [2]

- (ii) Calculate the total surface area of the pyramid toy.

Answer _____ cm^2 [3]

End of paper ☺



BEATTY SECONDARY SCHOOL
END OF YEAR EXAMINATION 2018

SUBJECT : Mathematics

LEVEL : Sec 2 Normal (A)

PAPER : 2

DURATION : 1 hour 30 minutes

SETTER : Ms Yu Lingling

DATE : 10 Oct 2018

CLASS :	NAME :	REG NO :
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Volume of a cone = $\frac{1}{3}\pi r^2 h$

Volume of a sphere = $\frac{4}{3}\pi r^3$

Answer **all** the questions.

- 1 By rounding each number to 1 significant figure, estimate the value of $\frac{3456 \times 0.987}{25}$.

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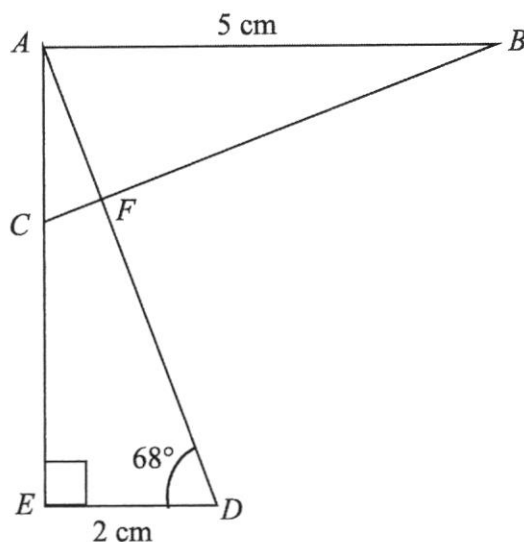
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- 2 In the diagram, $\triangle ABC$ is congruent to $\triangle EAD$. Given that $AB = 5$ cm, $ED = 2$ cm, $\angle ADE = 68^\circ$, $\angle AED = 90^\circ$ and AD meets BC at F , find

(a) the length of CE , [1]

(b) $\angle ABC$, [2]

(c) the length of BC , giving your answer to 3 significant figures. [2]



- 3 Adrian needs to save at least \$147 before he has enough money to buy his grandmother a gift.

(a) Given that he saves \$16 every week, find an expression in terms of x , for the amount of money he will save in x weeks. [1]

(b) By forming an inequality in x and solving it, find the least number of weeks needed for Adrian to save up sufficient money to buy the gift. [2]

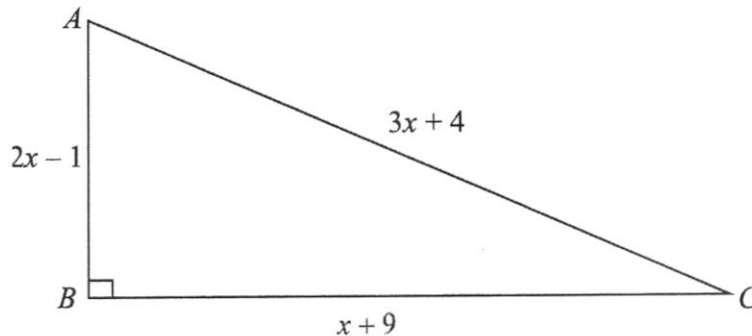
- 4 (a) Solve the equation $1 - \frac{2f-3}{2} = \frac{f+2}{5}$. [3]
- (b) Simplify $\frac{2p-3}{(q-4)^3} \div \frac{8p^2-12q}{(q-4)^2}$, giving your answer as a single fraction in its lowest terms. [3]
- (c) Given that $2a^2 - 2b^2 = 70$ and $a - b = 7$, find the value of $a + b$. [3]

- 5 A survey was conducted among 50 families to find out the number of times they travelled together as a family in 2017. The data collected is shown in the table below.

Number of times travelled	0	1	2	3	4
Number of families	15	a	11	7	b

- (a) Show that $a + b = 17$. [1]
- (b) If the mean number of times they travelled as a family is 1.68, show that $a + 4b = 41$. [2]
- (c) Solve the two equations in (a) and (b) simultaneously. [2]
- (d) Find the percentage of families that travelled at most 2 times. [2]

- 6 The diagram shows $\triangle ABC$ in which $\angle ABC = 90^\circ$, $AB = (2x - 1)$ cm, $BC = (x + 9)$ cm and $AC = (3x + 4)$ cm.



- (a) Using Pythagoras' Theorem, form an equation in x and show that it reduces to $2x^2 + 5x - 33 = 0$. [3]
- (b) Write down an expression, in terms of x , for the area of $\triangle ABC$. Expand and simplify your answer. [2]

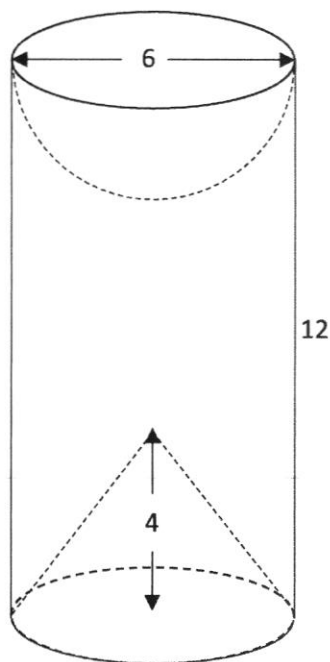
7 **Answer the whole of this question on a sheet of graph paper.**

The table below shows some corresponding x and y values for the equation $y = -3 - 2x$.

x	-1	0	1	2
y	p	-3	-5	-7

- (a) Find the value of p . [1]
- (b) Using a scale of 2 cm to represent 1 unit on both axes, draw the graph of $y = -3 - 2x$ for $-1 \leq x \leq 2$. [2]
- (c) From your graph, find the value of x when $y = -4.6$. [1]
- (d) Find the gradient of the line. [2]
- (e) (i) On the same axes, draw and label the line $y = -2$. [1]
- (ii) Write down the coordinates of the point where the line $y = -2$ meets the line $y = -3 - 2x$. [1]

- 8 The diagram below shows a solid formed by removing a cone and a hemisphere from the ends of a cylinder.



The base of the cylinder, the base of the cone and the base of the hemisphere have a common diameter of 6 cm. The height of the cone is 4 cm and the height of the cylinder is 12 cm.

- (a) Calculate the volume, in cm^3 , of the solid. [4]
- (b) Calculate the total surface area, in cm^2 , of the solid, leaving your answer in terms of π . [5]
- (d) A tube of acrylic paint can cover 36 cm^2 of the surface area of the solid. How many tubes of acrylic paint are needed to paint the entire solid? [2]

~ End of Paper ~

Answer Key

Qn	Answer
1 (a)	$\frac{4b}{5a}$
1 (b)	$\frac{9-t}{6}$
2 (a)	$x \geq 3\frac{2}{3}$
2 (b)	[B1 – Correct position of $3\frac{2}{3}$ on number line, B1 – Correct shaded circle and direction of arrow]
2 (c)	4
3 (a)	$(3r-5)(2r+1)$
3 (b)	4 and 7
4 (a)	$y(x-z)$
4 (b)	9800
5 (a)	6
5 (b)	1 : 150000
5 (c)	7.5
6 (a)	135°
6 (b)	6.3
7 (a)	$6x-5$
7 (b)	$\frac{6x-5}{x-3} = 7$
7 (c)	13
8 (a)	(6 , 2)
8 (b)	Washroom
8 (c)	Marked and labelled origin
8 (d)	7
8 (e)	13.4
9 (a)	4
9 (bi)	24
9 (bii)	21.5
9 (c)	$\frac{1}{4}$
10 (a)	1 : 3
10 (ci)	16.8
10 (cii)	728

Answers:

1	100
2(a)	3cm
(b)	22°
(c)	5.39 cm
3(a)	\$16 x
(b)	10 weeks
4(a)	$f = \frac{7}{4}$
(b)	$\frac{1}{4p(q-4)}$
(c)	5
5(c)	$a = 9, b = 8$
(d)	70%
6(b)	$= \frac{1}{2}(2x^2 + 17x - 9)$ $= x^2 + \frac{17}{2}x - \frac{9}{2}$
8(a)	245 cm ³ (3 s.f.)
(b)	105 π
(c)	10 tubes



BEATTY SECONDARY SCHOOL
END OF YEAR EXAMINATION 2018

SUBJECT : Mathematics

LEVEL : Sec 2 Normal (A)

PAPER : 2

DURATION : 1 hour 30 minutes

SETTER : Ms Yu Lingling

DATE : 10 Oct 2018

CLASS :	NAME : MARKING SCHEME	REG NO :
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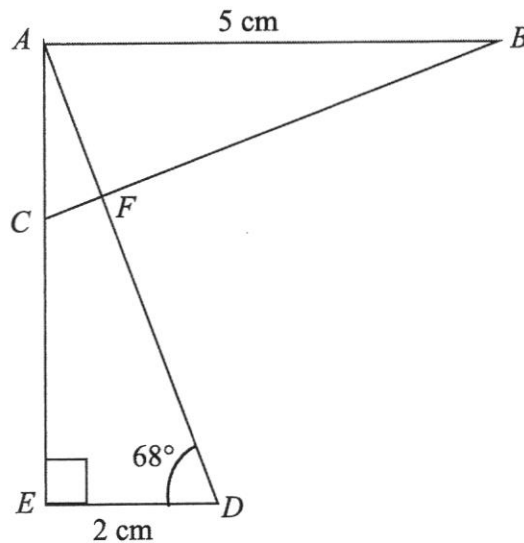
[2]

$$\frac{3000 \times 1}{30} \quad \text{M1}$$

$$= 100 \quad \text{A1}$$

- 2 In the diagram, $\triangle ABC$ is congruent to $\triangle EAD$. Given that $AB = 5$ cm, $ED = 2$ cm, $\angle ADE = 68^\circ$, $\angle AED = 90^\circ$ and AD meets BC at F , find

- (a) the length of CE , [1]
 (b) $\angle ABC$, [2]
 (c) the length of BC , giving your answer to 3 significant figures. [2]



- (a) $CE = 5 - 2 = 3$ cm B1
 (b) $\angle ABC = 180 - 90 - 68$ M1
 $= 22^\circ$ A1
 (c) $BC^2 = 5^2 + 2^2$ M1
 $BC = 5.39$ cm (3s.f.) A1

- 3 Adrian needs to save at least \$147 before he has enough money to buy his grandmother a gift.

(a) Given that he saves \$16 every week, find an expression in terms of x , for the amount of money he will have in x weeks. [1]

(b) By forming an inequality in x and solving it, find the least number of weeks needed for Adrian to save up sufficient money to buy the gift. [2]

(a) $\$16x$ B1

(b) $16x \geq 147$ M1

$$x \geq 9.1875$$

He needs 10 weeks. A1

- 4 (a) Solve the equation $1 - \frac{2f-3}{2} = \frac{f+2}{5}$. [3]

(b) Simplify $\frac{2p-3}{(q-4)^3} \div \frac{8p^2-12q}{(q-4)^2}$, giving your answer as a single fraction in its

lowest terms. [3]

(c) Given that $2a^2 - 2b^2 = 70$ and $a - b = 7$, find the value of $a + b$. [3]

(a) $1 - \frac{2f-3}{2} = \frac{f+2}{5}$

$$10 - 5(2f-3) = 2(f+2) \quad \text{M1 (simplify fractions)}$$

$$10 - 10f + 15 = 2f + 4$$

$$10 + 15 - 4 = 2f + 10f \quad \text{M1}$$

$$21 = 12f$$

$$f = \frac{7}{4} \quad \text{A1}$$

$$(b) \quad \frac{2p-3}{(q-4)^3} \div \frac{8p^2-12q}{(q-4)^2}$$

$$\frac{2p-3}{(q-4)^3} \times \frac{(q-4)^2}{8p^2-12q}$$

M1 (to flip)

$$\frac{2p-3}{(q-4)^3} \times \frac{(q-4)^2}{4p(2p-3)}$$

M1 (to factorize)

$$\frac{1}{4p(q-4)}$$

A1

$$(c) \quad 2a^2 - 2b^2 = 70$$

$$a^2 - b^2 = 35$$

M1

$$(a-b)(a+b) = 35$$

M1

$$\text{since } (a-b) = 7$$

$$a+b = 5$$

A1

- 5 A survey was conducted among 50 families to find out the number of times they travelled together as a family in 2017. The data collected is shown in the table below.

Number of times travelled	0	1	2	3	4
Number of families	15	a	11	7	b

- (a) Show that $a + b = 17$. [1]
- (b) If the mean number of times they travelled as a family is 1.68, show that $a + 4b = 41$. [2]
- (c) Solve the two equations in (a) and (b) simultaneously. [2]
- (d) Find the percentage of families that travelled at most 2 times. [2]

(a) $50 - 15 - 11 - 7 = a + b$ B1

$$17 = a + b \text{ (shown)}$$

(b) $mean = \frac{0 \times 15 + a + 2 \times 11 + 3 \times 7 + 4b}{50}$

$$1.68 = \frac{a + 22 + 21 + 4b}{50} \quad \text{M1}$$

$$84 = a + 4b + 43$$

$$41 = a + 4b \text{ (shown)} \quad \text{A1}$$

(c) $a + b = 17$ eq 1

$$a + 4b = 41 \quad \text{eq 2}$$

$$4b - b = 41 - 17$$

$$\text{eq 2} - \text{eq 1} \quad 3b = 24 \quad \text{M1}$$

$$b = 8$$

sub $b = 8$ into eq 1

$$a + 8 = 17$$

$$a = 9$$

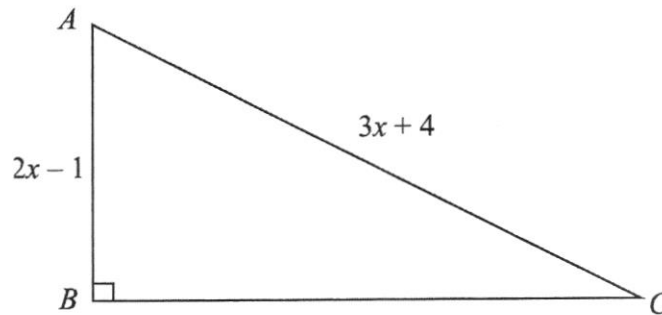
A1 for both answers correct

- (d) no. of families at most 2 = $15 + 9 + 11 = 35$

$$\frac{35}{50} \times 100\% \quad \text{M1}$$

$$= 70\% \quad \text{A1}$$

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$$2x^2 + 5x - 33 = 0. \quad [3]$$

- (b) Write down an expression, in terms of x , for the area of $\triangle ABC$. Expand and simplify your answer. [2]

$$(a) \quad (3x + 4)^2 = (2x - 1)^2 + (x + 9)^2 \quad \text{M1}$$

$$9x^2 + 24x + 16 = 4x^2 - 4x + 1 + x^2 + 18x + 81 \quad \text{M1}$$

$$4x^2 + 10x - 66 = 0$$

$$2x^2 + 5x - 33 = 0 \text{ (shown)} \quad \text{A1}$$

$$(b) \quad \frac{1}{2}(x + 9)(2x - 1) \quad \text{M1}$$

$$= \frac{1}{2}(2x^2 + 17x - 9) \quad \text{A1}$$

$$= x^2 + \frac{17}{2}x - \frac{9}{2}$$

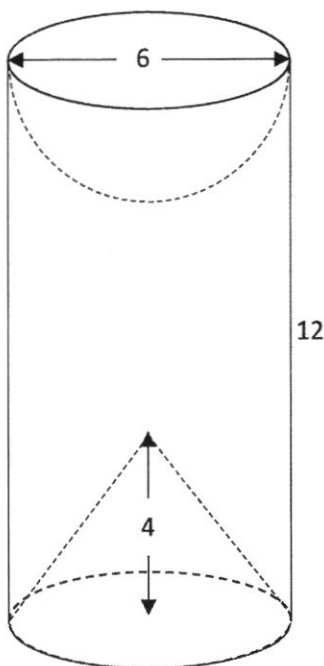
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- (ii) Write down the coordinates of the point where the line $y = -2$ meets the line $y = -3 - 2x$. [1]

- 8 The diagram shows a solid formed by removing a cone and a hemisphere from a cylinder.



The base of the cylinder, the base of the cone and the base of the hemisphere have a common diameter of 6 cm. The height of the cone is 4 cm and the height of the cylinder is 12 cm.

- (a) Calculate the volume in cm^3 of the solid. [4]
- (b) Calculate the total surface area in cm^2 of the solid, leaving your answer in terms of π . [4]
- (d) A tube of acrylic paint can cover 36 cm^2 of the surface area of the solid. How many tubes of acrylic paint are needed to paint the entire solid? [2]

- (a) Volume of hemisphere

$$= \frac{2}{3} \pi r^3$$

$$= \frac{2}{3} \pi 3^3$$

$$= 18\pi$$

M1

Volume of cone

$$\begin{aligned}
 &= \frac{1}{3} \pi r^2 h \\
 &= \frac{1}{3} \pi 3^2 (3) && \text{M1} \\
 &= 12\pi
 \end{aligned}$$

Volume of cylinder

$$\begin{aligned}
 &= \pi r^2 h \\
 &= \pi 3^2 (12) && \text{M1} \\
 &= 108\pi
 \end{aligned}$$

$$\begin{aligned}
 \text{Volume of the solid} &= 108\pi - 12\pi - 18\pi \\
 &= 245.044227 \\
 &= 245 \text{ cm}^3 \text{ (3 s.f.)}
 \end{aligned}$$

(b) curved surface area of hemisphere

$$\begin{aligned}
 &= 2\pi r^2 \\
 &= 2\pi 3^2 && \text{M1} \\
 &= 18\pi
 \end{aligned}$$

$$\begin{aligned}
 \text{Slanted height} &= \sqrt{4^2 + 3^2} \\
 &= 5
 \end{aligned}$$

curved surface area of cone

M1 either one or both

$$\begin{aligned}
 &= \pi r l \\
 &= \pi (3)(5) \\
 &= 15\pi
 \end{aligned}$$

curved surface area of cylinder

$$\begin{aligned}
 &= 2\pi r h \\
 &= 2\pi (3)(12) && \text{M1} \\
 &= 72\pi
 \end{aligned}$$

total surface area = $18\pi + 15\pi + 72\pi$

$$\begin{aligned}
 &= 105\pi && \text{A1}
 \end{aligned}$$

(c) no. of tubes needed

$$= \frac{105\pi}{36}$$

M1

$$= 9.162978573$$

$$= 10 \text{ tubes}$$

A1

~ End of Paper ~



BEATTY SECONDARY SCHOOL
END OF YEAR EXAMINATION 2018

SUBJECT : Mathematics

LEVEL : Sec 2 Normal (A)

PAPER : 1

DURATION : 1 hour 15 minutes

SETTER : Ms Estella Chin

DATE : 8 October 2018

CLASS :	NAME :	REG NO :
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1 Simplify

(a) $\frac{8ab^2}{10a^2b},$

Answer (a) $\frac{4b}{5a}$ [B1] [1]

(b) $\frac{3(t+1)}{2} - \frac{5t}{3}$
 $\frac{3(t+1)}{2} - \frac{5t}{3} = \frac{9(t+1) - 10t}{6}$ [M1]
 $= \frac{9-t}{6}$ [A1]

Answer (b) $\frac{9-t}{6}$ [2]

2 (a) Solve the inequality $16 - 3x \leq 5$.

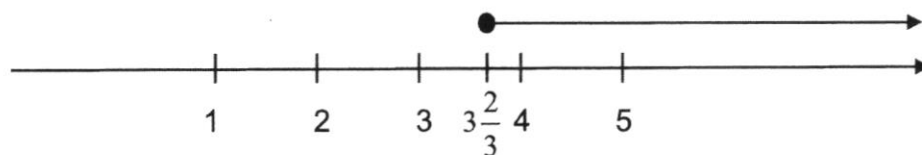
$$16 - 3x \leq 5$$

$$-3x \leq -11$$
 [M1]

$$x \geq 3\frac{2}{3}$$
 [A1]

Answer (a) $x \geq 3\frac{2}{3}$ [2]

(b) Draw a number line to represent the solution of the inequality found in (a).



[B1 – Correct position of $3\frac{2}{3}$ on number line, B1 – Correct shaded circle and direction of arrow] [2]

(c) Hence, state the minimum integer value of x .

Answer (c) 4 [B1] [1]

- 3 (a) Factorise $6r^2 - 7r - 5$.

x	2r	1
3r	6r ²	3r
-5	-10r	-5

Accept any other working
[M1]

Answer (a) $(3r - 5)(2r + 1)$ [A1] or [B2] [2]

- (b) Given that $r = 3$, evaluate the factors found in part (a).

Answer (b) 4 [B1] and 7 [B1] [2]

- 4 (a) Factorise $y(x - z)$.

Answer (a) $y(x - z)$ [B1] [1]

- (b) Hence, evaluate $143 \times 98 - 98 \times 43$, without the use of a calculator.

$$\begin{aligned}
 &143 \times 98 - 98 \times 43 \\
 &= 98(143 - 43) \quad [\text{M1}] \\
 &= 9800 \quad [\text{A1}]
 \end{aligned}$$

Answer (b) 9800 [2]

[Turn over]

- 5 An area of 4 cm^2 on a map represents an actual area of 9 km^2 .

- (a) If the actual area of a theme park is 13.5 km^2 , find the area of the theme park on the map, in cm^2 .

$$\frac{13.5}{9} \times 4 = 6$$

[M1]

Answer (a) 6 [A1] cm^2 [2]

- (b) Find the scale of the map in the form $1 : r$.

Map area : Actual area
 $4 \text{ cm}^2 : 9 \text{ km}^2$

Map distance : Actual distance

$2 \text{ cm} : 3 \text{ km}$ [M1]

$1 \text{ cm} : 1.5 \text{ km}$

$1 \text{ cm} : 150000 \text{ cm}$

$1 : 150000$ [A1]

Answer (b) 1 : 150000 [2]

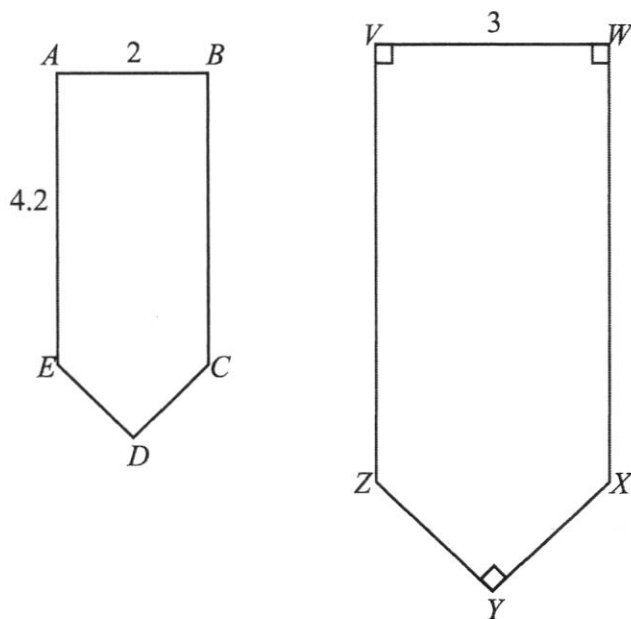
- (c) If the distance between two buildings on the map is 5 cm , calculate the actual distance between the two buildings in km .

$$\frac{5}{2} \times 3 = 7.5$$

[M1] [A1]

Answer (c) 7.5 km [2]

- 6 In the diagram below, pentagons $ABCDE$ and $VWXYZ$ are similar. $AB = 2$ cm, $AE = BC = 4.2$ cm, $VW = 3$ cm, $\angle ZVW = \angle VWX = \angle XYZ = 90^\circ$ and $XY = YZ$.



Find

- (a) $\angle VZY$,

Sum of interior angles in a polygon

$$= (5 - 2) \times 180^\circ$$

$$= 540^\circ \quad [\text{M1}]$$

$\angle VZY$

$$= \frac{540^\circ - 90^\circ \times 3}{2}$$

$$= 135^\circ \quad [\text{A1}]$$

Answer (a) 135° [2]

- (b) the length of WX .

$$\frac{3}{2} \times 4.2 \quad [\text{M1}]$$

$$= 6.3 \quad [\text{A1}]$$

Answer (b) 6.3 cm [2]

[Turn over

- 7 Elle wanted to organise a party for x number of people. She bought one cup of ice cream per person, and a total of $(2x+10)$ chicken wings and $(3x-15)$ fishballs.

- (a) Write an expression in terms of x , for the total number of items Elle bought for the party. Simplify your answer.

$$2x+10+3x-15+x=6x-5$$

Answer (a) $6x-5$ [B1] [1]

- (b) 3 people did not attend the party. Elle distributed the items equally among the people at the party and found that each of them received 7 items.

- (i) Using the information provided, form an algebraic equation in terms of x .

$$\frac{6x-5}{x-3} = 7 \quad [\text{B1}]$$

Answer (b)(i) $\frac{6x-5}{x-3} = 7$ [B1] [1]

- (ii) Solve the equation in (b)(i) and find the number of people who attended the party.

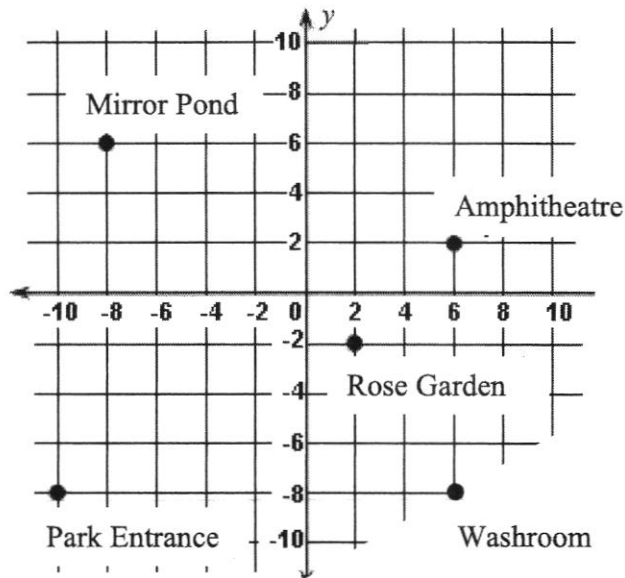
$$6x-5=7x-21 \quad [\text{M1}]$$

$$x=16 \quad [\text{M1}]$$

$$16-3=13 \quad [\text{A1}]$$

Answer (b)(ii) 13 [3]

- 8 The Cartesian coordinate plane below shows the positions of four locations in a park.



- (a) Write down the coordinates of the Amphi theatre.

Answer (a) (6 , 2) [B1] [1]

- (b) Write down the name of the place at (6, -8).

Answer (b) Washroom [B1] [1]

- (c) Mark the origin on the given axes. Label the origin *O*.

[1]

- (d) Calculate the gradient of the line formed between the coordinates representing the Park Entrance and the Mirror Pond.

Answer (d) 7 [B1] [1]

- (e) Roy is standing at the Park Entrance. He wants to visit the Rose Garden. Calculate the shortest distance (in units) that he would need to walk.

$$\sqrt{12^2 + 6^2} \quad [\text{M1}]$$

$$= 13.4 \text{ units} \quad [\text{A1}]$$

Answer (e) 13.4 [2]

- 9 The total number of hours spent using the computer in a week by 12 students are shown in the stem-and-leaf diagram below.

Stem	Leaf
0	8
1	2 4 4 k 8
2	5 5
3	0 8
4	1 9

Key: 1 | 2 means 12 hours

- (a) Given that the mode is 14 hours, find the value of k .

Answer (a) 4 [B1] [1]

- (b) Find

- (i) the mean number of hours,

$$\frac{8+12+14+14+14+18+25+25+30+38+41+49}{12} \quad [\text{M1}]$$

$$=24 \quad [\text{A1}]$$

Answer (b)(i) 24 hours [2]

- (ii) the median number of hours.

$$\frac{18+25}{2}$$

$$=21.5 \quad [\text{B1}]$$

Answer (b)(ii) 21.5 hours [1]

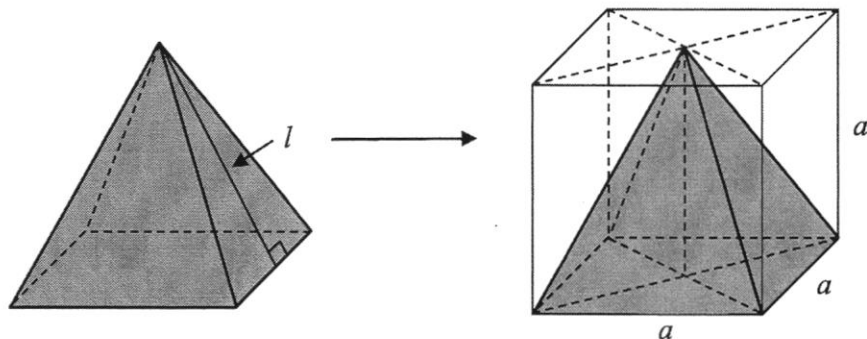
- (c) A teacher selects one student at random to do a project on cyber wellness. Calculate the probability that the student selected spent more than 35 hours using the computer in that week.

$$\frac{3}{12} \quad [\text{M1}]$$

$$=\frac{1}{4} \quad [\text{A1}]$$

Answer (c) $\frac{1}{4}$ [2]

- 10 A solid square pyramid toy, which has a slant height l cm, fits exactly into a cubic gift box, measuring a cm by a cm by a cm, as shown in the diagram.



- (a) State the ratio of the volume of the pyramid toy to the volume of the cubic gift box.

Answer (a) 1 : 3 [B1] [1]

- (b) Given that the volume of the pyramid toy is 1125 cm^3 , show that the value of a is 15.

$$\frac{1}{3}a^3 = 1125 \text{ [M1]}$$

$$a^3 = 3375$$

$$a = 15 \text{ (shown) [A1]}$$

- (c) (i) Calculate the slant height, l cm, of the pyramid toy.

$$\begin{aligned} & \sqrt{15^2 + 7.5^2} \quad [\text{M1}] \\ & = \sqrt{281.25} \\ & = 16.8 \quad [\text{A1}] \end{aligned}$$

Answer (c)(i) 16.8 cm [2]

- (ii) Calculate the total surface area of the pyramid toy.

$$\begin{aligned} & \text{Total surface area of pyramid toy} \\ & = (15 \times 15) [\text{M1}] + 4\left(\frac{1}{2} \times 15 \times \sqrt{281.25}\right) [\text{M1} - \text{ECF}] \\ & = 728 \text{ cm}^2 \text{ (3 s.f.) } [\text{A1}] \end{aligned}$$

Answer (c)(ii) 728 cm² [3]

End of paper ☺