Name: _____

Class	Registration Number

CHIJ KATONG CONVENT
END-OF-YEAR EXAMINATION 2010
MATHEMATICS
PAPER 1

SECONDARY ONE (EXPRESS) Duration: 1 hour 15 minutes

Classes: 1.3, 1.4, 1.5, 1.6

INSTRUCTIONS TO CANDIDATES

Write your name, class and registration number in the spaces at the top of this page and on any separate answer paper used.
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
The number of marks is given in brackets [ ] at the end of each question or part question.

If working is needed for any question, it must be shown in the space below that question.
Omission of essential working will result in loss of marks.
The total number of the marks for this paper is 50.

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.

FOR EXAMINER'S USE	
Total marks	/50

This question paper consists of 10 printed pages (including this cover page).

[Turn over

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Mathematical Formulae

Compound interest

$$\text{Total amount} = P\left(1+\frac{r}{100}\right)^n$$

Mensuration

Curved Surface area of a cone = πrl

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

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

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

Area of triangle ABC = $\frac{1}{2}ab\sin C$

Arc length = $r\theta$, where θ is in radians

Sector area = $\frac{1}{2}r^2\theta$, where θ is in radians

Trigonometry

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc\cos A$$

Statistics

$$\text{Mean} = \frac{\Sigma fx}{\Sigma f}$$

$$\text{Standard deviation} = \sqrt{\frac{\Sigma fx^2}{\Sigma f} - \left(\frac{\Sigma fx}{\Sigma f}\right)^2}$$

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Name:_____( ) Sec ____

Answer **all** the questions.

1 Arrange the following numbers in ascending order.

$$0.1874,\ \frac{3}{16},\ 0.\dot{1}\dot{8},\ 0.1\dot{8}$$

Answer ..... [2]

---

2 (a) Express 480 and 1620 as products of prime factors.

(b) Hence or otherwise, find the sum of the HCF and the LCM of 480 and 1620.

Answer (a) 480 = ... [1]
1620 = ... [1]

(b) ..... [2]

---

3 Express, correct to 3 significant figures,

(a) 4.7185,

(b) 0.0038952.

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

(b) ..... [1]

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4 (a) \$540 is divided among three brothers in the ratio $\frac{3}{4}:\frac{2}{3}:\frac{5}{6}$. By writing the ratio in its simplest form or otherwise, find the amount each of them receives respectively.

(b) A tuition teacher charges \$124 for a tuition session lasting $2\frac{1}{2}$ hours. How much should he charge for one lasting $3\frac{3}{4}$ hours, if charges are made at the same hourly rate?

(c) A car travels 84 km in $1\frac{3}{4}$ hours and then travels at a constant speed of 36 km/h for a further $1\frac{1}{4}$ hours. Calculate the average speed for the whole journey.

Answer (a) \$....., \$....., \$..... [2]

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

(c) .....km/h [2]

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5 Fill in the missing numbers for the following number patterns.

(a) 15, 17, 21, 27, _____, _____

(b) 2, 3, 7, 8, 12, 13, _____, _____

(c) 2, 2, 4, 6, 10, 16, _____, _____

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

(b) ..... [1]

(c) ..... [1]

---

6 Simplify

(a) $\frac{x+5}{3}-\frac{2x-7}{6}+\frac{x}{2}$,

(b) $2(3x-5)-3(7-4x)$.

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

(b) ..... [2]

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7 Factorise $3ac - ad + 2bd - 6bc$ completely.

Answer ..... [2]

8 Solve the following equations.

(a) $15x + 4 = 4x + 103$,

(b) $5x - 1\frac{3}{4} = 6 + \left(1\frac{2}{3}x\right) - \frac{5}{6}$,

(c) $\frac{5x-1}{8} - \frac{5-7x}{2} = \frac{3(6-x)}{6}$.

Answer (a) x = ... [2]

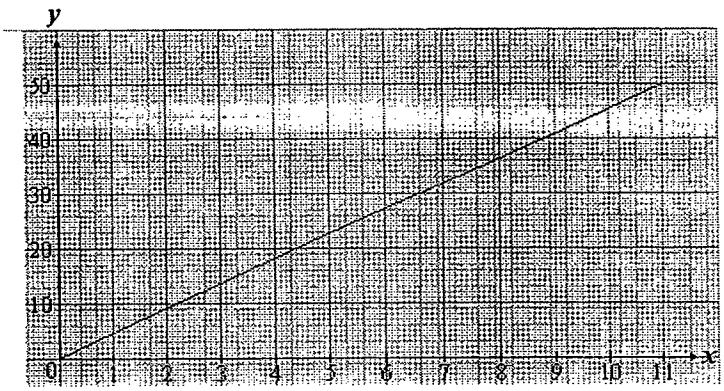
(b) x = ... [2]

(c) x = ... [3]

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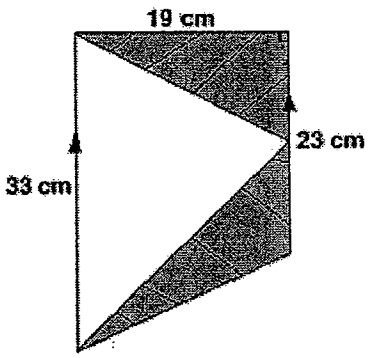
Name:_____( ) Sec ____

9 Find the gradient of the line.



Answer ..... [2]

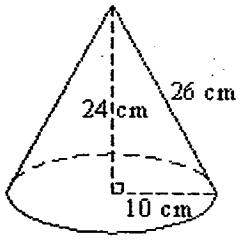
10 Calculate the area of the shaded regions in the given figures.



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

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11 Find the total surface area of the cone in the diagram, taking π to be 3.142.



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

12 (a) Find the surface area of a sphere of radius 4 cm, to the nearest whole number.

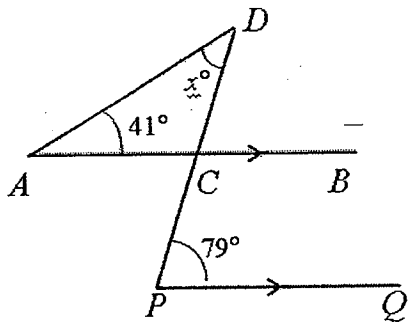
(b) If the volume of a pyramid is 46 cm^3 and the base area is equal to 12 cm^2, find the height of the pyramid.

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

(b) ..... cm [2]

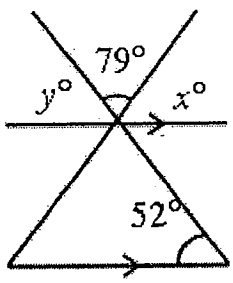
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13 Given that *ACB* // *PQ*, find the value of *x*.



Answer x = ... [3]

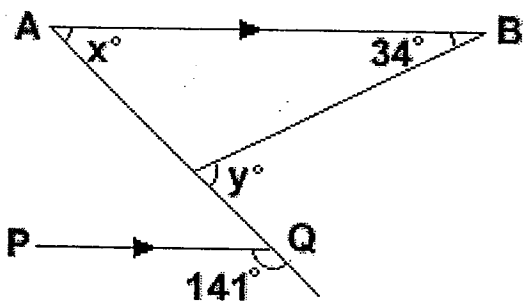
14 Find the values of *x* and *y* in the given figure.



Answer x = ..., y = ... [2]

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15. Given that *AB* is parallel to *PQ*, find the values of *x* and *y*.



Answer x = ..., y = ... [3]

End of Paper

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END-OF-YEAR EXAMINATION 2010
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Name:_____( ) Sec ____

Answer **all** the questions.

1 Arrange the following numbers in ascending order.

$0.1874,\ \frac{3}{16},\ 0.\dot{1}\dot{8},\ 0.1\dot{8}$

$\frac{3}{16} = 0.1875$

$0.\dot{1}\dot{8} = 0.1818...$

$0.1\dot{8} = 0.1888...$ **[M1]**

$0.\dot{1}\dot{8}, 0.1874, \frac{3}{16}, 0.1\dot{8}$ **[A1]**

Answer $0.\dot{1}\dot{8}, 0.1874, \frac{3}{16}, 0.1\dot{8}$ [2]

---

2 (a) Express 480 and 1620 as products of prime factors.

(b) Hence or otherwise, find the sum of the HCF and the LCM of 480 and 1620.

(a) $480 = 2^5 \times 3 \times 5$ **[A1]**
$1620 = 2^2 \times 3^4 \times 5$ **[A1]**

(b) $HCF = 2^2 \times 3 \times 5 = 60$
$LCM = 2^5 \times 3^4 \times 5 = 12960$ **[M1]**

$Sum = 60 + 12960 = 13020$ **[A1]**

Answer (a) $480 = 2^5 \times 3 \times 5$ [1]
$1620 = 2^2 \times 3^4 \times 5$ [1]

(b) 13020 [2]

---

3 Express, correct to 3 significant figures,

(a) 4.7185,

(b) 0.0038952.

Answer (a) 4.72 [1]

(b) 0.00390 [1]

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4 (a) \$540 is divided among three brothers in the ratio $\frac{3}{4}:\frac{2}{3}:\frac{5}{6}$. By writing the ratio in its simplest form or otherwise, find the amount each of them receives respectively.

(b) A tuition teacher charges \$124 for a tuition session lasting $2\frac{1}{2}$ hours. How much should he charge for one lasting $3\frac{3}{4}$ hours, if charges are made at the same hourly rate?

(c) A car travels 84 km in $1\frac{3}{4}$ hours and then travels at a constant speed of 36 km/h for a further $1\frac{1}{4}$ hours. Calculate the average speed for the whole journey.

(a) $\frac{3}{4}:\frac{2}{3}:\frac{5}{6} = 9:8:10$ **[M1]**

Amt each receives respectively $= \frac{9}{27}\text{x}\$540, \frac{8}{27}\text{x}\$540, \frac{10}{27}\text{x}\$540$
$= \$180, \$160, \$200$ **[A1]**

(b) Rate = $\$124 \div 2\frac{1}{2} = \$49.60/\text{h}$ **[M1]**

Amt charged = $\$49.60/\text{h} \times 3\frac{3}{4} = \$186$ **[A1]**

(c) Dist. Traveled for 2nd part = $36 \times 1\frac{1}{4} = 45$ km **[M1]**

Ave. speed = $(45+84) / (1\frac{3}{4}+1\frac{1}{4}) = 43$ km/h **[A1]**

Answer (a) \$180, \$160, \$200 [2]

(b) \$186 [2]

(c) 43 km/h [2]

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5 Fill in the missing numbers for the following number patterns.

(a) 15, 17, 21, 27, _____, _____

(b) 2, 3, 7, 8, 12, 13, _____, _____

(c) 2, 2, 4, 6, 10, 16, _____, _____

Answer (a) 35, 45 [1]

(b) 17, 18 [1]

(c) 26, 42 [1]

---

6 Simplify

(a) $\frac{x+5}{3}-\frac{2x-7}{6}+\frac{x}{2}$,

(b) $2(3x-5)-3(7-4x)$.

(a) $\frac{x+5}{3}-\frac{2x-7}{6}+\frac{x}{2} = \frac{2(x+5)}{6}-\frac{2x-7}{6}+\frac{3x}{6}$ **[M1]**

$= \frac{2x+10}{6}-\frac{2x-7}{6}+\frac{3x}{6}$

$= \frac{2x+10-2x+7+3x}{6}$

$= \frac{3x+17}{6}$ **[A1]**

(b) $2(3x-5)-3(7-4x) = 6x-10-21+12x$ **[M1]**

$= 18x-31$ **[A1]**

Answer (a) $\frac{3x+17}{6}$ [2]

(b) $18x-31$ [2]

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7 Factorise $3ac - ad + 2bd - 6bc$ completely.

$3ac - ad + 2bd - 6bc = a(3c - d) + 2b(d - 3c)$ **[M1]**

$= a(3c - d) - 2b(3c - d)$

$= (a - 2b)(3c - d)$ **[A1]**

Answer $(a - 2b)(3c - d)$ [2]

8 Solve the following equations.

(a) $15x + 4 = 4x + 103$,

(b) $5x - 1\frac{3}{4} = 6 + \left(1\frac{2}{3}x\right) - \frac{5}{6}$,

(c) $\frac{5x - 1}{8} - \frac{5 - 7x}{2} = \frac{3(6 - x)}{6}$.

(a) $15x + 4 = 4x + 103$

$15x - 4x = 103 - 4$ **[M1]**

$11x = 99$

$x = 9$ **[A1]**

(b) $5x - 1\frac{3}{4} = 6 + \left(1\frac{2}{3}x\right) - \frac{5}{6}$

$5x - 1\frac{2}{3}x = 6 - \frac{5}{6} + 1\frac{3}{4}$ **[M1]**

$3\frac{1}{3}x = 6\frac{11}{12}$

$x = 2\frac{3}{40}$ **[A1]**

(c) $\frac{5x - 1}{8} - \frac{5 - 7x}{2} = \frac{3(6 - x)}{6}$

$3(5x - 1) - 12(5 - 7x) = 4(3)(6 - x)$ **[M1]**

$15x - 3 - 60 + 84x = 72 - 12x$ **[M1]**

$111x = 135$

$x = 1\frac{8}{37}$ **[A1]**

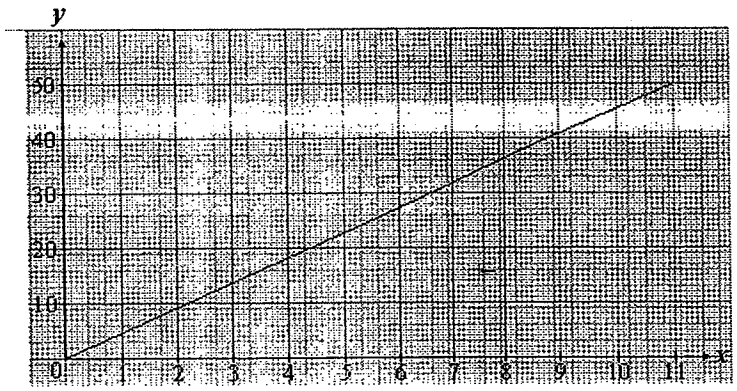
Answer (a) $x = 9$ [2]

(b) $x = 2\frac{3}{40}$ [2]

(c) $x = 1\frac{8}{37}$ [3]

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9 Find the gradient of the line.

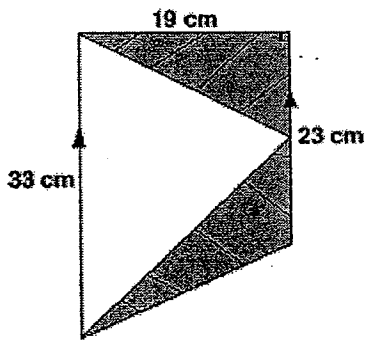


$m = \frac{50}{11}$ **[M1]**

$= 4\frac{6}{11}$ **[A1]**

Answer $4\frac{6}{11}$ [2]

10 Calculate the area of the shaded regions in the given figures.



Area of unshaded triangle = $\frac{1}{2}(33)(19) = 313.5\ cm^2$ **[M1]**

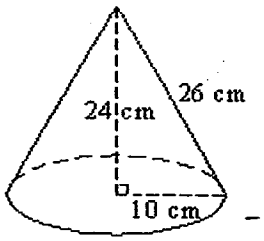
Area of trapezium = $\frac{1}{2}(33+23)(19) = 532\ cm^2$ **[M1]**

Shaded area = $532 - 313.5 = 218.5\ cm^2$ **[A1]**

Answer $218.5\ cm^2$ [3]

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11 Find the total surface area of the cone in the diagram, taking π to be 3.142.



Surface area of cone $= \pi rl + \pi r^2$
$= 3.142(10)(26) + 3.142(10)^2$ **[M2]**
$= 816.92 + 314.2$
$= 1131.12\ cm^2$ **[A1]**

Answer 1131.12 cm^2 [3]

12 (a) Find the surface area of a sphere of radius 4 cm, to the nearest whole number.

(b) If the volume of a pyramid is 46 cm^3 and the base area is equal to 12 cm^2, find the height of the pyramid.

(a) Surface area $= 4\pi r^2$
$= 4(3.142)(4^2)$ **[M1]**
$= 201\ cm^2$ (whole no.) **[A1]**

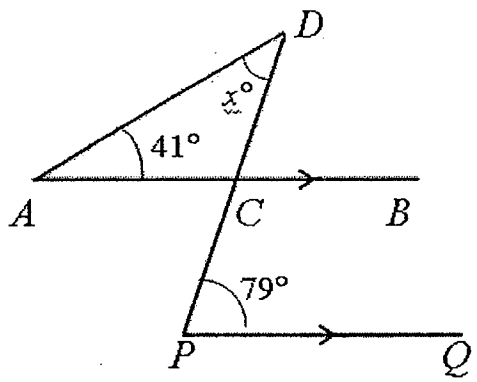
(b) Vol. of pyramid $= \frac{1}{3}$(base area)(height) $= 46cm^3$
$\frac{1}{3}(12)(h) = 46$ **[M1]**
height = 11.5 cm **[A1]**

Answer (a) 201 cm^2 [2]

(b) 11.5 cm [2]

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13 Given that *ACB // PQ*, find the value of *x*.



∠PCB = 180° – 79° (int. ∠s)
= 101° **[M1]**

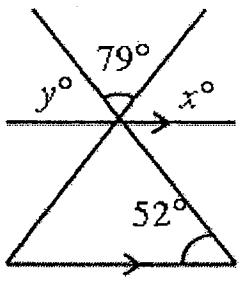
∠ACD = 101° (vert. opp. ∠s)

x = 180 – 41 – 101 (∠ sum triangle) **[M1]**

= 38 **[A1]**

Answer x = 38 [3]

14 Find the values of *x* and *y* in the given figure.



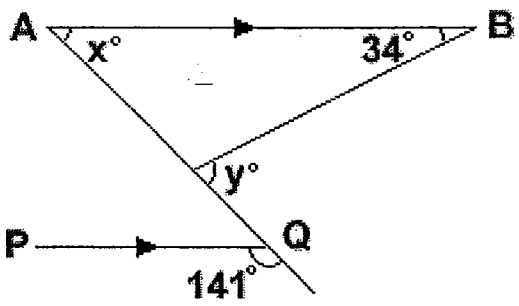
y = 52 (corr. ∠s) **[A1]**

x = 180 – 52 – 79 (adj ∠s)
= 49 **[A1]**

Answer x = 49, y = 52 [2]

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15. Given that *AB* is parallel to *PQ*, find the values of *x* and *y*.



$\angle AQP = 180^\circ - 141^\circ$ (adj. $\angle$s)
$= 39^\circ$ **[M1]**

$x = 39$ (alt. $\angle$s) **[A1]**

$x + 34 = y$ (ext. $\angle$ = sum int. $\angle$s)
$39 + 34 = y$
$y = 73$ **[A1]**

Answer $x = 39, y = 73$ [3]

End of Paper

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Class	Registration Number

CHIJ KATONG CONVENT

END-OF-YEAR EXAMINATION 2010

MATHEMATICS

PAPER 2

SECONDARY ONE (EXPRESS) Duration: 1 hour 15 minutes

Classes: Sec 1.3, 1.4, 1.5, 1.6

Additional materials:
Writing paper
Graph Paper

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Answer **all** questions

1 Use a calculator to evaluate $\dfrac{\sqrt[3]{13\,824} \times \sqrt{676} + \sqrt{13\,182^2 \div 169^3}}{3^2 \times \sqrt{121} - \sqrt[3]{729}}$. [1]

2 In Mr Yong's shop, a pair of shoes for sale has a marked price of $125. He allows a discount of 28% off the marked price, and still makes a profit of 25% of the price he paid for it. Find
(a) the discounted selling price, [1]
(b) the cost price. [1]

3 Dylan's salary in 2010 is 12% more than his salary in 2009. If his annual salary in 2010 is $24 808, calculate his annual salary in 2009. [2]

4 Mr Tan's monthly income consists of $550 plus a commission of 4% on all sales. Find his total monthly income if his monthly total sales is $18 000. [2]

5 Consider the pattern:

$3(0) + 1 = 1$
$3(1) + 1 = 4$
$3(2) + 1 = 7$
$3(3) + 1 = 10$
⋮
⋮

Write down
(a) the 10^{th} line in the pattern, [1]
(b) the n^{th} line in the pattern. [2]

6 If $a = -2$ and $b = -5$, find the value of $-5a - (-2b) + 3$. [2]

7 Given that x is an odd number, find the sum of the next three consecutive odd numbers in terms of x. [2]

8 The result of adding 14 to twice a number is the same as subtracting 8 from four times of that number. Let the number be x and form an equation. Hence or otherwise, find the number. [3]

9 (a) Given the equation $y = -2x + 5$, copy and complete the table below:

x	-5	0	5
y			

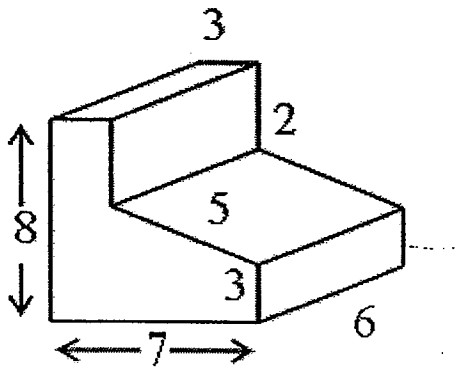
[3]

(b) Draw the graph of the equation $y = -2x + 5$ using the above table. [2]
(c) Using the graph or otherwise, find the value of x when $y = 11$. [1]
(d) Using the graph or otherwise, find the gradient of the line obtained. [1]

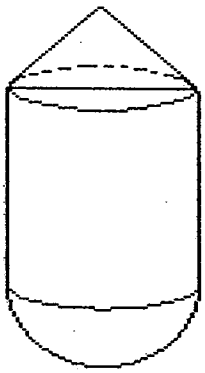
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10 (a) Plot the following points and join them with straight lines on a fresh piece of graph paper:
A(0, 3), B(3, 0), C(-2, 0). [2]
(b) Name the figure formed. [1]
(c) Find the area of the figure. [1]

11 In the figure, all dimensions are given in cm. Calculate
(a) the volume, [4]
(b) the total surface area of the solid. [2]



12 A solid consists of a cylinder of diameter 8 cm sandwiched between a cone and a hemisphere of the same diameter. If the cone is of height 10 cm and the cylinder is of height 12 cm, find the total volume of the solid, using π as 3.142. [4]

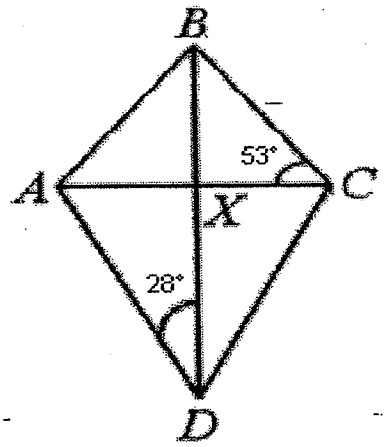


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13 In the diagram *ABCD* is a kite in which $\angle BCA = 53°$ and $\angle ADB = 28°$. Find the size of

(a) $\angle ABX$, [2]

(b) $\angle BAD$. [2]



14 (a) The interior angles of a pentagon are 85°, 106°, $(2x - 4)°$, $(3x - 15)°$ and $(200 - 2x)°$. Calculate the value of x. [3]

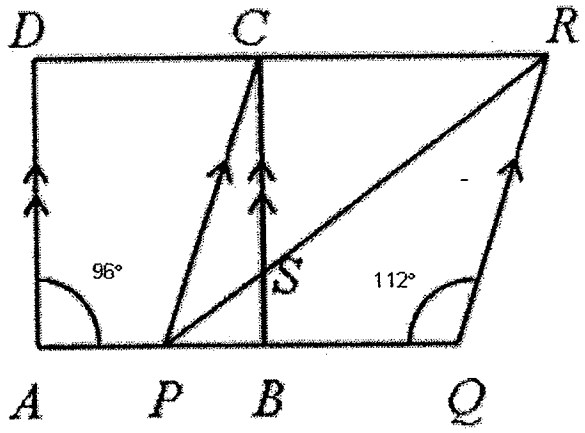
(b) Calculate the size of an exterior angle of a regular polygon with 24 sides. [1]

15 In the diagram, *ABCD* and *CPQR* are two rhombuses. If $\angle PQR = 112°$ and $\angle BAD = 96°$, calculate

(a) $\angle PRQ$, [1]

(b) $\angle QBC$, [1]

(c) $\angle PSB$. [2]



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Class	Registration Number

CHIJ KATONG CONVENT

END-OF-YEAR EXAMINATION 2010

MATHEMATICS

PAPER 2

SECONDARY ONE (EXPRESS) Duration: 1 hour 15 minutes

Classes: Sec 1.3, 1.4, 1.5, 1.6

Additional materials:
Writing paper
Graph Paper

READ THESE INSTRUCTIONS FIRST

Write your name, class and registration number on all the work you hand in.
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.
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 your 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 50.

FOR EXAMINER'S USE	
Total marks	**/50**

This paper consists of 5 printed pages (including this cover page).

[Turn over

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Mathematical Formulae

Compound interest

$$\text{Total amount} = P\left(1+\frac{r}{100}\right)^n$$

Mensuration

Curved Surface area of a cone = πrl

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

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

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

Area of triangle ABC = $\frac{1}{2}ab\sin C$

Arc length = $r\theta$, where θ is in radians

Sector area = $\frac{1}{2}r^2\theta$, where θ is in radians

Trigonometry

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc\cos A$$

Statistics

$$\text{Mean} = \frac{\Sigma fx}{\Sigma f}$$

$$\text{Standard deviation} = \sqrt{\frac{\Sigma fx^2}{\Sigma f} - \left(\frac{\Sigma fx}{\Sigma f}\right)^2}$$

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Answer **all** questions

1 Use a calculator to evaluate $\dfrac{\sqrt[3]{13\,824}\times\sqrt{676}+\sqrt{13\,182^2\div 169^3}}{3^2\times\sqrt{121}-\sqrt[3]{729}}$.

$$\frac{\sqrt[3]{13\,824}\times\sqrt{676}+\sqrt{13\,182^2\div 169^3}}{3^2\times\sqrt{121}-\sqrt[3]{729}}=\frac{630}{90}=7 \qquad \textbf{[A1]}$$

2 In Mr Yong's shop, a pair of shoes for sale has a marked price of \$125. He allows a discount of 28% off the marked price, and still makes a profit of 25% of the price he paid for it. Find
(a) the discounted selling price,
(b) the cost price.

(a) Discounted selling price $= \dfrac{72}{100}\text{x}\$125 = \$90$ **[A1]**

(b) Cost price $= \dfrac{\$90}{125}\text{x}100 = \$72$ **[A1]**

3 Dylan's salary in 2010 is 12% more than his salary in 2009. If his annual salary in 2010 is \$24 808, calculate his annual salary in 2009.

Salary in 2009 $= \dfrac{\$24808}{112}\text{x}100$ **[M1]**
$= \$22150$ **[A1]**

4 Mr Tan's monthly income consists of \$550 plus a commission of 4% on all sales. Find his total monthly income if his monthly total sales is \$18 000.

Commission $= \dfrac{\$18000}{100}\text{x}4 = \$720$ **[M1]**
Income $= \$720 + 550 = \$1270$ **[A1]**

5 Consider the pattern: $3(0) + 1 = 1$
$3(1) + 1 = 4$
$3(2) + 1 = 7$
$3(3) + 1 = 10$
:

Write down
(a) the 10^{th} line in the pattern,
(b) the n^{th} line in the pattern.

(a) $3(9) + 1 = 28$ **[A1]**
(b) $3(n-1) + 1 = 3n - 2$ **[A2]**

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6 If $a = -2$ and $b = -5$, find the value of $-5a - (-2b) + 3$.

$-5a - (-2b) + 3 = -5(-2) - [-2(-5)] + 3$ **[M1]**
$= 10 - 10 + 3$
$= 3$ **[A1]**

7 Given that x is an odd number, find the sum of the next three consecutive odd numbers in terms of x.

sum $= (x+2) + (x+4) + (x+6)$ **[M1]**
$= 3x + 12$ **[A1]**

8 The result of adding 14 to twice a number is the same as subtracting 8 from four times of that number. Let the number be x and form an equation. Hence or otherwise, find the number.

$14 + 2x = 4x - 8$ **[M2]**
$22 = 2x$
$x = 11$ **[A1]**

9 (a) Given the equation $y = -2x + 5$, copy and complete the table below:

x	-5	0	5
y			

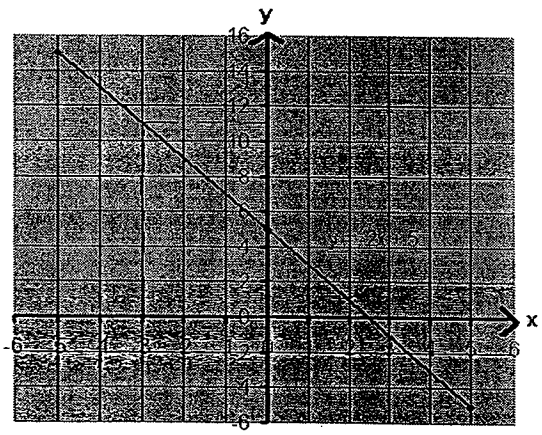
(b) Draw the graph of the equation $y = -2x + 5$ using the above table.
(c) Using the graph or otherwise, find the value of x when $y = 11$.
(d) Using the graph or otherwise, find the gradient of the line obtained.

(a)

x	-5	0	5
y	**15**	**5**	**-5**

[A3]

(b)



[A2]

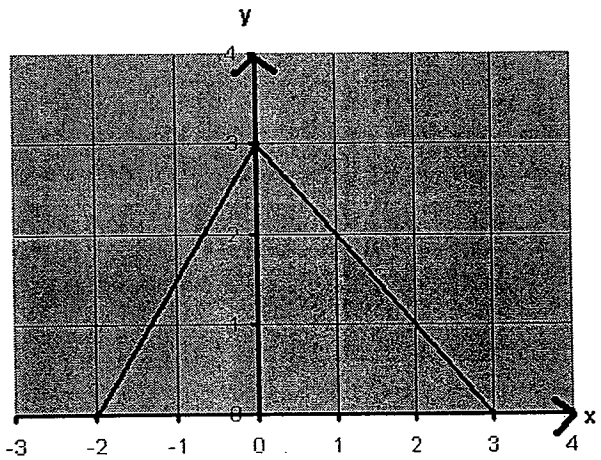
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(c) $11 = -2x + 5$
$2x = 5 - 11$
$x = -6/2$
$= -3$ **[A1]**

(d) $m = -2$ **[A1]**

10 (a) Plot the following points and join them with straight lines on a fresh piece of graph paper:
A(0, 3), B(3, 0), C(-2, 0).
(b) Name the figure formed.
(c) Find the area of the figure.

(a)

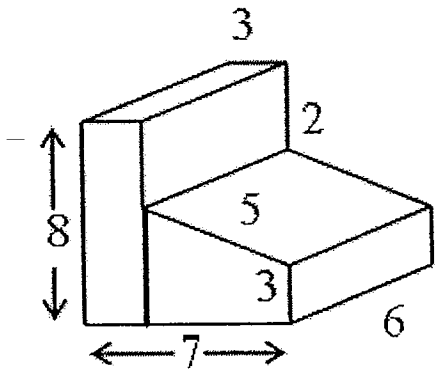


[A2]

(b) Triangle **[A1]**

(c) Area = $\frac{1}{2}(2+3)(3) = 7.5$ units^2 **[A1]**

11 In the figure, all dimensions are given in cm. Calculate
(a) the volume,
(b) the total surface area of the solid.



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(a) Base Area $= 8(3) + \frac{1}{2}(6+3)(7-3)$ **[M1]**

$= 24 + 18 = 42\ cm^2$ **[M1]**

Volume $= 42 \times 6$ **[M1]**

$= 252\ cm^3$ **[A1]**

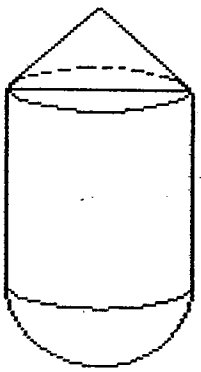
(b) Perimeter of base $= 8+7+3+5+2+3$

$= 28$ cm **[M1]**

Surface area $= 28x6 + 2x42$

$= 252\ cm^2$ **[A1]**

12 A solid consists of a cylinder of diameter 8 cm sandwiched between a cone and a hemisphere of the same diameter. If the cone is of height 10 cm and the cylinder is of height 12 cm, find the total volume of the solid, using π as 3.142.



Radius $= \frac{8}{2} = 4$ cm

Vol. of cylinder $= 3.142 \times 4^2 \times 12 = 603.264\ cm^3$ **[M1]**

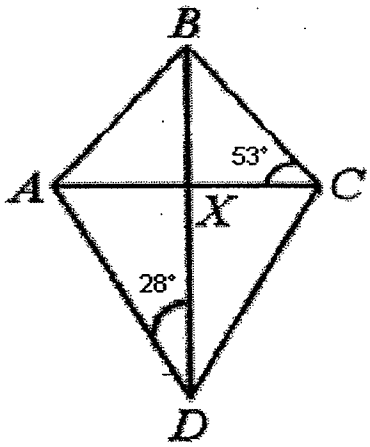
Vol. of cone $= \frac{1}{3} \times 3.142 \times 4^2 \times 10 = 167.573...\ cm^3$ **[M1]**

Vol. of hemisphere $= \frac{2}{3} \times 3.142 \times 4^3 = 134.0586...\ cm^3$ **[M1]**

Total vol. $= 603.264 + 167.573... + 134.0586... = 904.8956... = 905\ cm^3$ **[A1]**

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13 In the diagram *ABCD* is a kite in which $\angle BCA = 53°$ and $\angle ADB = 28°$. Find the size of
(a) $\angle ABX$,
(b) $\angle BAD$.



(a) $\angle CBX = 180° - 90° - 53°$ ($\angle$ sum triangle)
$= 37°$ **[M1]**
$\angle ABX = 37°$ ($\angle$ in a kite) **[A1]**

(b) $\angle BAD = 180° - 28° - 37°$ ($\angle$ sum triangle) **[M1]**
$= 115°$ **[A1]**

14 (a) The interior angles of a pentagon are 85°, 106°, $(2x - 4)°$, $(3x - 15)°$ and $(200 - 2x)°$. Calculate the value of x.
(b) Calculate the size of an exterior angle of a regular polygon with 24 sides.

(a) $85 + 106 + (2x - 4) + (3x - 15) + (200 - 2x) = (5-2)(180)$ **[M1]**
$372 + 3x = 540$ **[M1]**
$3x = 168$
$x = 56$ **[A1]**

(b) ext. $\angle = 360° / 24 = 15°$ **[A1]**

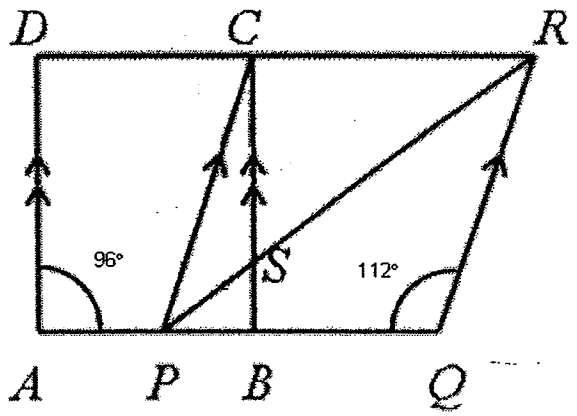
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15 In the diagram, *ABCD* and *CPQR* are two rhombuses. If $\angle PQR = 112°$ and $\angle BAD = 96°$, calculate

(a) $\angle PRQ$,

(b) $\angle QBC$,

(c) $\angle PSB$.



(a) $\angle PRQ = (180^\circ - 112^\circ) / 2$ (isos. triangle)
$= 34^\circ$ **[A1]**

(b) $\angle QBC = 96^\circ$ (corr. $\angle$s) **[A1]**

(c) $\angle SPB = 34^\circ$ (isos. triangle)

$\angle SPB + \angle PSB = \angle QBC$ (ext. $\angle$ = sum of int. $\angle$s)
$34^\circ + \angle PSB = 96^\circ$ **[M1]**
$\angle PSB = 62^\circ$ **[A1]**

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