BEATTYSECONDARY SCHOOL
END-OF-YEAREXAMINATION 2014

SUBJECT : Mathematics **LEVEL : Sec 1Express**

PAPER :2 **DURATION : 1 hour 30 minutes**

SETTER : Ms Yuen Shu Yan **DATE :10October 2014**

CLASS :	NAME :	REG NO :

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 $5a-3b+c$ from $2b+3a-5c$. [2]

2 Michelle wishes to cover a wall of length $2^2\times3^3\times5^4$ cm and breadth $3^2\times5^2\times7^2$ cm completely with square wallpaper of the same size. Find the length of the largest possible square wallpaper that can be used. [2]

3 Simplify the following expressions.

(a) $\frac{x}{5}+\frac{1-2x}{3}$ [2]

(b) $2-\frac{3(5y-7)}{4}$ [2]

4 Without using a calculator, evaluate $[5+(-2)^3]-[24-(-31)]\times(-2)$. [3]

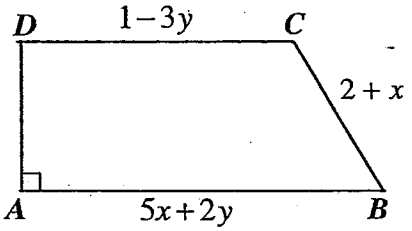
5 Solve $\frac{6}{3-4z}=\frac{3}{-3+4z}$. [3]

6 Alex bought a thumbdrivefor \$15. He marked up the costprice by 60%. He then sold thethumbdrive at a discount of 20% on the marked price.

(a) Calculate the selling price of the thumbdrive. [3]

(b) If 7% GST is applied on the selling price, calculate the selling price including GST. [2]

7



$ABCD$ is a trapezium. $AB=(5x+2y)$cm, $BC=(2+x)$cm, $CD=(1-3y)$cm and the perimeter of the trapezium is $(5x-2y+9)$cm.

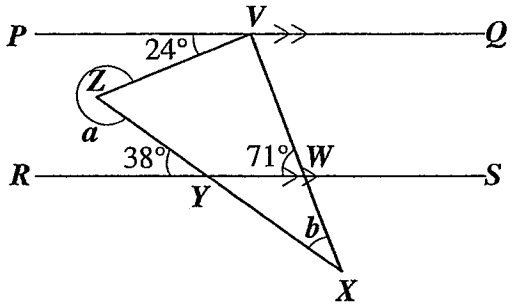
(a) Find the length of AD in terms of x and y. [2]

(b) Given $x=5$ and $y=-3$, find the area of the trapezium $ABCD$. [3]

8 In the diagram, PQ is parallel to RS. The lines VW and ZY are produced to meet at X.

Given that $\angle PVZ=24°$, $\angle RYZ=38°$ and $\angle RWV=71°$.

Stating the reasons, find the values of a and b. [4]



Answer the whole question on a piece of blank paper.

9 In quadrilateral $WXYZ$, $WX=8$ cm, $WZ=5.8$ cm, $XY=YZ=9$ cmand $\angle XWZ=115°$.

(a) Construct the quadrilateral $WXYZ$. [3]

(b) The angle bisector of $\angle XYZ$ cuts WX at P. Locate, using accurate construction, the position of P. [1]

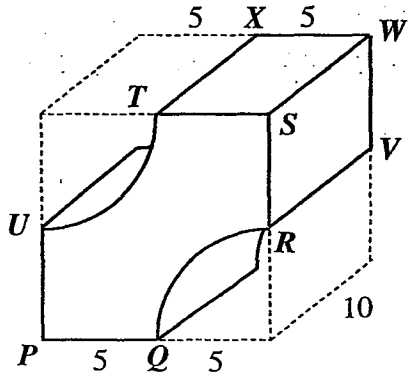
(c) Measure and write down the length of PX. [1]

10 The solid below is formed froma wooden cubewith its two corners cut out in the shape of a quadrant of radius 5 cm.

(a) Find, in terms of π, the area of the cross-section. [2]

(b) Calculate the volume of the solid. [2]

(c) Calculate the total surface area of the solid. [3]



Answer the whole question on a piece of graph paper.

11 **(a)** The table below shows some values of x and y for the equation $3y = 2x - 12$.

x	0	3	6	9
y	p	-2	q	2

Find the value of p and of q. [2]

(b) Using the scale of 2 cm to 1 unit on both axes, draw the graph of $3y = 2x - 12$. [3]

(c) From the graph,

(i) state the coordinates where the line cuts the x–axis, [1]

(ii) find the value of y when $x = 1$. [1]

(d) Find the gradient of the line $3y = 2x - 12$. [1]

(e) Draw and label the line $x = 7$. State the coordinates of the intersection point of $3y = 2x - 12$ and $x = 7$. [2]

~ End of Paper ~

Answers

1 $-2a + 5b - 6c$

2 225 cm

3 **(a)** $\frac{5 - 7x}{15}$

(b) $\frac{29 - 15y}{4}$

4 107

5 $\frac{3}{4}$

6 **(a)** \$19.20

(b) \$20.54

7 **(a)** $-x - y + 6$

(b) 58 cm^2

8 $\angle a = 298°$, $\angle b = 33°$

9 **(c)** PX = 6.6 cm

10 **(a)** $100 - 12.5\pi$ cm^2

(b) 607 cm^3

(c) 479 cm^2

11 **(a)** $p = -4$, $q = 0$

(c) (i) (6, 0)

(ii) $y = -3.3$

(d) $\frac{2}{3}$

(e) (7 , 0.7)

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Marking Scheme

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1 $(2b + 3a - 5c) - (5a - 3b + c)$

$= 2b + 3a - 5c - 5a + 3a - c$ ... [M1]

$= -2a + 5b - 6c$ ... [A1]

2 HCF $= 3^2 \times 5^2$ ... [M1]

$= 225$

$\therefore$ length of the largest possible square wallpaper = 225 cm. ...[A1]

3 (a) $\frac{x}{5} + \frac{1-2x}{3} = \frac{3x+5(1-2x)}{15}$

$= \frac{3x+5-10x}{15}$ ... [M1]

$= \frac{5-7x}{15}$ ... [A1]

(b) $2 - \frac{3(5y-7)}{4} = \frac{8-15y+21}{4}$ ... [M1]

$= \frac{29-15y}{4}$ ... [A1]

4 $[5 + (-2)^3] - [24 - 31) \times (-2)$ $= [5 + (-8)] - (24 + 31) \times (-2)$ ... [M2]

$= (-3) - (-110)$

$= 107$ ... [A1]

5 $\frac{6}{3-4z} = \frac{3}{-3+4z}$

$6(-3+4z) = 3(3-4z)$ ... [M1]

$-18+24z = 9-12z$

$36z = 27$ ... [M1]

$z = \frac{27}{36} = \frac{3}{4}$ ... [A1]

6 (a) Marked price of thumbdrive $= \frac{160}{100} \times 15$ ... [M1]

$= \$24$

Selling price of thumbdrive $= \frac{80}{100} \times 24$ ... [M1]

$= \$19.20$ ... [A1]

(b) Selling price including GST $= \frac{107}{100} \times 19.20$ ... [M1]

$= \$20.54$ (to2 d.p.) ... [A1]

7 (a) AD $= (5x-2y+9)-(5x+2y)-(2+x)-(1-3y)$ ... [M1]

$= 5x-2y+9-5x-2y-2-x-1+3y$

$= -x-y+6$ cm ... [A1]

(b) When $x = 5, y = -3$,

AD $= -5-(-3)+6 = 4$ cm

CD $= 1-3(-3) = 10$ cm

AB $= 5(5)+2(-3) = 19$ cm

... Substitution of values [M1]

$\therefore$ Area of trapezium $= \frac{1}{2}(4)(10+19)$ ... [M1]

$= 58$ cm^2 ... [A1]

8 (Addition of one parallel line that passes through Z)

Acute $\angle VZY = 24° + 38° = 62°$ (alt. $\angle$s) ... [M1]

$\angle a = 360° - 62° = \underline{298°}$ ($\angle$s at a point) ... [A1]

$\angle QVW = 71°$ (alt. $\angle$s)

$\angle ZVX = 180° - (71° + 24°) = 85°$ ($\angle$s on a straight line) ... [M1]

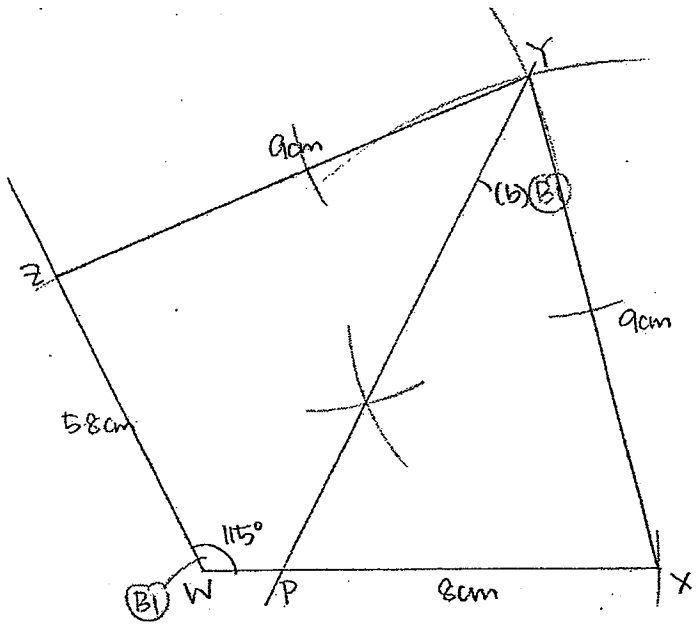
$\angle b = 180° - (62° + 85°) = \underline{33°}$ ($\angle$sum of Δ) ... [A1]

9

(c) PX = 6.6 cm (B1)

Accept ± 0.1 cm

(a)



WZ & WX — (B1)

YZ = XZ = 9cm — (B1)

10 (a) Area of cross-section $= (10 \times 10) - \frac{1}{2}[\pi(5)^2]$ ... [M1]

$= 100 - 12.5\pi$ cm^2 ... [A1]

(b) Volume of wood $= (100 - 12.5\pi) \times 10$ ... [M1]

$= 607$ cm^3 (to 3 sig. fig) ... [A1]

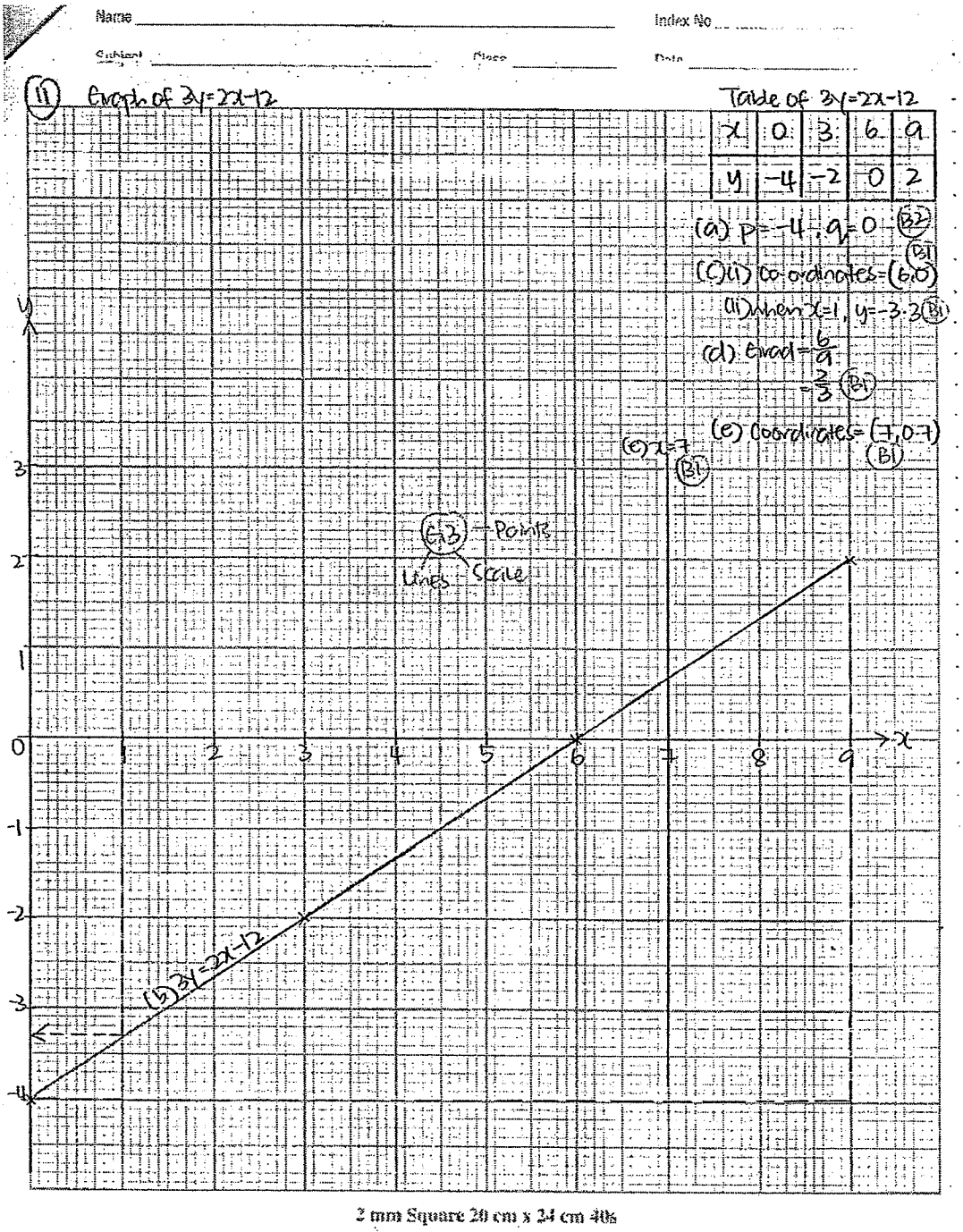
(c) Perimeter of figure $= \frac{1}{2}[2\pi(5)] + 4(5)$

$= 5\pi + 20$ cm

$\therefore$ Total surface area $= (5\pi + 20) \times 10 + 2(100 - 12.5\pi)$ ... [M2]

$= 479$ cm^2 (to 3 sig. fig.) ... [A1]

11



2 mm Square 20 cm x 24 cm 40s