Anglo Chinese School (Barker Road)
End of the Year Examination 2012
Secondary One Express - Mathematics
Paper 1

Answer **all** the questions.

1 **(a)** Estimate the value of $\frac{7.955\times25.05}{2.012\times2.498}$ correct to the nearest integer.

Answer: (a) _____ [1]

(b) Express $\frac{8}{5}$ as a percentage.

Answer: (b) _____% [1]

2 Calculate $\frac{\sqrt[3]{3.41}}{18.5-2.81^2}$, giving your answer correct to 3 significant figures.

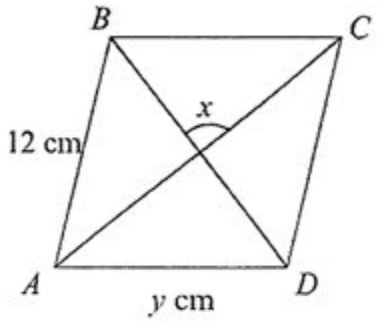
Answer: _____ [2]

3 Solve the inequality $3x + 6 \geq -3x - 1$.

Answer: _____ [2]

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4 The figure *ABCD* is a rhombus.



Write down

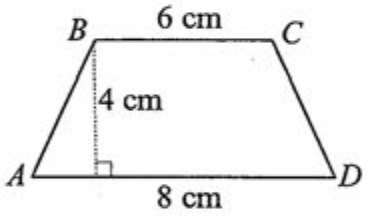
(a) the value of x,

Answer: (a) $x =$ _____° [1]

(b) the value of y.

Answer: (b) $y =$ _____cm [1]

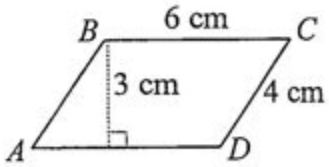
5 The figure *ABCD* is a trapezium. Find the area.



Answer: _____ cm^2 [2]

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6 The figure $ABCD$ is a parallelogram.



Find

(a) the perimeter,

Answer: _____ cm [1]

(b) the area.

Answer: _____ cm^2 [1]

7 A bag of flour is divided into three packets in the ratio 2 : 3 : 7. If the mass of the smallest packet is 160 g, find the mass of the bag of flour.

Answer: _____ g [3]

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8 **(a)** Find the highest common factor of 30, 42 and 54.

Answer: (a) _____ [1]

(b) Three alarm clocks are set to ring at intervals of 14 minutes, 18 minutes and 21 minutes respectively. If all the alarm clocks ring together at 0830, at what time will they next ring together again?

Answer: (b) _____ [2]

9 A square pyramid has a base area of 36 cm^2 and height of 4 cm. Each of its triangular faces has an area of 15 cm^2.

Find

(a) the volume of the pyramid,

Answer: (a) _____ cm^3 [2]

(b) the total surface area of the pyramid.

Answer: (b) _____ cm^2 [1]

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10 Given $x = 3$ and $y = -2$, find the value of

(a) $2x + 3y$

Answer: (a) _____ [1]

(b) $3x - (3y)^2$

Answer: (b) _____ [2]

11 **(a)** Expand $\frac{2}{5}(10x - 2y)$

Answer: (a) _____ [1]

(b) Factorise $4x + 6y - 12$

Answer: (b) _____ [1]

(c) Simplify $(3x + 4y) - (3y - 5x)$

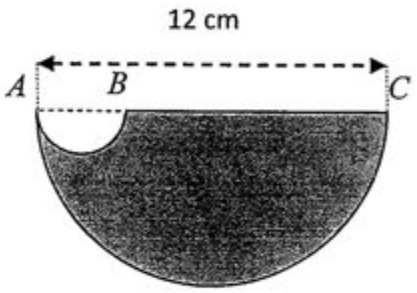
Answer: (c) _____ [1]

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12 The diagram shows a semi-circle with diameter $AC = 12$ cm.

$AB = \frac{1}{4}AC$ and a semi-circle is drawn with AB as the diameter.

Find the perimeter of the shaded region.



Answer: _____ cm [3]

13 Convert

(a) 320g to kg,

Answer: (a) _____ kg [1]

(b) $1.2m^3$ to cm^3.

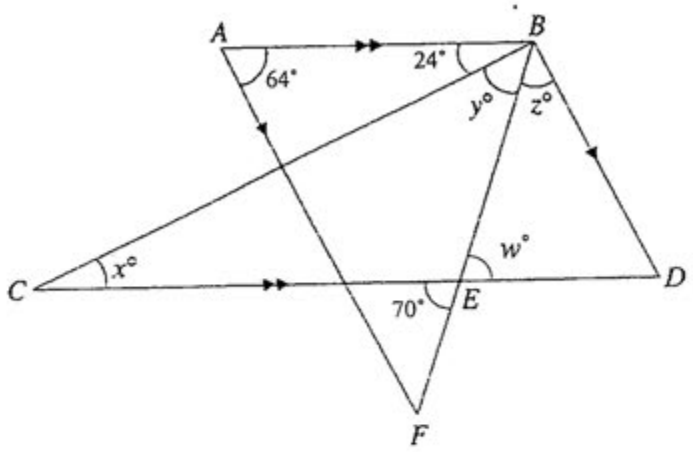
Answer: (b) _____ cm^3 [2]

(c) A glass block weighs 43 grams, correct to the nearest gram. Write down the least possible mass of the block.

Answer: (c) _____ g [1]

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14 In the diagram, find the values of w, x, y and z.



Answer: $w =$ _____° [1]

Answer: $x =$ _____° [1]

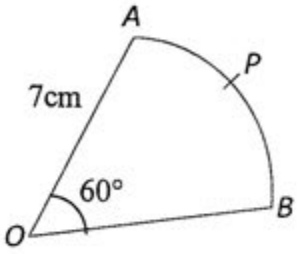
Answer: $y =$ _____° [1]

Answer: $z =$ _____° [1]

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15 The figure shows a sector $OAPB$ which is part of a circle with centre O.

$\angle AOB = 60°$ and $OA = 7$ cm.



Taking $\pi = \frac{22}{7}$, find

(a) the area of the figure,

Answer: (a) _____ cm^2 [2]

(b) the perimeter of the figure.

Answer: (b) _____ cm [2]

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16 A map is drawn to a scale of 1 : 25000.

(a) The distance between two towns on the map is 15 cm.
Find the actual distance, in kilometres, between the two towns.

Answer: (a) _____ km [2]

(b) A lake has an actual area of 3.5 km^2.
Find the area, in square centimetres, of the lake on the map.

Answer: (b) _____ cm^2 [2]

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17 The rates of courier charges to Country A are shown in the table below:

Weight of Parcel	Rate
8kg and below	\$9.50 per kilogram
Every additional kilogram	\$11.00 per kilogram

(a) Frederick needs to send a parcel of 12 kg to Country A. Calculate how much he has to pay.

Answer: (a) \$ _____ [2]

(b) Jaslyn paid \$98 to get her parcel delivered to Country A. Find the weight of her parcel.

Answer: (b) _____ kg [2]

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Anglo Chinese School (Barker Road)
End of the Year Examination 2012
Secondary One Express - Mathematics
Paper 2

Answer **all** the questions.

1 The diagram below shows a sequence of patterns formed by squares.

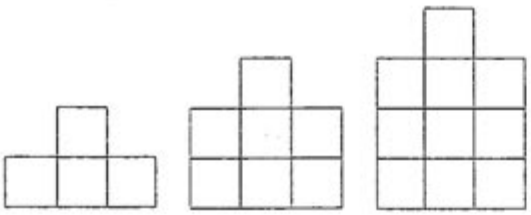


Fig 1 Fig 2 Fig 3

(a) Draw the next 2 figures in the sequence. [2]

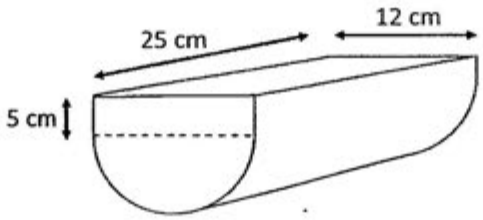
(b) Find the number of squares in the 10^{th} figure. [1]

(c) Write the expression for the n^{th} figure in the sequence. [2]

(d) Find the figure number that is made up of 46 squares. [1]

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2 In the diagram, the cross-section of the 3-D solid is made up of a **semi-circle** and a **rectangle**.



Find

(a) the volume of the solid, [3]

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

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3 **(a)** Solve $35 + 12x = 29 + 24x$. [2]

(b) Factorise completely $25wy - 12xz - 15xy + 20wz$. [2]

(c) Simplify $\frac{3x-2}{2} - \frac{3-2x}{3}$ [3]

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4 **(a)** The length of a rectangle is twice its width. Find the width of the rectangle if its perimeter is 12 cm. [2]

(b) The sum of 3 consecutive odd numbers is 201. Find the largest of the numbers. [2]

(c) Solve the inequality $19 \leq 2x + 3 < 29$. Show your solution on a number line. [2]

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5 **(a)** The cash price of a new laptop is \$2499.
Jim buys this computer on hire purchase.
He pays a deposit of 10% of the cash price followed by 24 monthly instalments of \$114 each.

(i) Find the total amount that Jim will pay for the laptop. [2]

(ii) Find the cost of buying the laptop on hire purchase as a percentage of the cash price. [2]

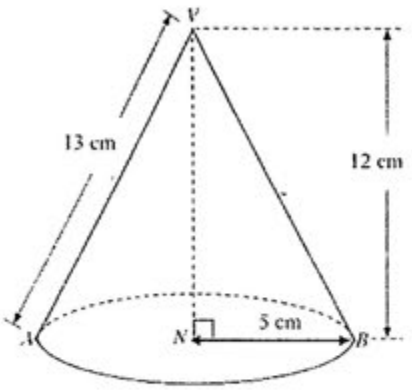
(b) Natasha bought a camera for \$459 from a trader.
When she bought the camera, the trader made a profit of 15% of the price he paid for it.

Calculate how much the trader had paid for the camera. [2]

(c) A finance company charges compound interest of 2% per annum for loans.
Find the amount to be repaid at the end of 3 years for a loan of \$25000. [2]

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6 (a) The figure shows a solid cone with height $VN = 12$ cm, slant height $VA = 13$ cm and radius $NB = 5$ cm.

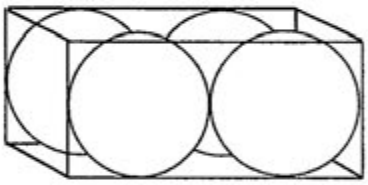


Find

(i) the volume of the cone, [2]

(ii) the total surface area of the cone. [2]

(b) The diagram shows 4 identical spherical balls packed into a transparent box. The radius of each sphere is 3 cm.



Find

(i) the volume of one ball, [2]

(ii) the volume of the box, [2]

(iii) the percentage of the volume of the box that is **not** occupied by the balls. [2]

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7 Zhi An drives at an average speed of $2x$ km/h for 30 min and then at an average speed of $4x$ km/h for the next 20 min.

(a) Find the distance travelled, in km, in the first 30 min.
Give your answer in terms of x. [1]

(b) Show that the total distance travelled for the whole journey is $2\frac{1}{3}x$ km. [2]

(c) Find the average speed for the whole journey in km/h. [2]

(d) For the whole journey, Zhi An estimates he covered more than 70 km at an average speed of less than 80 km/h. Is his estimate reasonable? Explain your answer. [2]

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Sec 1 Express EOY Examination 2012 Mathematics Paper 1 Answer

1a)	40	[1]
b)	160%	[1]
2.	$\frac{3\sqrt{3.41}}{10.6039}$	M1
	$= 0.142$	A1
3.	$6x \geq -7$	M1
	$= x \geq -1\frac{1}{6}$	A1
4a)	$x = 90^{\circ}$	[1]
b)	$y = 12cm$	[1]
5.	$\frac{1}{2} \times (6+8) \times 4$	M1
	$= 28cm^2$	A1
6a)	$20cm$	[1]
b)	$18\,cm^2$	[1]
7.	Total Unit $= 2 + 3 + 7$	
	$= 12$	M1
	Bag of Flour $= \frac{12}{2} \times 160g$	M1
	$= 960\,g$	A1
8a)	6	[1]
b)	$LCM\ 2 \times 3 \times 7 = 126$	M1
	126 --- 2hr6min $= 1036$	A1
9a)	$V = \frac{1}{3} \times 36 \times 4$	M1
	$= 48cm^3$	A1
b)	Total surface area $= 15 \times 4 + 4$	M1
	$= 96\,cm^2$	A1
10a)	0	[1]
b)	$3(3) - [3 \times (-2)]^2$	M1
	$= -27$	A1

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11a)	$4x-\frac{4}{5}y$	[1]
b)	$2(2x+3y-6)$	[1]
c)	$8x+y$	[1]
12.	Perimeter $= \frac{1}{2} \times 2\pi(6)$	M1
	$\frac{1}{2} \times 2\pi(1.5)$	M1
	$= 32.6cm$	A1
13a)	$0.32kg$	[1]
b)	$1.2m^3 = 1.2\times100\times100\times100cm^3$	M1
	$= 1200000$	A1
c)	$42.5g$	[1]
14.	$w = 70^\circ$	[1]
	$x = 24^\circ$	[1]
	$y = 46^\circ$	[1]
	$z = 46^\circ$	[1]
15a.	$\frac{60}{360}\times\frac{22}{7}\times(7)^2$	M1
	$= 25\frac{2}{3}cm^2$ or 25.7	A1
b.	$7+7+\left(\frac{60}{360}\times2\times\frac{22}{7}\times7\right)$	M1
	$= 21\frac{1}{3}cm$ or 21.3	A1
16a.	M1 for correct method leading to answer	
	$3.75km$	A1
b.	$1cm^2 : 0.0625km^2$	M1
	$56cm^2$	A1
17a.	$4kg \rightarrow 4\times\$11$	M1
	$= \$120$	A1
b.	$\$(98-76)$	
	$= \$22$ --- $2kg$	M1
	$= 10kg$	A1

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Sec 1 Express EOY Examination 2012 Mathematics Paper 2 Answer

1a.

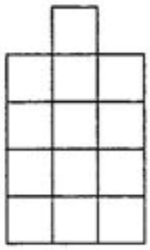


Fig 4

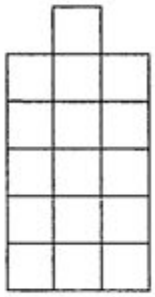


Fig 5 A2

b. No of squares = 3 x 10 + 1 = 31 A1

c. $n \times 3 + 1$ M1

$= 3n + 1$ A1

d. Figure 15 B1

2a. Area of semi- circle = $\frac{1}{2} \times \pi \times 6^2$

$= 56.549$ or $18\pi cm^2$ M1

Area of rectangle = 5×12

$= 60cm^2$ M1

Volume of solid = $(18\pi + 60) \times 25$ A1

$= 2914cm^3$

$\approx 2910\ cm^3$

b. Area of curved surface = 1/2 x 2 x π x 6 x 25 + 18 π x 2

$= 150\pi + 36\pi = 186\pi cm^2$ M1

Area of rectangular block = 25 x 12 + 5 x 25 x 2 + 5 x 12 x 2

$= 670cm^2$ M1

Total surface area = $150\pi + 670 + 36\pi$

$= 1178.938 \approx 1180\,cm^2$ A1

3a. $12x - 24x = 29 - 35$ M1

$x = 0.5$ or ½ A1

b. $5y(5w - 3x) + 4z(5w - 3x)$ M1

$= (5y + 4z)(5w - 3x)$ A1

c. $\frac{3(3x-2) - 2(3-2x)}{6}$ M1

$= \frac{9x - 6 - 6 + 4x}{6}$ M1

$= \frac{13x - 12}{6}$ A1

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4a. $x+2x+x+2x=12$ M1

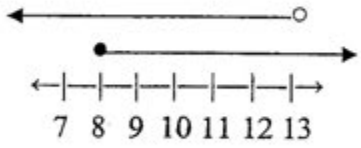
$x=2cm$ A1

b. $n+(n+2)+(n+4)=201$ M1

$n=65$

The largest number is 69 A1

c. $8 \le x < 13$ A1



B1

5ai. Total installments : $24 \times \$114 = \$2736$ M1

Total amount paid : $249.90 + 2985.90 = \$2985.90$ A1

ii. $\text{Percentage} = \frac{2985.90}{2499} \times 100\%$ M1

$= 119\%$ A1

b. $\text{Amount trader paid} = \frac{100}{115} \times \$459$ M1

$= \$399.13$ A1

c. $\text{Amount to be repaid} = 25000\left(1+\frac{2}{100}\right)^3$ M1

$= \$26530.20$ A1

Deduct 1 mark overall if not expressed to nearest cent

6a(i) Volume of cone : $\frac{1}{3} \times \pi \times 5^2 \times 12$ M1

$= 314cm^3$ A1

(ii) $\text{T.S.A} = \pi \times 5 \times 13 + \pi \times 5^2$ M1

$= 283cm^2$ A1

bi. $\text{Volume of ball} = \frac{4}{3} \times \pi \times 3^3$ M1

$= 113.097 \approx 113cm^3$ A1

ii. $\text{Volume of box} = (3\times4)\times(3\times2)\times(3\times4)$ M1

$= 864cm^3$ A1

iii. $\%\text{ of volume unoccupied} = \frac{864-(4\times113.097)}{864} \times 100\%$ M1

$\approx 47.7\%$ B1

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7a. $2x \times 0.5 = x\ km$ B1

b. $4x \times \frac{20}{60} km = \frac{4}{3}x$ M1

Total distance traveled : $x + \frac{4}{3}x = 2\frac{1}{3}x km$ A1

c. Average speed : $2\frac{1}{3}x \div \frac{50}{60}$ M1

$= 2\frac{4}{5}x km/h$ A1

d. Total distance traveled $< 2\frac{1}{3} \times \left(28\frac{4}{7}\right)$

$= < 66\frac{2}{3} km$ M1

Zhi An's estimate is not reasonable. A1

Or $2\frac{1}{3}x > 70$ M1

$x > 30$

average speed $= 2\frac{4}{5}$ x 30 = 84 km/h

Zhi An's estimate is not reasonable. A1

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