Index Number	Class	Name

Anglo-Chinese School (Barker Road)

MID-YEAR EXAMINATION 2011

SECONDARY ONE EXPRESS/NORMAL ACADEMIC

MATHEMATICS
PAPER ONE

1 HOUR

READ THESE INSTRUCTIONS FIRST

Do not open this booklet until you are told to do so.

Please write your answer clearly in the space provided on the question paper.

Write your class and candidate number on the cover sheet.
Write in dark blue or black pen.
You may use a soft 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 the 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 of the marks for this paper is 50.

3 s.f.		Simplify fraction	
1 d.p.		Truncation error	

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Answer **all** questions

1. Calculate the following using your calculator.
Give your answers correct to 3 significant figures.

(a) $5 \div \left[\left(1\frac{1}{5} - 2 \right)^3 - \frac{15}{3} \right]$,

(b) $\dfrac{\sqrt[3]{2744-9}}{3.2^3 + 0.9^2}$.

Answer (a) _____ [1]

(b) _____ [1]

2. Express the following numbers correct to the degree of accuracy indicated within the brackets.

(a) 18.749 (2 decimal places)
(b) 59 510 (2 significant figures)
(c) 0.030067 (3 significant figures)

Answer (a) _____ [1]

(b) _____ [1]

(c) _____ [1]

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3. **(a)** Express $2\frac{9}{11}$ as a recurring decimal.

(b) Arrange the following in ascending order.

$$0.\dot{2}\dot{5}\ ,\ \frac{1}{\sqrt{15}}\ ,\ 0.2\dot{5}\ ,\ \frac{1}{4}$$

(c) From the 4 given numbers in part (b), write down the number(s) that is/are irrational.

Answer (a) _____ [1]

(b) _____ [2]

(c) _____ [1]

4. **(a)** Find the prime factorization of 441. Give your answer in index notation.

(b) Hence, without the use of calculator, find the value of

(i) $\sqrt{441}$,

(ii) $\sqrt[3]{\frac{441\times 3}{49}}$

Show clearly our working.

Answer (a) _____ [2]

(b)(i) _____ [2]

(b)(ii) _____ [2]

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5. The scale of a map is 1:50000.
   (a) If a road is represented in 2.5 cm on the map, find the actual length of the road, in km.
   (b) If the actual area of a plot of land is 1.5 km^2, find its area on the map, in cm^2.

Answer (a) _____ km [2]

(b) _____ cm^2 [2]

6. **(a)** Find the HCF and LCM of $2^2 \times 5^3 \times 7$ and $2 \times 3^2 \times 5$, expressing your answer in index notation.
   (b) Find the smallest possible value of a whole number W such that $2 \times 3^2 \times 5 \times W$ is a multiple of $2^2 \times 5^3 \times 7$.

Answer (a) HCF = _____ [1]

LCM = _____ [1]

(b) _____ [2]

7. **(a)** Find the ratio of 0.35 km to 1200 m, giving your answer in the simplest form.

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(b) The sides of a triangle are in the ratio 3 : 5 : 11. The difference between the longest side and the shortest side is 28 cm. Calculate

(i) the longest side of the triangle,

(ii) the perimeter of the triangle.

Answer (a) _____ [1]

(b)(i) _____ cm [2]

(b)(ii) _____ cm [1]

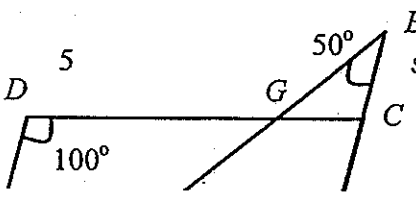
8. On a particular day, the temperature at the bottom of a mountain was 32.5 °C and the temperature at the top of the mountain was −5.2 °C,

(a) What was the difference between the temperature at the top and the temperature at the bottom of the mountain?

(b) Given that the mountain is 2500 m tall and assuming that the temperature drop per metre height is constant, find the height of the mountain where the temperature is 5 °C.

Answer (a) _____ °C [2]

(b) _____ m [3]



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9.

$ABCD$ is a parallelogram. $FHGE$, FAB and BCE are straight lines. $\angle ADC = 100°$ and $\angle BEF = 50°$. Find

(a) $\angle DCB$

(b) $\angle DHE$

(c) $\angle AFH$

(d) the obtuse $\angle FHD$.

(e) the reflex $\angle DGE$.

State clearly your reasons for each step.

Answer (a) _____ ° [1]

(b) _____ ° [1]

(c) _____ ° [1]

(d) _____ ° [1]

(e) _____ ° [2]

10. Ferrell ran 5 km in 20 minutes. He then walked a further 8 km at an average speed of 6

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km/h. Find

(a) his running speed, giving your answer in km/h,

(b) the time he took to walk 8 km in minutes.

(c) his average speed for the whole journey in km/h.

Answer (a) _____ km/h [2]

(b) _____ minutes [2]

(c) _____ km/h [2]

11. In 2009, John had his salary increased by 25% from 2008. Due to the recession in 2010, he

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had his salary reduced by 30%. His salary in 2009 was $4000.

(a) Find his salary after it has been reduced due to the recession in 2010.

(b) Find his salary in 2008 before he had his salary increased.

(c) Find the percentage decrease in his salary from 2008 to 2010.

Answer (a) $ _____ [2]

(b) $ _____ [2]

(c) _____ % [2]

END OF PAPER

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1. The marked price of a coffee table is $450. During a sale, it is sold at a discount of 35%. The seller suffered a loss of 2.5% from the sale.
   (a) Find the discounted selling price of the coffee table. [2]
   (b) Find the cost price of the coffee table. [2]

2. A sum of $8 600 is invested at the interest rate of 7% per annum for 5 years.
   (a) Find the total interest accumulated if it is calculated as **simple** interest. [2]
   (b) Find the total interest accumulated if it is calculated as **compound** interest, giving your answer correct to the nearest cent. [4]

   [Compound interest formula: $\text{Interest} + \text{Principal} = p\left(1+\frac{i}{100}\right)^n$]

3. The cash price of a car was $76 000. Mr Chan bought the car by paying a deposit of 15% of the cash price of the car and paying the rest over 36 equal monthly instalments on a loan at the flat rate of 5% per annum.
   Calculate
   (a) the amount of deposit, [2]
   (b) the amount of the total interest, [2]
   (c) the monthly instalment, giving your answer correct to the nearest cent. [2]

4. Betty made a business trip to New York. The exchange rate between the Singapore dollar (S$) and the US dollar (USD) then was S$ 1.32 = US$ 1.
   (a) Betty exchanged S$ 2500 for US dollars. Calculate the amount of US$ she had received, giving your answer correct to the nearest cent. [2]
   (b) She bought a jacket in New York for US$ 370. Express the price of the jacket in S$. [2]

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5. The breakdown of the cost for the usage of water is as follows:

Amount payable for water used	\$ 1.35 per m^3
Waterborne fee	\$ 0.35 per m^3
Water Conservation tax	30% of the amount payable for the water used
Good and Services tax	7% on the total sum of the amount payable for the water used and the water conservation tax.

If a household used 21 m^3 of water in February, find the amount payable in that month for the
(a) water used, [1]
(b) waterborne fee, [1]
(c) water conservation tax (Give your answer correct to the nearest cent), [2]
(d) overall water bill. [3]

6. Mary bought a vanguard sheet each measuring 90 cm by 105 cm. She cut out square cards of identical size from the vanguard sheets such that there was no wastage.
(a) What is the largest possible length of the side of each square card she cut out? [2]
(b) What is the total number of square cards she can cut out such that there was no wastage? [3]

7. The bell of St Michael's School rings every 35 minutes while the bell of St Paul's School rings every 40 minutes. The bells of both schools ring for the first time together at 07 45. When will the bells of both schools next ring at the same time after 07 45?

[4]

8. The table below shows the tax rates on chargeable income for the year of assessment.

Chargeable Income (\$)	Tax Rate (%)	Tax payable (\$)
On the first 20 000	0	0
On the next 10 000	3.75	375
On the first 30 000		375
On the next 10 000	5.75	575
On the first 40 000		950
On the next 40 000	8.75	3500
On the first 80 000		4450
On the next 80 000	14.5	11 600

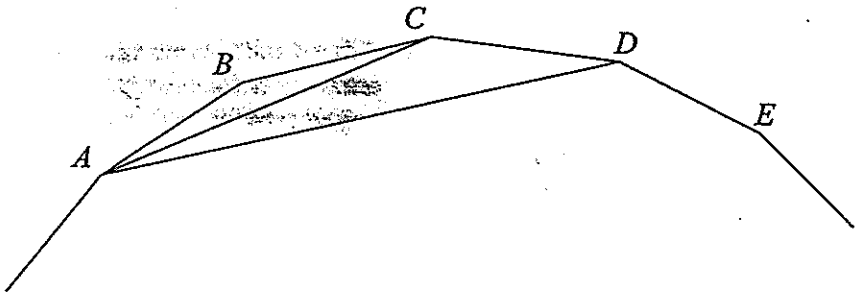
Tom's annual income was \$54 600. He donated \$100 to Community Chest and he was entitled to the personal relief of \$16 000.

Given that chargeable income = annual income – donation – total personal relief,
calculate (a) Tom's chargeable income, [2]
(b) the amount of personal income tax paid by him. [3]

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9. (a) Find the sum of the interior angles of a 12-sided polygon. [2]
   (b) An interior angle of a regular polygon is five times its exterior angle. [2]
   Find the size of the exterior angle.

10. The diagram shows part of a regular polygon with n sides.
    Each interior angle of this polygon is 156°.
    (a) Find the value of n. [3]
    (b) Find $\angle BCA$. [2]



The diagram is not drawn to scale.

END OF PAPER 2

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Sec 1 Express MIDYEAR Examination 2011 Mathematics Paper 2 Answer

1a.	\$292.50	A1
b.	\$300.00	A1
2a.	\$3010.00	A1
b.	$8600\left(1+\frac{7}{100}\right)^5$	M1
	$= 12061.94$	A1
	Interest $= 12061.94 - 8600$	M1
	$= \$3461.94$	A1
3a.	Deposit $= \frac{15}{100} \times 76000$	M1
	$= \$11400.00$	A1
b.	Balance $= 76000 - 11400$	
	$= 64600$	M1
	Interest $= 64600 \times \frac{5}{100} \times 3$	
	$= \$9690$	A1
c.	Monthly Installment $= \frac{64600+9690}{36}$	M1
	$= \$2063.61$	A1
4a.	$\$2500 = \frac{2500}{1.32}$	M1
	$=$ US\$1893.94	A1
b.	370×1.32	M1
	$= \$488.40$	A1
5a.	$= \$28.35$	A1
b	$= \$7.35$	A1
c.	Water Conservation Tax $= \frac{30}{100} \times 28.35$	M1
	$= \$8.51$	A1
d.	GST $= 2.580$	A1
	Overall bill $= 28.35 + 8.51 + 7.35 + 2.58$	M1
	$= 46.79$	A1

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6a. $5\overline{)90,105}$

$3\overline{)18,21}$

6,7 M1

Largest possible length = 15cm A1

b. $90 \div 15 = 6$ M1

$105 \div 15 = 7$ M1

Total number $= 6 \times 7 = 42$ A1

7. $2\overline{)35,40}$

$2\overline{)35,20}$

$2\overline{)35,10}$

$5\overline{)35,5}$

$7\overline{)7,1}$

1,1 M1

LCM $= 2\times2\times2\times5\times7 = 280$ M1

280 min = 4hr40min M1

The next time will be 12.25 A1

8a. Chargeable Income = 54600 -100 – 16000 M1

= $38500 A1

b. First $30k $\leftrightarrow$ $375 M1

$\frac{575}{100} \times \$8500 = \$488.75$ M1

Total = $375 + $488.75

= $863.75 A1

9a $\{12-2\} \times 180$ M1

$= 1800°$ A1

b. 6 ext. R $= 180$ M1

1 ext. R $= 30°$ A1

10a. $\frac{(n-2)\times180}{n} = 156$ M2

$n = 15$ A1

b. $\frac{180-156}{2}$ M1

$= 12°$ A1

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