

Register No.      Class

Name: \_\_\_\_\_

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**'Perseverance Yields Success'**



**Ping Yi Secondary School**  
End of Year Examination 2011

Sec 1 Express  
**Mathematics**

**4016 / 01**

Paper 1

**1 hour 15 minutes**

**INSTRUCTIONS TO CANDIDATES**

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

Write your name, class and register number in the spaces at 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.

Calculator 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**. Answers in **degrees** should be given to **one decimal place**. For  $\pi$ , use either your calculator value or 3.142.

The number of marks is given in brackets [    ] at the end of each question or part question.

FOR EXAMINER'S USE	
<b>Paper 1</b>	50

<b>Expected Grade</b>	<input type="checkbox"/> A1	<input type="checkbox"/> A2	<input type="checkbox"/> B3	<input type="checkbox"/> B4	<input type="checkbox"/> C5
<b>Teacher's Comment</b>					
<b>Student's Comment</b>					
<b>Parent's Comment and Signature</b>					

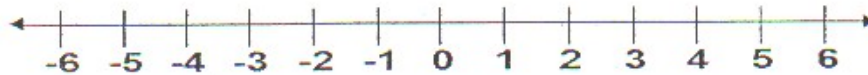
[Turn over]

This document consists of 10 printed pages including the cover page.

Answer all the questions.

1. Represent the two numbers  $(-\sqrt{4})^2$  and  $15 \div (-\sqrt[3]{27})$  on the number line below.

[2]



2. Express the following word statements algebraically in their simplest form.

- (a) Subtract the square of  $a$  from the quotient of  $p$  divided by the cube of  $q$ .

Ans: (a) \_\_\_\_\_ [1]

- (b) Divide the sum of  $4a$  and  $5a$  by the product of 3 and  $z$ .

Ans: (b) \_\_\_\_\_ [2]

3. Using a calculator, evaluate

- (a)  $-4^2 \times (-5)^2 + \{[3 - (-3)] \times 25\}$ ,

Ans: (a) \_\_\_\_\_ [1]

- (b)  $\frac{\sqrt{3.21 - (-\frac{2}{5})^2}}{19} - 0.1^3$ ,

Ans: (b) \_\_\_\_\_ [1]

- (c) 20% of 0.385.

Ans: (c) \_\_\_\_\_ [1]

[Turn over

Answer all the questions.

4. Correct 907.5895 to

(i) the nearest whole number,

Ans: (i) \_\_\_\_\_ [1]

(ii) 3 decimal places,

Ans: (ii) \_\_\_\_\_ [1]

(iii) 3 significant figures.

Ans: (iii) \_\_\_\_\_ [1]

5. The results of a survey on the height of a class of 36 secondary school students are shown in a frequency table below.

(i) Fill in the blank under the **Frequency** column. [1]

Height, $h$ (cm)	Frequency
$160 < h \leq 165$	8
$165 < h \leq 170$	
$170 < h \leq 175$	5
$175 < h \leq 180$	6
$180 < h \leq 185$	3

(ii) What percentage of the students in the class has a height greater than 170 cm?  
Leave your answer to 1 decimal place.

Ans: (ii) \_\_\_\_\_ % [2]

[Turn over

This exam paper is the property of Ping Yi Secondary School. It must not be duplicated in part or whole.

Answer all the questions.

6. (a) Three numbers are given as follows.

$$1^{\text{st}} \text{ number} = 3 \times 5 \times 7$$

$$2^{\text{nd}} \text{ number} = 3^2 \times 5^2$$

$$3^{\text{rd}} \text{ number} = 3^3 \times 5$$

- (i) Find the highest common factor (HCF) of the three numbers.

Ans: (ai) HCF = \_\_\_\_\_ [1]

- (ii) Find the lowest common multiple (LCM) of the three numbers.

Ans: (aii) LCM = \_\_\_\_\_ [1]

- (b) Find the smallest positive integer  $k$  such that  $2^2 \times 3 \times 11 \times k$  is a perfect cube. Leave your answer in index notation.

Ans: (b)  $k =$  \_\_\_\_\_ [1]

[Turn over]

Answer all the questions.

7. Solve the equation  $\frac{4x-3}{2} = \frac{7x-3}{9} + 1$ .

Ans: \_\_\_\_\_ [3]

[Turn over

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Answer all the questions.

8. (a) The ratio of Aily's height to Bily's height is 3:5. The ratio of Aily's height to Camy's height is 2:3. Find the ratio of Aily's height to Bily's height to Camy's height.

Ans: (a) \_\_\_\_\_ [2]

- (b) A 4-minute overseas call costs \$20.60. Mr Lee makes an overseas call from 09 55 to 10 10. Assuming that the cost per minute is the same, calculate the cost of Mr Lee's call.

Ans: (b) \$ \_\_\_\_\_ [2]

[Turn over

Answer all the questions.

9. (a) Express 12 cm as a percentage of 4 m.

Ans: (a) \_\_\_\_\_ % [2]

- (b) 4% of a number is 9.7. Find the number.

Ans: (b) \_\_\_\_\_ [2]

10. (a) Evaluate the value of  $\sqrt{\frac{ab+3a}{a^2-10c}}$  when  $a = 8$ ,  $b = 2$  and  $c = 6$ . Leave your answer to 3 significant figure.

Ans: (a) \_\_\_\_\_ [2]

- (b) Given that  $y = 4\left(\frac{d}{n} + \frac{n}{d}\right) - dn^2$ , find the value of  $y$  when  $d = 6$  and  $n = 3$ .

Ans: (b)  $y =$  \_\_\_\_\_ [3]

[Turn over]

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Answer all the questions.

11. (a) Factorise completely  $25ax - 5a - 35bx + 7b$ .

Ans: (a) \_\_\_\_\_ [2]

- (b) Simplify  $(3y + 5) - [5(4y - x) - 8y]$ .

Ans: (b) \_\_\_\_\_ [3]

[Turn over



Answer all the questions.

12. (a) (i) Write down a formula for an interior angle of a regular  $n$ -sided polygon, in terms of  $n$ .

Ans: (ai) \_\_\_\_\_ [1]

- (ii) Hence, if each interior angle of a regular  $n$ -sided polygon is  $108^\circ$ , find the value of  $n$ .

Ans: (aii)  $n =$  \_\_\_\_\_ [2]

- (b) A hexagon has exterior angles  $85^\circ$ ,  $74^\circ$ ,  $105^\circ$ ,  $2y^\circ$ ,  $3y^\circ$  and  $3y^\circ$ . Find the value of  $y$ .

Ans: (b)  $y =$  \_\_\_\_\_ [3]

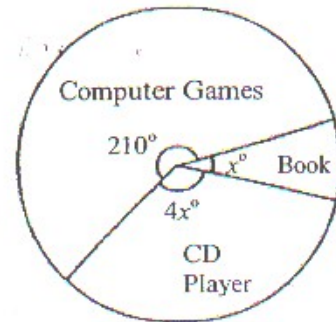
[Turn over

Answer all the questions.

13. Every student in a school was asked to choose a book, a CD player or a set of computer games as a birthday present. Their choices were presented on the pie chart as shown below.

Calculate the

- (i) value of  $x$ ,



Ans: (i)  $x =$  \_\_\_\_\_ [2]

- (ii) fraction of the students who did not choose computer games,

Ans: (ii) \_\_\_\_\_ [2]

- (iii) the number of students who chose computer games if there were 1440 students in the school.

Ans: (iii) \_\_\_\_\_ students [2]

**End of Paper**

**[Turn over**

Secondary 1E Final Year Exam 2011 Marking Scheme

**Paper 1**

Qn	Marking Point	Mark Awarded	Remarks
1	$15 \div (-\sqrt[3]{27})$ $(-\sqrt{4})^2$ 	B1, B1	1 mark for each correct dot at -5 and 4. Minus 1M for no labelling.
2a	$\frac{p}{q^3} - a^2$	B1	
2b	$\frac{9a}{3z}$ $= \frac{3a}{z}$	M1  A1	
3a	$-4^2 \times (-5)^2 + \{[3 - (-3)] \times 25\} = \underline{-250}$	B1	
3b	$\frac{\sqrt{3.21 - (-\frac{2}{5})^2}}{19} - 0.1^3 = \underline{0.0909}$	B1	Accept ONLY 0.0909.
3c	20% of 0.385 = <u>0.077</u>	B1	
4i	908	B1	
4ii	907.590	B1	
4iii	908	B1	
5i	14	B1	
5ii	$\frac{14}{36} \times 100\%$ $= 38\frac{8}{9}\%$ $= 38.9\%$	M1  A1	
6ai	HCF = 15	B1	
6aii	LCM = $3^3 \times 5^2 \times 7 = 4725$	B1	Accept ONLY 4725.
6b	$k = 2 \times 3^2 \times 11^2$	B1	Accept ONLY index form.

7	$\frac{4x-3}{2} = \frac{7x-3}{9} + 1 \text{ (multiply by 18)}$ $9(4x-3) = 2(7x-3) + 18$ $36x - 27 = 14x - 6 + 18$ $36x - 14x = 12 + 27$ $22x = 39$ $x = 1\frac{17}{22} \text{ or } x = 1.77$	M1  M1 I  A1	
8a	$A:B = 3:5 = 6:10 (\times 2); A:C = 2:3 = 6:9 (\times 3)$ $A:B:C = 6:10:9$	M1  A1	
8b	$09\ 55 \text{ to } 10\ 10 - 15 \text{ min}$ $15 \text{ min} - \frac{15}{4} \times \$20.60$ $= \$77.25$	M1 A1	
9a	$\frac{12}{400} \times 100\%$ $= 3\%$	M1  A1	
9b	$\frac{100}{4} \times 9.7$ $= 242.5$	M1  A1	
10a	$\sqrt{\frac{8 \times 2 + 3 \times 8}{8^2 - 10 \times 6}}$ $= \sqrt{\frac{40}{4}}$ $= \sqrt{10}$ $= 3.16$	M1   A1	
10b	$4 \times \left(\frac{6}{3} + \frac{3}{6}\right) - 6 \times 3^2$ $= 4 \times 2\frac{1}{2} - 54$ $= 10 - 54$ $= -44$	M1  M1  A1	
11a	$25ax - 5a - 35bx + 7b$ $= 5a(5x-1) - 7b(5x-1)$ $= (5x-1)(5a-7b) \text{ or } (5a-7b)(5x-1)$	M1  A1	
11b	$(3y+5) - [5(4y-x) - 8y]$		

	$= 3y + 5 - [20y - 5x - 8y]$ $= 3y - 12y + 5x + 5$ $= 5x - 9y + 5$ or $-9y + 5x + 5$	M1 M1 A1	Accept other equivalent form
12ai	$\frac{(n-2)}{n} \times 180^\circ$	B1	
12aii	$\frac{(n-2)}{n} \times 180 = 108$ $180n - 360 = 108n$ $72n = 360$ $n = 5$	M1   A1	
12b	$85^\circ + 74^\circ + 105^\circ + 2y^\circ + 3y^\circ + 3y^\circ = 360^\circ$ $264 + 8y = 360$ $8y = 96$ $y = 96/8$ $= 12$	M1  M1  A1	
13i	$5x + 210 = 360$ $5x = 150$ $x = 30$	M1  A1	
13ii	$\frac{5 \times 30}{360}$ $= \frac{5}{12}$	M1  A1	
13iii	$\frac{210}{360} \times 1440$ $= 840$	M1  A1	