

Name: _____

Register No. Class

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'Perseverance Yields Success'



Ping Yi Secondary School
End of Year Examination 2011

Sec 1 Express
Mathematics

4016 / 02

Paper 2

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 π , 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	
Paper 2	50

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

[Turn over

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

Answer all the questions.

1. (a) Arrange the following in descending order.

$$\frac{-1}{6}, 0.67, \sqrt{6}, 0.\dot{6}.$$

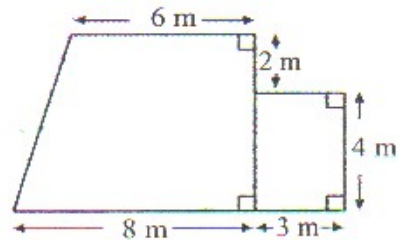
Ans: (a) _____ [2]

- (b) Evaluate the following using a calculator. Leave your answer in fraction form.

$$\left[-5\frac{3}{4} - \left(-6\frac{1}{2}\right)\right]^3 \times \sqrt[3]{2^9}$$

Ans: (b) _____ [1]

2. The diagram below shows the floor plan of two rooms in an apartment. Calculate the total floor area of the two rooms.



Ans: _____ m² [3]

Answer all the questions.

3. The table below shows the first five terms of a number sequence,

$$T_1 = 1, T_2 = 2, T_3 = 5, T_4 = 10, T_5 = 17, \dots$$

- (i) Fill in the table for T_6 and T_{20} .

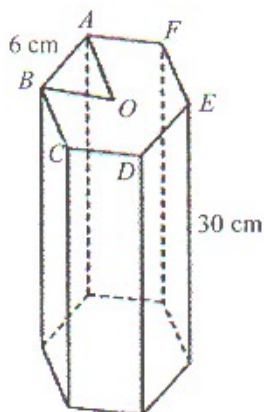
[2]

n	T_n
1	$1 = 0 + 1$
2	$2 = 1 + 1$
3	$5 = 4 + 1$
4	$10 = 9 + 1$
5	$17 = 16 + 1$
6	
.	.
.	.
.	.
20	

- (ii) Write an expression, in terms of n , for T_n .

Ans: (ii) _____ [1]

4. The diagram below shows an open container, used as a vase, with a regular hexagonal cross-section. Given that AB is 6 cm, vertical height is 30 cm and the area of the equilateral triangle AOB is 15.6 cm^2 , find the total surface area of the container.



Ans: _____ cm^2 [3]

Answer all the questions.

5. Mr X planned to travel from location A to location B . He walked at an average speed of 4 km/h for an hour. He then rented a bicycle and cycled the remaining 8 km of his journey. His cycling speed is 12 km/h. Find the

(i) total time taken, in minutes, for Mr X's journey from location A to B ,

Ans: (i) _____ min [2]

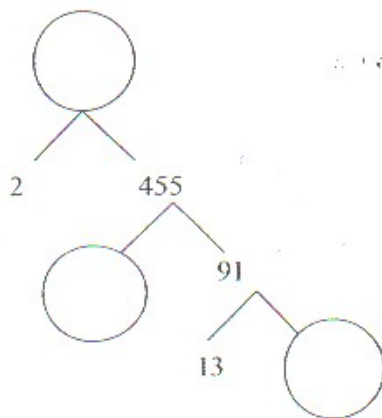
(ii) average speed for Mr X's journey in m/min.

Ans: (ii) _____ m/min [2]

Answer all the questions.

6. (i) Fill in the missing numbers in the factor tree.

[3]



- (ii) Express 910 in prime factorisation form.

Ans: (ii) _____ [1]

Answer all the questions.

7. Simplify

(a) $(4a - 3 + 12c)\left(\frac{1}{6}\right) - 2c(a + 1),$

Ans: (a) _____ [2]

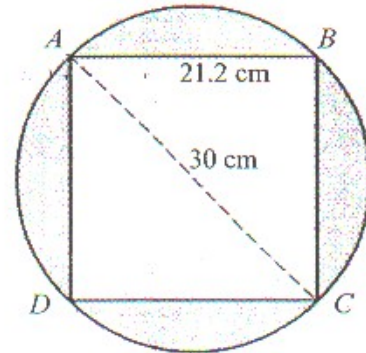
(b) $\frac{3x + 2}{5} - \frac{2(x - 1)}{3}.$

Ans: (b) _____ [3]

Answer all the questions.

8. In the figure below, $ABCD$ is a square of side 21.2 cm. A , B , C and D are points on the circumference of a circle with diameter 30 cm.

- (i) Find the area of the circle. (Take $\pi = 3.142$)



Ans: (i) _____ cm^2 [2]

- (ii) Find the area of the unshaded region of the circle.

Ans: (ii) _____ cm^2 [1]

- (iii) Find the total area of the shaded portions.

Ans: (iii) _____ cm^2 [2]

Answer all the questions.

9. In the diagram below, $BCDE$ and FGH are parallel lines, ACF and ADG are straight lines, $\angle CAD = 27^\circ$ and $\angle ACD = 50^\circ$. Stating all appropriate reasons in your working, calculate

(i) $\angle EDG$,

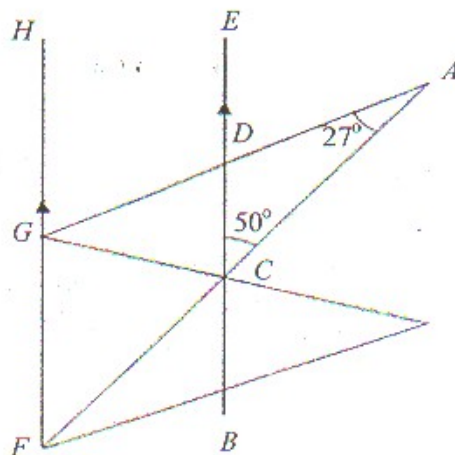


Diagram not drawn to scale

Ans (i) _____^o [2]

(ii) $\angle CDG$,

Ans: (ii) _____^o [2]

(iii) $\angle DGF$.

Ans: (iii) _____^o [2]

Answer all the questions.

10. (a) The price of an adult admission ticket to an amusement park is \$23 more than the price of a child admission ticket. A family of 3 adults and 8 children paid a total of \$201 for their admission tickets. Find the price of an adult ticket.

Ans: (a) \$ _____ [3]

- (b) The lengths of two pieces of ribbons are $[a(8x - y) - 3cx]$ cm and $3c(9x - y)$ cm.
 (i) Find the total length of the two pieces of ribbons. Simplify your answer.

Ans: b(i) _____ cm [2]

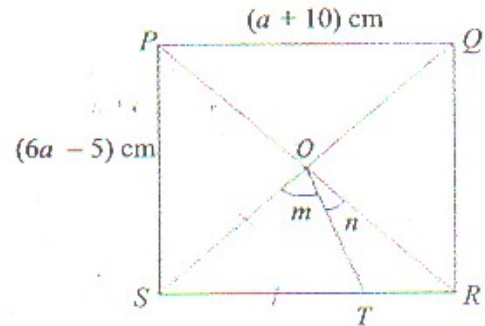
- (ii) Factorise the answer in b(i).

Ans: b(ii) _____ [2]

Answer all the questions.

11. In the figure below, $PQRS$ is a square and POR is a straight line. $PQ = (a + 10)$ cm, $QR = (6a - 5)$ cm and $SO = ST$.

- (i) Write down the value of $\angle OST$.
Hence, find the angles m and n .



Ans: (i) $\angle OST =$ _____ $^{\circ}$ [1]

$m =$ _____ $^{\circ}$ [1]

$n =$ _____ $^{\circ}$ [1]

- (ii) Find the value of a .

Ans: (ii) $a =$ _____ [2]

- (iii) Find the perimeter of the square.

Ans: (iii) _____ cm [2]

End of Paper

Secondary 1E Final Year Exam 2011 Marking Scheme

Paper 2

Qn	Marking Point	Mark Awarded	Remarks
1a	$\sqrt{6}, 0.67, 0.6, \frac{-1}{6}$	B1, B1	1 mark for each correct pair
1b	$[-5\frac{3}{4} - (-6\frac{1}{2})]^2 \times \sqrt[3]{2^9} = 3\frac{3}{8}$	B1	Accept ONLY this.
2	Area of trapezium = $0.5(6 + 8) \times 6 = 42 \text{ m}^2$ Area of rectangle = $4 \times 3 = 12 \text{ m}^2$ Total = 54 m^2	M1 M1 A1	
3i	$T_6: 26 = 25 + 1$ $T_{20}: 362 = 361 + 1$	B1 B1	Accept only this equation form
3ii	$T_n = (n - 1)^2 + 1$ or $n^2 - 2n + 2$	B1	Accept BOTH
4	Base area = 6×15.6 = 93.6 cm^2 Area of 6 side faces = $6 \times (6 \times 30)$ = 1080 cm^2 Total = $93.6 + 1080$ = 1173.6 cm^2	M1 M1 A1	
5i	Cycling time = $d/s = \frac{8}{12} = \frac{2}{3} \text{ h}$ Total time taken = $(1 + 2/3) \text{ h} = (60 + 40) \text{ min}$ = 100 min	M1 A1	
5ii	Walking distance = 4 km, Cycling distance = 8 km <u>Total distance</u> = 12 km = 12000m Average speed = $\frac{12000}{100}$ = 120 m/min	M1 A1	
6i	910, 5, 7 (top to bottom)	B3	
6ii	$2 \times 5 \times 7 \times 13$	B1	Accept any arrangement.

7a	$(4a-3+12c)\left(\frac{1}{6}\right) - 2c(a+1)$ $= \frac{4}{6}a - \frac{3}{6} + 2c - 2ac - 2c$ $= \frac{2}{3}a - 2ac - \frac{1}{2}$	M1 A1	
7b	$\frac{3x+2}{5} - \frac{2(x-1)}{3}$ $= \frac{3(3x+2)}{15} - \frac{10(x-1)}{15}$ $= \frac{9x+6}{15} - \frac{10x-10}{15}$ $= \frac{9x+6-(10x-10)}{15}$ $= \frac{9x-10x+6+10}{15}$ $= \frac{-x+16}{15}$	M1 M1 A1	
8i	<p>Area of circle = $3.142 \times (30/2)^2$</p> $= 706.95 \text{ cm}^2$	M1 A1	
8ii	Area of unshaded region = $21.2 \times 21.2 = 449.44 \text{ cm}^2$	B1	
8iii	<p>Area of shaded region</p> <p>= area of circle – area of square</p> $= 706.95 - 449.44$ $= 257.51 \text{ cm}^2$	M1 A1	
9i	$\angle ADC = 180^\circ - 50^\circ - 27^\circ (\angle \text{ sum of } \Delta)$ $= 103^\circ$ $\angle EDG = \angle ADC (\text{vert. opp. } \angle\text{s})$ $= 103^\circ$	M1 A1	Deduct 1M from total if there is(are) wrong reason(s).
9ii	$\angle CDG + \angle EDG (\text{or } \angle ADC)$ $= 180^\circ (\text{adj. } \angle\text{s on str. Line})$ $\angle CDG = 180^\circ - \underline{103^\circ}$ $= 77^\circ$	M1 A1	Deduct 1M from total if there is(are) wrong reason(s). *Accept error carried forward from 10i)

9iii	<p>Method 1</p> $\angle DGF + \angle CDG = 180^\circ \text{ (int. } \angle\text{s, // lines)}$ $\angle DGF = 180^\circ - \underline{77^\circ}^*$ $= 103^\circ$ <p>Method 2</p> $\angle DGF = \angle EDG \text{ (corr. } \angle\text{s, // lines)}$ $= 103^\circ$	M1 A1 M1 A1	Deduct 1M from total if there is(are) wrong reason(s). *Accept error carried forward.
10a	<p>Let the price of an adult ticket be \$x.</p> <p>Then the price of a child ticket is \$(x - 23).</p> $3x + 8(x - 23) = 201$ $3x + 8x - 184 = 201$ $11x = 385$ $x = \frac{385}{11}$ $= 35$	M1 M1 A1	Accept non-algebra method.
10bi	$a(8x - y) - 3cx + 3c(9x - y)$ $= 8ax - ay - 3cx + 27cx - 3cy$ $= 8ax - ay + 24cx - 3cy$	M1 A1	Accept other arrangement of the final 4 terms
10bii	$8ax - ay + 24cx - 3cy$ $= a(8x - y) + 3c(8x - y) \text{ or } 8x(a + 3c) - y(a + 3c)$ $= (8x - y)(a + 3c) \text{ or } (a + 3c)(8x - y)$	M1 A1	
11i	$\angle OST = 45^\circ$	B1	
	$m = \frac{180^\circ - 45^\circ}{2} \text{ (isos. } \Delta)$ $= 67.5^\circ$ $n = 90^\circ - 67.5^\circ = 22.5^\circ$	B1 B1	
11ii	$a + 10 = 6a - 5$ $5a = 15$ $a = 3$	M1 A1	
11iii	$\text{Perimeter} = 2(6(3) - 5) + 2(3 + 10) \text{ or } 4(3 + 10)$ $= 52 \text{ cm}$	M1 A1	