

NAME:

NO:

CLASS:

ADMIRALTY SECONDARY SCHOOL



END-OF-YEAR EXAMINATION 2011

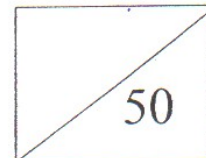
SUBJECT : Mathematics
PAPER : 1
LEVEL/STREAM : 1 Express
DATE : 11 October 2011
TIME : 0750 - 0850
DURATION : 1 h

Instructions to candidates:

1. Write your name, class and index number.
2. Answer **ALL** questions in the spaces provided.
3. Use an electronic 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 .

4. Essential working must be shown. Omission of essential workings and illegible handwriting will lead to loss of marks.



DO NOT TURN OVER THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

This question paper consists of 8 printed pages including this cover page.

1. Express the following in index notation, where all the bases are prime numbers.

(a) 81×156

(b) 22×440

Answer: (a) [4]

(b) [4]

2. Express your answers in index notation.

(a) Find the square of $4^6 \times 19^3$.

(b) Find the cube root of the result in (a).

Answer: (a) [1]

(b) [2]

3. Evaluate each of the following.

(a) $(-9 - 7) + 13 \times 4$

(b) $[50 - (28 - 32)] \times 6$.

Answer: (a) [2]

(b) [2]

4. The price of a cake of radius r cm and height h cm is given by the formula $P = \frac{1}{25}r^2h$.

(a) Find the price for a cake of radius 35 cm and height of 11 cm.

(b) If the price of cake is \$240 and the height is 15 cm, calculate the radius of the cake.

Answer: (a) \$. [2]

(b)cm [3]

5. Expand and simplify the following.

(a) $3(2a + 4b) + 5(b - a)$,

(b) $-6(b - a) + 4b$,

(c) $\frac{c+1}{3} + \frac{c-2}{2}$.

Answer: (a) [2]

(b) [2]

(c) [2]

6. A pail was half filled with water. An amount of water equivalent to $\frac{1}{4}$ of the volume of the pail was poured out. Given that the remaining volume of water in the pail is 300 ml, find the volume of the pail.

Answer:ml [2]

7. Convert the following speed. Leave your answers in 3 significant figures.

(a) 223 km/h to m/s,

(b) 16 m/s to km/h.

Answer: (a)m/s [2]

(b)km/h [2]

8. A mobile phone shop sold 21 mobile phones a day. This is 40% below the daily target. What is the target number of mobile phones to be sold a day?

Answer:mobile phones [2]

9. (a) The general term of a sequence is $T_n = n^2 - 3n + 4$. Find its 4th term.

(b) Consider the sequence 38, 36, 34, 32

- (i) Find the next term.
- (ii) Find its general term.
- (iii) Find the 50th term.

Answer: (a) [2]
(bi) [1]
(bii) [1]
(biii) [1]

10. A club needs to raise \$52 000 to build some indoor squash courts. The club needs to recruit 500 members to raise the funds.
- (a) If each member pays an equal amount of membership fee, how much is the membership fee in order to meet the target?
 - (b) If each court costs \$8600, find the largest possible number of courts that can be built with \$52 000.

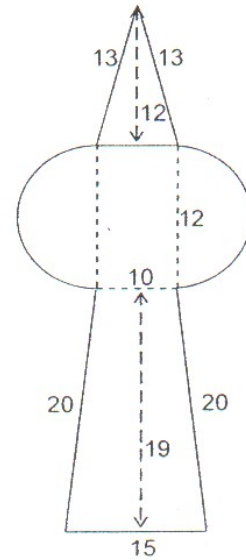
Answer: (a) \$..... [2]
(b)courts [2]

11. The figure shows a diagram of a building. The top part is a triangle. The bottom part is a trapezium. These two parts are joined by a rectangle and two semicircles in the middle. The perpendicular height of the triangle and trapezium is 12 and 19 respectively. Take $\pi = 3.14$.

(a) Calculate the perimeter of the figure.

(b) Calculate

- (i) the area of triangle,
- (ii) the area of trapezium,
- (iii) the total area of the diagram.



Answer: (a)units [2]

(bi)units² [1]

(bii)units² [1]

(biii)units² [3]

Sec 1 Express End of Year Exam 2011
Mathematics Paper 1 Marking Scheme

1a)

$$81 \times 156$$

$$81 = 3^4 \text{ [M1]}$$

$$156 = 2^2 \times 3 \times 13 \text{ [M1]}$$

$$81 \times 156$$

$$= 3^4 \times 2^2 \times 3 \times 13 \text{ [M1]}$$

$$= 2^2 \times 3^5 \times 13 \text{ [A1]}$$

1b)

$$22 \times 440$$

$$22 = 2 \times 11 \text{ [M1]}$$

$$440 = 2^3 \times 5 \times 11 \text{ [M1]}$$

$$22 \times 440$$

$$= 2 \times 11 \times 2^3 \times 5 \times 11 \text{ [M1]}$$

$$= 2^4 \times 5 \times 11^2 \text{ [A1]}$$

2a)

$$(4^6 \times 19^3)^2$$

$$= 4^{12} \times 19^6 \text{ [A1]}$$

2b)

$$\sqrt[3]{4^{12} \times 19^6} \text{ [M1]}$$

$$= 4^4 \times 19^2 \text{ [A1]}$$

3a)

$$(-9 - 7) + 13 \times 4$$

$$= (-16) + 52 \text{ [M1]}$$

$$= 36 \text{ [A1]}$$

3b)

$$[50 - (28 - 32)] \times 6$$

$$= [50 - (-4)] \times 6 \text{ [M1]}$$

$$= 54 \times 6$$

$$= 324 \text{ [A1]}$$

4a)

$$P = \frac{1}{25} r^2 h$$

$$= \frac{1}{25} (35^2)(11) \text{ [M1]}$$

$$= \$539 \text{ [A1]}$$

4b)

$$240 = \frac{1}{25} (r^2)(15) \text{ [M1]}$$

$$240 \div 15 \times 25 = r^2 \text{ [M1]}$$

$$r = \sqrt{400}$$

$$r = 20 \text{ cm [A1]}$$

5a)

$$3(2a + 4b) + 5(b - a)$$

$$= 6a + 12b + 5b - 5a \text{ [M1]}$$

$$= a + 17b \text{ [A1]}$$

$$5b) -6(b - a) + 4b$$

$$= -6b + 6a + 4b \text{ [M1]}$$

$$= 6a - 2b \text{ [A1]}$$

5c)

$$\frac{c+1}{3} + \frac{c-2}{2}$$

$$= \frac{2(c+1)}{2 \times 3} + \frac{3(c-2)}{3 \times 2}$$

$$= \frac{2c+2+3c-6}{6} \text{ [M1]}$$

$$= \frac{5c-4}{6} \text{ [A1]}$$

6)

$$\frac{1}{4} = 300 \text{ ml}$$

$$\frac{4}{4} = 300 \times 4 \text{ [M1]}$$

$$= 1200 \text{ ml [A1]}$$

7a)

$$\frac{223 \text{ km}}{1 \text{ h}} = \frac{223 \times 1000 \text{ m}}{1 \times 60 \times 60 \text{ s}} \text{ [M1]}$$

$$= 61.9 \text{ m/s [A1]}$$

Sec 1 Express End of Year Exam 2011
Mathematics Paper 1 Marking Scheme

7b)

$$\frac{16 \text{ m}}{1 \text{ s}} = \frac{16 \div 1000 \text{ km}}{1 \div 3600 \text{ h}}$$

$$\frac{16 \times 3600}{1000} \text{ [M1]}$$

$$= 57.6 \text{ km/h [A1]}$$

8)

$$60\% \rightarrow 21$$

$$100\% \rightarrow 21 \div 60 \times 100 \text{ [M1]}$$

$$= 35 \text{ [A1]}$$

9a)

$$T_4 = 4^2 - 3(4) + 4 \text{ [M1]}$$

$$= 8 \text{ [A1]}$$

9bi)

$$T_5 = 30 \text{ [B1]}$$

9bii)

$$T_n = 40 - 2n \text{ [B1]}$$

9biii)

$$T_{50} = 40 - 2(50)$$

$$T_{50} = -60 \text{ [A1]}$$

10a)

$$52\,000 \div 500 \text{ [M1]}$$

$$= \$104 \text{ [A1]}$$

10b)

$$52\,000 \div 8600 \text{ [M1]}$$

$$= 6.04 \sim 6 \text{ courts [A1]}$$

11a)

Perimeter =

$$13 + 13 + (3.14 \times 12) + 20 + 20 + 15 \text{ [M1]}$$

$$= 26 + 37.68 + 55$$

$$= 118.68 \text{ [A1]}$$

11bi)

$$\text{Area of triangle} = \frac{1}{2}(10)(12)$$

$$= 60 \text{ [A1]}$$

11bii)

$$\text{Area of trapezium} = \frac{1}{2}(10 + 15) 19$$

$$= 237.5 \text{ [A1]}$$

11biii)

$$\text{Area of rectangle} = 10 \times 12 \text{ [M1]}$$

$$= 120$$

$$\text{Area of circle} = 3.14 \times 6^2 \text{ [M1]}$$

$$= 113.04$$

$$\text{Total area} = 60 + 120 + 113.04 + 237.5$$

$$= 530.54 \text{ [A1]}$$