100 LAMBS

MID YEAR EXAMINATION
May 2019
Secondary 1

Candidate Name: _Answer sheet_

Centre Number:

Candidate Number :

Date: _____

MATHEMATICS PAPER 3
(1.5 hours)

READ THESE INSTRUCTIONS FIRST

- Do not open this booklet until told to do so.
- Write out your working clearly in the spaces provided
- Write in dark blue or black pen.
- You may use an 2B pencil for any tables, diagrams or graphs.
- Do not use staples, paper clips, glue, highlighters, correction fluid or correction tape.
- Answer **all** questions.
- Electronic calculators may be used.
- 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 $\frac{22}{7}$ or 3.142
- Indicate the units in your answer if necessary

For Examiner's use	
Total (100 %)	

Setter : _**Tr. Jason Chen**_
Examiner : _**Tr. Jason Chen**_

Approved by: _____

*This booklet consists of **09** printed pages (inclusive of the cover page)*

1. Simplify each of the following, giving your answer in <u>positive</u> index.

   a) 5^{-2}

   $\dfrac{1}{5^2}$ _____ [3]

   b) $\dfrac{1}{6^{-2}}$

   6^2 _____ [3]

   c) $\left(\dfrac{3}{2}\right)^{-3}$

   $\left(\dfrac{2}{3}\right)^3$

   $\dfrac{2^3}{3^3}$ _____ [3]

   d) $12^5 \times 12^6 \times 12^{-4}$

   12^{5+6-4}

   12^7 _____ [3]

   e) $8^{11} \div 8^{-3} \times 8^5$

   $8^{11-(-3)+5}$

   8^{11+4+5}

   8^{19} _____ [3]

f) $\left(7^8 \times 7^9\right)^3$

$$\left(7^{17}\right)^3$$

$$7^{51}$$

7^{51} ___ [3]

g) $2^5 \div 2^{-5} \times 2^{-4}$

$$2^{5-(-5)+(-4)}$$

$$2^{5+5-4}$$

$$2^6$$

2^6 ___ [3]

h) $5x^4 \times 4x^2$

$$5 \times 4 \times x^4 \times x^2$$

$$20 \times x^{4+2}$$

$$20x^6$$

$20x^6$ [3]

i) $16y^5 \div 2y^1$

$$\frac{16y^5}{2y^1}$$

$$8 \, y^{5-1}$$

$$8y^4$$

$8y^4$ [3]

j) $\left(3x^2\right)^3$

$$(3)^3(x^2)^3$$

$$27x^6$$

$27x^6$ [3]

2. Write down the next two terms of the following sequence.

a) 15, 21, 27, 33, _39_, _45_ [4]

+6 +6 +6 +6 +6

b) 28, 24, 20, 16, _12_, _8_ [4]

-4 -4 -4 -4 -4

c) 1, 8, 27, 64, _5³_, _6³_ [4]

125, 216

d) 21, 23, 26, 30, _35_, _41_ [4]

+2 +3 +4 +5 +6

e) 9, 1, 8, 2, 7, 3, _6_, _4_ [4]

10   10

10   10

3. y is directly proportional to x and y = 60 when x = 20, find

    i)   the equation connecting x & y.

$$y = kx$$
$$60 = k(20)$$
$$\frac{60}{20} = k$$
$$k = 3$$

$$y = 3x$$

$$\underline{y = 3x} \quad [3]$$

    ii)   the value of y when x = 8.

$$y = 3x$$
$$y = 3(8)$$
$$y = 24$$

$$\underline{24} \quad [2]$$

    iii)   the value of x when y = 18.

$$y = 3x$$
$$18 = 3x$$
$$\frac{18}{3} = x$$
$$x = 6$$

$$\underline{6} \quad [2]$$

4. y is inversely proportional to x and y =100 when x = 10 find

i)   equation connecting x & y.

$$y = \frac{k}{x}$$

$$100 = \frac{k}{10}$$

$$1000 = k$$

$$y = \frac{1000}{x}$$

$$y = \frac{1000}{x} \text{ [3]}$$

ii)   value of y when x = 5

$$y = \frac{1000}{x}$$

$$y = \frac{1000}{5}$$

$$y = 200$$

200 [2]

iii)   value of x when y = 50

$$y = \frac{1000}{x}$$

$$50 = \frac{1000}{x}$$

$$x = \frac{1000}{50}$$

$$x = 20$$

20 [2]

5. y is inversely proportional to x. Find the value of a and b.

x	4	a	10
y	16	8	b

$y = \frac{k}{x}$

$16 = \frac{k}{4}$

$64 = k$

$y = \frac{64}{x}$

$8 = \frac{64}{a}$

$a = \frac{64}{8}$

$a = 8$

$b = \frac{64}{10}$

$b = 6.4$

a = __8__ , b = __6.4__ [7]

6. The number of days (d) required to renovate a house is inversely proportional to the number of workers (w). When 6 workers do the job, the renovation takes 8 days. How many workers are needed to complete the job in 12 days?

$d = \frac{k}{w}$

$8 = \frac{k}{6}$

$48 = k$

$d = \frac{48}{w}$

$12 = \frac{48}{w}$

$w = \frac{48}{12}$

$w = 4$

__4__ [6]

7. The variable x & y are connected by the equation $y = k\sqrt{x+1}$, where k is a constant.
   Find p and q

x	63	p	8
y	24	15	q

$y = k\sqrt{x+1}$

$24 = k\sqrt{63+1}$

$24 = k \cdot 8$

$\frac{24}{8} = k$

$k = 3$

$y = 3\sqrt{x+1}$

$15 = 3\sqrt{p+1}$

$5 = \sqrt{p+1}$

$(5)^2 = p+1$

$25-1 = p$

$p = 24$

$y = 3\sqrt{x+1}$

$q = 3\sqrt{8+1}$

$q = 3\sqrt{9}$

$q = 3 \times 3$

$q = 9$

p = _24_ , q = _9_ [10]

8. y is directly proportional to k(x+2)(x+7) & y = 4 when x = 1.
   Find y when x = 5.

$y = k(x+2)(x+7)$

$4 = k(1+2)(1+7)$

$4 = k(3)(8)$

$1 = k 6$

$k = \frac{1}{6}$

$y = \frac{1}{6}(x+2)(x+7)$

$y = \frac{1}{6}(5+2)(5+7)$

$y = \frac{1}{6}(7)(14)$

$y = 14$

y= _14_ [7]

9. The first 4 terms of the sequence are 21, 25, 29, 33 ...

   a) Find the formula for the n term of the sequence

   $4n + 17$

   $4n + 17$ [4]

   b) Find the value of the 20th term of the sequence.

   $4(20) + 17 = 97$

   97 [2]