

**SKH St. Simon's Lui Ming Choi Secondary School**

**Form 5 Mathematics**

**Tiered Assignment**

**Name:** \_\_\_\_\_ **Class:** \_\_\_\_\_ (      ) **Date:** \_\_\_\_\_ **Mark:** \_\_\_\_\_/50

**Section A(1)**

1. Simplify  $\frac{(m^{-3}n^4)^3}{m^6n^{-2}}$  and express your answer with positive indices. (3 marks)

2. Make  $h$  the subject of the formula  $2k = \frac{2k + h - 5}{h}$ . (3 marks)

3. Factorize

(a)  $4x^2 + 4xy + y^2$ ,

(b)  $4x^2 + 4xy + y^2 - 6x - 3y$ .

(3 marks)

4. The total number of books owned by Alan and Krystal is 56. If both of them buy 4 books from a bookstore, the number of books owned by Alan will be 3 times that owned by Krystal. Find the original number of books owned by Alan.

(4 marks)

5. (a) Find the range of values of  $x$  which satisfy both  $\frac{3x-17}{2} < 5(4-x)$  and  $5x+32 \leq 0$ .
- (b) Write down the greatest integer which satisfies both inequalities in (a).

(4 marks)

6. A pair of glasses is sold at a discount of 12% on its marked price. The marked price of the pair of glasses is \$1125.
- (a) Find the selling price of the pair of glasses.
- (b) If the percentage profit is 10%, find the cost of the pair of glasses.

(4 marks)

7. The coordinates of the point  $A$  are  $(3, 4)$ .  $A$  is rotated anti-clockwise about the origin  $O$  through  $90^\circ$  to  $H$ , then  $H$  is translated downwards by 6 units to  $K$ .

(a) Write down the coordinates of  $H$  and  $K$ .

(b) Is  $AK$  perpendicular to  $OH$ ? Explain your answer.

(5 marks)

8. Let  $f(x) = x^3 - 2x^2 + x + k$ , where  $k$  is a constant. It is given that  $f(x)$  is divisible by  $x + 2$ .

(a) Find the value of  $k$ .

(b) Someone claims that there is only one real root in the equation  $f(x) = 0$ . Do you agree?  
Explain your answer.

(5 marks)

9. The radius and the perimeter of a sector are 6 cm and  $(2\pi + 12)$  cm respectively.
- (a) Find the angle of the sector.
  - (b) Express the area of the sector in terms of  $\pi$ .

(5 marks)

**Section A(2)**

**10.** Let  $P$  be the cost of producing a box of surface area  $A \text{ cm}^2$ . It is given that  $P$  is the sum of two parts, one part is a constant and the other part varies directly as  $A$ . When  $A = 50$ ,  $P = 5$ ; when  $A = 250$ ,  $P = 9$ .

(a) Find the cost of producing a box of surface area  $400 \text{ cm}^2$ . (4 marks)

(b) There is a larger box which is similar to the box described in (a). If the volume of the larger box is 27 times that of the box described in (a), is it possible to produce the larger box at a cost less than \$80? Explain your answer. (3 marks)

11. The stem-and-leaf diagram below shows the distribution of the marks of a group of students in a Mathematics test.

<u>Stem (tens)</u>	<u>Leaf (units)</u>
6	5 6 8 9 9
7	0 0 1 1 3 4 5 6 7 9
8	1 4 4 4 5 7 7 8
9	0 2

- (a) Find the median, the mode and the range of the above distribution. (3 marks)
- (b) The marks of three more students are included. It is found that the median and the mode of the distribution of the marks are increased by 1 and 3 respectively. Find the mark of each of these three students. (4 marks)