Name:_____( ) Class :_____ Group :_____ Mark :_____/30

Section C Long Questions (30 marks)

1. A delivery man drives a truck to deliver parcels to different buildings. He sets off from the warehouse and travels 50 km due north to building A for 30 minutes, then travels 70 km due south to building B for 1 hour. He then travels due south to building C at a speed of 90 km/h for 20 mins, and travels 80 km due north to building D for 2 hours. Suppose a positive number represents a journey of travelling a distance due south.

   a) Use a directed number to represent the distance travelled in each journey and fill in the following table.

Journey	Travelling distance due south
From warehouse to building A	
From building A to building B	
From building B to building C	
From building C to building D	

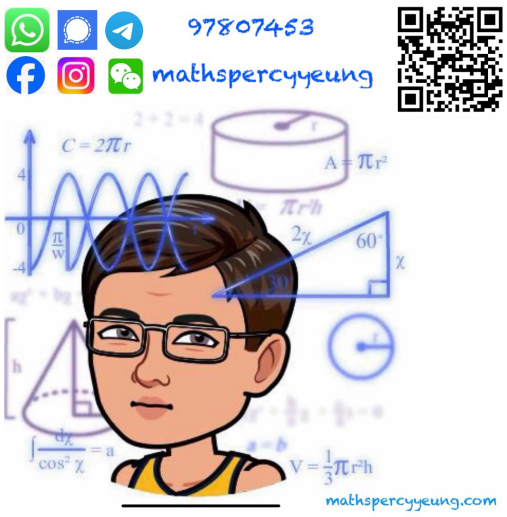
   b) After the visit to building D, the delivery man drives back to the warehouse at a speed of 60 km/h.

      i. Find the total distance that the delivery man travels.

      ii. Find the average travelling speed for the whole journey.

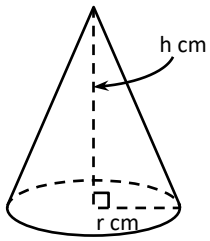
      iii. The delivery man claims that if he travels at an average speed of 100 km/h, he can deliver to all the buildings and return to the warehouse in 2 hours with another route with a different delivery order. Do you agree? Explain your answer.

(8 marks)



2. The figure shows a metal right circular cone. Its volume $V\ cm^3$ can be calculated by formula

$$V = \frac{1}{3}\pi r^2 h$$



By taking $\pi = \frac{22}{7}$,

a) i. find the value of V when $r = 6$ and $h = 3.5$, and
ii. find the value of h when $r = 14$ and $V = 308$.

b) There are three identical metal cubes, each with side length 7 cm. Anna claims she can melt these cubes and recast them into two identical right circular cones, each with a base radius (r) of 5 cm and a height (h) of 21 cm. Do you agree? Explain your answer.

(8 marks)

3. A container holds a mixture of alcohol and water. The percentage of alcohol in the mixture is 40%. 40 mL of pure alcohol is now added into the container so that the percentage of alcohol in the mixture becomes 50%.

   a) Find the new volume of the mixture in the container.
   b) More water is then added to the container. Find the volume of water added so that the percentage of alcohol in the liquid becomes 40% again.
   c) Finally, 500 mL of another liquid mixture (containing 16% alcohol) is added to the container. Find the new overall percentage of alcohol in the liquid within the container now.

(7 marks)

4. In a bookstore, Peter pays $248 for 1 fiction book and 3 magazines. Assume the marked price of a fiction book is $x.

   a) Express the marked price of a magazine in terms of x.
   b) During the current month, a "buy 3 fiction books get 1 fiction book free" promotion is active. If Amy pays $376 in one purchase for 4 fiction books and 1 magazine, find the marked price of a fiction book and the marked price of a magazine respectively.
   c) For the following month, the promotion changes: customers can receive a 10% discount when purchasing a bundle set containing 1 fiction book and 1 magazine. The marked prices for both items remain unchanged. It is known that the profit per cent obtained by selling a bundle set is 30%.
      i. Find the cost price of a bundle set.
      ii. Given that the cost price of a fiction book is $7 less than 4 times the cost price of a magazine, find the cost price of a fiction book.

(7 marks)

Section D Challenging Questions (5 marks)

Car A and car B are x km apart on a straight road. They drive towards each other and will meet in 35 minutes. It is given that the speed of car A is 75 km/h.

a) Express the distance travelled by car B in terms of x.
b) If the speeds of both cars are reduced by 10 km/h, it takes 10 more minutes for the cars to meet.
   i. Express the new distance travelled by car B in term of x.
   ii. Find x. (5 marks)