

Topic Y3 Trigonometry (Post-TT) [38]

1.

Triangle ABC has $AB = 10$ cm, $BC = 7$ cm and angle $B = 80^\circ$. Calculate

- (i) the area of the triangle, [2]
- (ii) the length of CA , [2]
- (iii) the size of angle C . [2]

(Total 6 marks)

2.

- (i) Show that the equation

$$3 \cos^2 \theta = \sin \theta + 1$$

can be expressed in the form

$$3 \sin^2 \theta + \sin \theta - 2 = 0. \quad [2]$$

- (ii) Hence solve the equation

$$3 \cos^2 \theta = \sin \theta + 1,$$

giving all values of θ between 0° and 360° . [5]

(Total 7 marks)

3.

- (i) A student suggests that, for any prime number between 20 and 40, when its digits are squared and then added, the sum is odd. For example, 23 has digits 2 and 3 which gives $2^2 + 3^2 = 13$, which is odd. Show by counter example that this suggestion is false. [2]

- (ii) Prove that the sum of the squares of any three consecutive positive integers cannot be divided by 3. [3]

(Total 5 marks)

4.

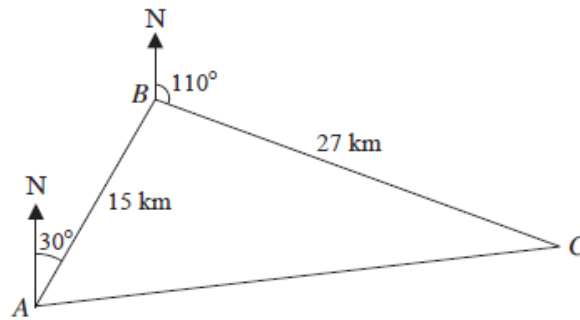
- (i) (a) Sketch the graph of $y = 2 \cos x$ for values of x such that $0^\circ \leq x \leq 360^\circ$, indicating the coordinates of any points where the curve meets the axes. [2]

- (b) Solve the equation $2 \cos x = 0.8$, giving all values of x between 0° and 360° . [3]

- (ii) Solve the equation $2 \cos x = \sin x$, giving all values of x between -180° and 180° . [3]

(Total 8 marks)

5.



In the diagram, a lifeboat station is at point A . A distress call is received and the lifeboat travels 15 km on a bearing of 030° to point B . A second call is received and the lifeboat then travels 27 km on a bearing of 110° to arrive at point C . The lifeboat then travels back to the station at A .

(i) Show that angle ABC is 100° . [1]

(ii) Find the distance that the lifeboat has to travel to get from C back to A . [2]

(iii) Find the bearing on which the lifeboat has to travel to get from C to A . [4]

(Total 7 marks)

6.

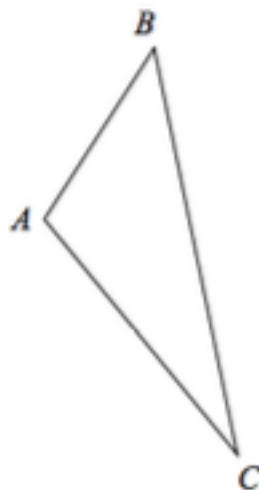


Figure 2

Figure 2 shows a sketch of a triangle ABC .

Given $\vec{AB} = 2\mathbf{i} + 3\mathbf{j} + \mathbf{k}$ and $\vec{BC} = \mathbf{i} - 9\mathbf{j} + 3\mathbf{k}$,

show that $\angle BAC = 105.9^\circ$ to one decimal place.

(5)

(Total 5 marks)