Specialist Methods (Year 11)
(Trigonometry and Functions)

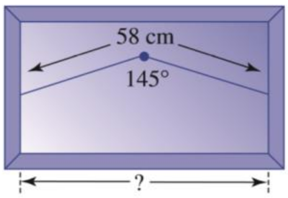
Practice Test#1

Please Note: Use calculator wherever necessary Marks: 50 Time: 3600 sec

1. Two rowers set out from the same point. One rows N70°E for 2000 m and the other rows S15°W for 1800 m. How far apart are the two rowers? [4]

2. From point P, a ship (S) is sighted 12.4 km away on a bearing of 137°. Point Q is due south of P and is a distance of 31.2 km from the ship. Calculate the bearing of the ship from Q, correct to the nearest degree. [4]

3. The cord supporting a picture frame is 58 cm long. It is hung over a single hook in the centre of the cord and the cord then makes an angle of 145° as shown in the figure on the right. Calculate the length of the backing of the picture frame, to the nearest centimetre. [4]



4. Sketch **y = 3 tan (πx/2)** over the range [-2, 4] [4]

5. Sketch the graphs of the following functions and state (i) the period and (ii) the amplitude of each.

(a) $y = 4\cos 3x$ for $-360° \le x \le 360°$ (b) $y = -\sin 4x$ for $-2\pi \le x \le 2\pi$ [4]

6. 16. **XYZ** is a triangle in which ***XZ***=7cm, A circle, center ***Y*** and radius ***YZ***, cuts ***XY*** internally at ***D***. Given ***XD***=5cm and ***DZ***=4cm, calculate the length of ***YZ*** and the area of the triangle. [6]

7. Find **x** if $\sqrt{2}\cos x + 1 = 0$ over the domain $-2\pi \le x \le 2\pi$ [4]

8. A walker walks on a flat plane directly towards a distant high rocky outcrop R. At point A the angle of elevation of the outcrop is 24°, and a km closer at B the angle of elevation is 32°. [4]

   (a) Find the horizontal distance from B to the outcrop, to the nearest meter.

   (b) Find the height of the outcrop above the plane, to the nearest meter.

9. The circle $x^2 + y^2 = 36$ meets the positive direction of the x-axis at A. Find the coordinates of the points P on the circle such that angle AOP = 60°. [4]

10. Prove the following – [12]

   a) $\sin 2x + \sin 4x + \sin 6x = 4\cos x.\cos 2x.\cos 3x$

   b) $\dfrac{\sin\theta + \sin 3\theta + \sin 5\theta}{\cos\theta + \cos 3\theta + \cos 5\theta} = \tan 3\theta$

   c) $\cos 4x = 8\cos^4 x - 8\cos^2 x + 1$

   d) $\dfrac{\tan 2\theta - \tan\theta}{\tan 2\theta + \cot\theta} = \tan^2\theta$

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