Unit Test: Radian Measure   Name:_____

Instructions: Show all work for each of the following in the space provided.   **[52 Marks]**

1. (a) Convert the following to radian measure: $250°$ [2]

   (b) Convert the following to degree measure: 1.35 rad   [2]

   (c) Determine the principal angle of $\frac{-37\pi}{6}$ in radians.   [2]

2. Solve the following trigonometric equation: $\cos x(1 + 2\sin x) = 0$, $-4\pi \leq x < 2\pi$ [5]

3. Without using a calculator, evaluate the following: [12]

(Must include a separate sketch for each angle)

$$5\sin\left(-\frac{29\pi}{6}\right) - 3\sec^2\left(\frac{25\pi}{4}\right) + \sqrt{3}\tan\left(\frac{14\pi}{3}\right) - \csc\left(\frac{11\pi}{2}\right) + 5\cos(53\pi)$$

4. Solve each of the following trigonometric equations:

(a) $7\cos^2 x + 4\cos x = 3$, $\qquad -360° \le x \le 720°$ [6]

(b) $(2\sin\theta - 1)^2 + 9\sin\theta = 2\sin\theta(\sin\theta + 1)$, $\qquad -4\pi \le \theta \le 2\pi$ [8]

5. The helicopter shown has blades that are 7 m in length.

(a) If the blades made 250 revolutions in a 40 second interval, determine the angular velocity of the blades in **radians/second**? [3]

(b) Given the conditions from part (a) determine **how far** the tip of one of these blades travels after 12 seconds has passed. [3]

(c) Given that the helicopter has an internal gauge indicating that the blades are rotating at 425 km/h, determine the angular velocity of the blades in **radians/second**. [3]

6. Determine the area of the shaded segment shown below: [6]