Name:_____

1. **Sketch** $225°$ in standard position. State the reference angle and the exact, rationalized value for $\cos 225°$. Show calculations and a diagram as part of your work. **(2 marks)**

2. **Determine** all the possible angles of $\boldsymbol{\theta}$ in standard position if the reference angle is $50°$ and $0° \leq \theta \leq 360°$. Show calculations or a diagram as part of your work. **(1 mark)**

3. **Solve** for $\boldsymbol{\theta}$.

   a. $\sin \theta = -\frac{1}{2}$, $0° \leq \theta \leq 360°$ **(2 marks)**   b. $\tan \theta = \sqrt{3}$, $0° \leq \theta \leq 360°$ **(2 marks)**

4. **Justify** the trigonometric ratios of $\sin\theta$ and $\cos\theta$ for quadrantal angle of $90°$. **(1 mark)**

Name:_____

5. Sketch angle θ, in standard position so that the terminal arm passes through the point $(-3, 4)$.
    a. Determine the exact values of $\sin\theta$, $\cos\theta$ and $\tan\theta$. (2 marks)
    b. Determine the reference angle and the angle in standard position, both to the nearest degree. (2 marks)

6. While flying, a helicopter pilot spots a tower that is 7.4 km to the north and at the same time also spots a monument that is 8.5 km to the south. The tower and the monument are 11.4 km apart. What is the angle between the tower and monument at the helicopter, to the nearest tenth of a degree? (2 marks)

7.4 km

11.4 km

8.5 km
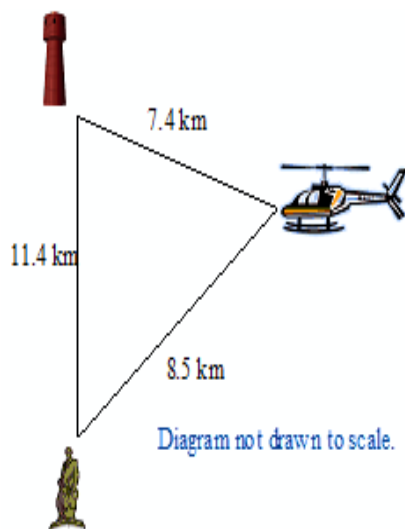
Diagram not drawn to scale.

7. A post is supported by two wires (one on each side going in opposite directions). One of the wires is 14 m long and the other wire is 16 m long. The angle between the wires joined on the post is 130°. How far apart are the ends of the wires along the ground, to the nearest meter? Draw and label a diagram of the post and wires. **(3 marks)**

8. Three friends are camping in the woods, John, Luke and Paul. They each have their own tent and the tents are set up in a triangular configuration. John and Paul are 10.8 ft apart. The angle formed at John is 20°. The angle formed at Paul is 105°. How far apart are Luke and Paul, to the nearest tenth of a foot? Draw and label a diagram to represent the positions of the tents. **(3 marks)**

9. Two scuba divers are 20m apart below the surface of the water. They both spot a clown fish, Nemo that is below them. Diver 1 estimates the angle of depression towards Nemo to be about 50°. Diver 2 estimates the distance to Nemo to be about 30 m. What is the angle at Nemo between the two divers, to the nearest degree? **(2 marks)**

20 m

50°

30 m