1. Given $\sec \theta = 4$ and $\csc \theta < 0$, find the exact values of

(a) $\sin 2\theta$.

(b) $\cos \left( \frac{\theta}{2} \right)$.

2. Use the identity $\sin \alpha - \sin \beta = 2 \cos \frac{\alpha + \beta}{2} \sin \frac{\alpha - \beta}{2}$ to exactly find all solutions to:

$$\sin 4x - \sin 3x = 0$$
3. Give all exact solutions, using inverse trigonometric functions, to:

\[ 6 \cos \theta - 3 = 5 - 3 \cos \theta, \quad 0 \leq \theta < 2\pi \]

4. Give all exact solutions to the equation:

\[ 2 \cos^2 \theta - 2 \sin^2 \theta = 1, \quad 0 \leq \theta < 2\pi \]

5. Graham is flying a kite on level ground. He holds the string 3 feet above the ground. The string is 250 feet long, and makes an angle of 48° with the horizontal. How high is the kite above the ground? Give your answer to the closest 0.1 foot.
6. Suppose that we have a triangle with $a = 4$, $b = 3$ and $B = 32^\circ$. Use the Law of Sines to find all possible values of $A$, to the closest degree.

7. Given a triangle with sides $a = 2$, $b = 3$ and $c = 4$, use the Law of Cosines to find $A$ to the closest degree.

8. By completing the square, find the directrix, focus and vertex of the parabola:

$$y^2 + 2x + 4y - 2 = 0.$$
9. Find the centre, vertices and foci of the ellipse:

\[ 9(x - 3)^2 + 4(y + 1)^2 = 36 . \]

10. A hyperbola has vertices (4,3) and (1,3), and foci (5,3) and (0,3). Find the standard equation of the curve, and sketch it, including the asymptotes.