Activity 19 Solving trigonometric equations

1. a) $\theta = 36.87°$

   b) $\theta = 143.13°$

   c) Angles are supplementary. In general, if θ is a solution to the equation $\sin\theta = k$ then another solution is $\theta_2 = 180° - \theta$.

   d) The relationship also holds for negative k.

2. $\theta = 17.46°,\ 162.54°$

3. $\theta = 210°,\ 330°$

4. Change the equation to $x = 0.2$

   Solutions: $\theta = 78.46°,\ 281.54°$

5. Further solutions can be found by adding or subtracting multiples of $360°$ to the existing solutions.

6. a) $\theta = 34.99°,\ 214.99°$

   b) $\theta_2 = \theta + 180°$

7. $\theta = 135°,\ 315°$

8. Add 360° to existing solutions. Solution set: $\theta = 135°, 315°, 495°, 675°$

9. By changing the domain to reflect the double angle, i.e. $0 \le \theta \le 720°$ we obtain solutions for 2θ of $2\theta = 53.13°,\ 126.87°,\ 413.13°,\ 486.87°$.

   Hence $\theta = 26.57°,\ 63.43°,\ 206.67°,\ 243.43°$.

10.