

Assignment 1

1. Consider the function $f(x) = x^2 - 10x + 21$.
 - (a) Factorise $f(x)$.
 - (b) Find the points where the graph of $y = f(x)$ cuts the x -axis.
 - (c) Graph $y = f(x)$.

2. Find the amplitude and period of $f(t) = -2 \sin(3\pi t - 1)$.

3. Solve $\cos(x + \frac{\pi}{4}) = \frac{1}{\sqrt{2}}$ for $0 \leq x \leq 2\pi$.

4. Consider the function $f(x) = \sqrt{9 - x^2}$.
 - (a) Find the domain of $f(x)$.
 - (b) Find the range of $f(x)$.
 - (c) Find $f(-\sqrt{2})$.
 - (d) Find and simplify $f(x - 3)$.
 - (e) Does the graph of $y = f(x)$ cut or touch the x -axis? If so, at which points?

5. The International Panel on Climate Change published data in 2000 showing that if current trends of burning fossil fuel and deforestation continue, then in 2200 the amount of atmospheric carbon dioxide in parts per million (ppm) will have increased to 2275 ppm (from the 502 ppm it was in 2000).
 - (a) Find an exponential function of the form $C(x) = C_0 e^{kx}$ that models this information, where x is the number of years since 2000 and $C(x)$ is the amount of carbon dioxide in the atmosphere.
 - (b) According to these calculations, what is the current level of atmospheric carbon dioxide?
 - (c) The preindustrial level of atmospheric carbon dioxide was 280 ppm. By which year will this level have doubled?