Graphical/numerical solutions

6 questions | 14 marks

Equivalent correct methods earn the corresponding marks.

1. Use a calculator to estimate both roots of $x^2 = 7$ to one decimal place. [2 marks]

$\sqrt{7} \approx 2.64575$, which rounds to 2.6.

Answer: $x \approx -2.6, 2.6$

2. For $f(x) = x^2 - 6$, calculate $f(2.4)$ and $f(2.5)$. [2 marks]

$2.4^2 - 6 = 5.76 - 6 = -0.24$.

$2.5^2 - 6 = 6.25 - 6 = 0.25$.

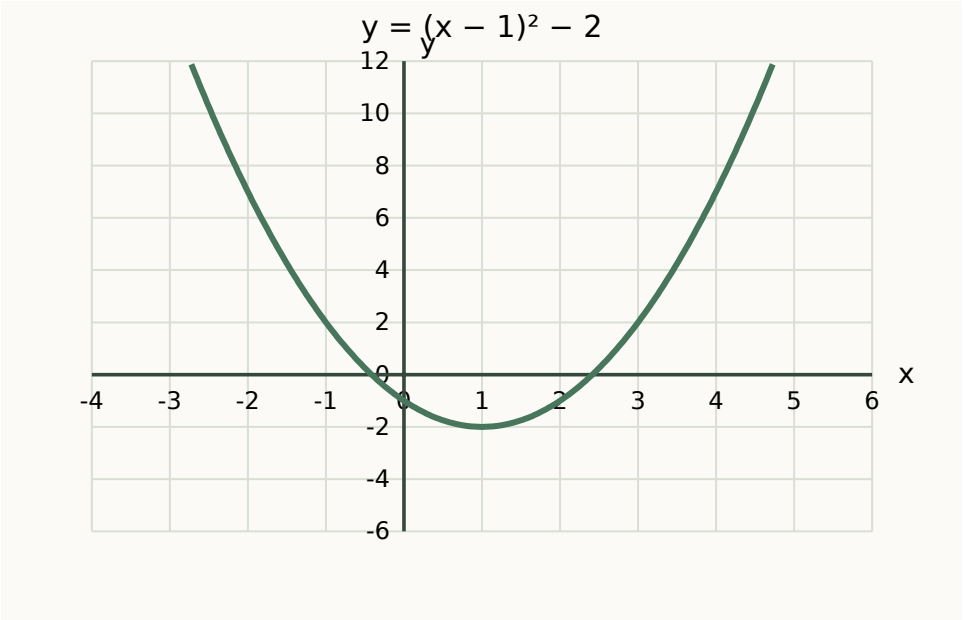
Answer: -0.24 and 0.25

3. Explain what the previous outputs show about a root of $x^2 - 6 = 0$. [2 marks]

The continuous quadratic changes from negative to positive.

Answer: A positive root lies between 2.4 and 2.5.

4. The graph of $y = (x - 1)^2 - 2$ is supplied. Estimate its roots to the nearest half unit. [2 marks]



The actual crossings are near -0.414 and 2.414.

The nearest half-unit readings are -0.5 and 2.5.

Answer: About -0.5 and 2.5.

5. Use a table to locate the positive root of $x^2 - 8 = 0$ between consecutive tenths. [3 marks]

$2.8^2 - 8 = -0.16$ and $2.9^2 - 8 = 0.41$.

Answer: Between 2.8 and 2.9.

6. Why does finding $x \approx 2.45$ not fully solve $x^2 = 6$ over the real numbers? [3 marks]

Both a positive and its negative have the same square.

Check both sides of the parabola.

Answer: There is also $x \approx -2.45$.