

Curve Sketching - Exercises (1 page; 7/10/18)

(1) Sketch the graph of $\sqrt{x^2 - 2x + 1}$ for $0 \leq x \leq 2$

(2) (i) What possible shapes might a cubic have (ignoring its position relative to the axes)?

(ii) How many stationary points does the cubic function,

$$f(x) = x^3 + x^2 - 2x + 3 \text{ have?}$$

(iii) What is the condition for there to be 2 stationary points for the general cubic $f(x) = ax^3 + bx^2 + cx + d$?

(iv) For $f(x) = ax^3 + bx^2 + cx + d$, find the x -coordinate of any turning points of the gradient.

If the cubic has turning points, how could they be used to find the point of inflexion?

(v) For $f(x) = ax^3 + bx^2 + cx + d$, find conditions for the shape of the curve to be each of the 3 possibilities shown in (i), by considering the gradient at the point of inflexion.

(3) Sketch $y = |x - 2| + 1$