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Maths@Work

7. A dolphin leaped out of the sea, dived back into the sea and then leaped out again. It was observed that the height, h metres, of the dolphin's leap above the sea level at time t seconds, is given by $h = t^2 - 5t + 1$ for $0 \leqslant t \leqslant 5$.

(a) Draw the graph of $h = t^2 - 5t + 1$ for $0 \leqslant t \leqslant 5$.

(b) Determine graphically the times at which the dolphin was at sea level.

Brainworks

8. Can the quadratic equation $6 - 2x - x^2 = 0$ be solved by the graphical method? If so, illustrate the steps and find the roots.

9. **(a)** Draw the graph of $y = x^2 - 3x$ for $-2 \leqslant x \leqslant 5$.

(b) Solve graphically the equation $x^2 - 3x = 0$.

(c) Can you use the graph in **(a)** to solve the equation $x^2 - 3x - 4 = 0$ without drawing another quadratic graph? If so, illustrate your method and find the roots of the equation.

(*Hint*: You may consider adding the graph of a straight line on the same grid.)

2.3 Completing The Square Method

We can use the graphical method to solve any quadratic equation. The drawbacks are it takes time to draw the graph and the degree of accuracy is limited. Let us now learn an algebraic method that involves adding a term to the expression $x^2 + bx$ to make it a perfect square in order to solve the given quadratic equation. In other words, we need to find a term c, which, when added to $x^2 + bx$, will make $x^2 + bx + c$ a perfect square, $(x + p)^2$, for some p.