

6. Find the coordinates of the points where the line $y = 4 - x$ intersects the circle $x^2 + y^2 = 22$.

7. (a) Draw the centrally-placed x - and y -axes and scale them using the ranges $-12 \leq x \leq 12$, $-12 \leq y \leq 12$.
- (b) Accurately construct the locus $x^2 + y^2 = 100$.
- (c) On the same graph, draw the line $y = 3x$.
- (d) Write down the coordinates of the points P and Q (as labelled in the diagram) where the x -axis meets the circle. PQ is a diameter of the circle.
- (e) By solving the simultaneous equations

$$x^2 + y^2 = 100$$

$$y = 3x$$

find the x - and y -coordinates of the point, R, where the line meets the circle in the first quadrant.

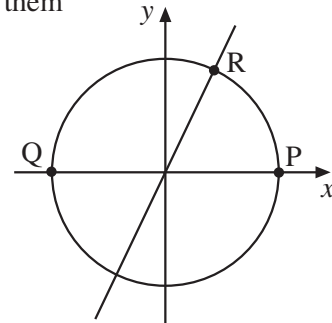
- (f) Calculate the area of $\triangle PQR$.

- (g) Show that the gradient of the line segment QR is $\frac{3}{\sqrt{10} + 1}$.

- (h) Find the gradient of the line segment PR.

- (i) Show that PR is perpendicular to QR.

N.B This illustrates the fact that the angle in a semicircle is a right angle.



Information

Both linear and quadratic equations have been used for over four thousand years. The early Chinese and Babylonians made use of equations to solve daily problems such as the sharing of an inheritance.