

## Equation of a Tangent to a Circle

(a) The point P  $(6, -2)$  lies on the circle with equation  $x^2 + y^2 = 40$ . Find the gradient of the tangent to the circle at point P.

$$(a) m = 3$$

(b) The point Q  $(2, 1)$  lies on the circle with equation  $x^2 + y^2 = 5$ . Find the gradient of the tangent to the circle at point Q.

$$(b) m = -2$$

(a) The point A  $(2, -5)$  lies on the circle with equation  $x^2 + y^2 = 29$ . Find the equation of the tangent to the circle at point A.

$$(a) y = \frac{2}{5}x - \frac{29}{5}$$

(b) The point B  $(-3, -2)$  lies on the circle with equation  $x^2 + y^2 = 13$ . Find the equation of the tangent to the circle at point A.

$$(b) y = -\frac{3}{2}x - \frac{13}{2}$$

(a) The point R  $(-2, -3)$  lies on the circle with centre  $(1, 2)$  and radius  $\sqrt{34}$ . Find the equation of the tangent to the circle at point R.

$$(a) y = -\frac{3}{5}x - \frac{21}{5}$$

(b) The point S  $(7, 1)$  lies on the circle with centre  $(x - 3)^2 + (y + 2)^2 = 25$ . Find the equation of the tangent to the circle at point S.

$$(b) y = -\frac{4}{3}x + \frac{31}{3}$$

(a) Point P  $(-2, 8)$  lies on a circle with centre  $(-1, 6)$ . Point Q with coordinates  $(a, 5)$  lies on the tangent to the circle at P. Find the value of  $a$ .

$$(a) y = \frac{1}{2}x + 9 \quad a = -8$$

(b) Point A  $(-1, -3)$  lies on the circle with equation  $(x - 3)^2 + (y + 2)^2 = 17$ . The line L is the tangent to the circle at point A. Find the coordinates of the point where line L crosses the  $x$ -axis.

$$(b) y = -4x - 7 \quad \left(-\frac{7}{4}, 0\right)$$