

(13) (a) Midpoint of PQ = $\left(\frac{4+6}{2}, \frac{10+2}{2}\right) = (5, 6)$

$$m_{PQ} = \frac{10-2}{4-6} = \frac{8}{-2} = -4$$

$$m_{\perp} = \frac{1}{4}$$

$$y-6 = \frac{1}{4}(x-5)$$

$$4(y-6) = x-5$$

$$4y-24 = x-5$$

$$4y = x+19$$

(b) Centre of circle has x-coordinate directly above the midpoint of QR.

$$x = \frac{6+12}{2} = 9$$

$$4y = x+19$$

$$= 9+19$$

$$= 28$$

$$y = 7$$

Centre (9, 7)

$$r^2 = (9-4)^2 + (7-10)^2$$

$$= 5^2 + (-3)^2$$

$$= 25 + 9$$

$$= 34$$

$$(x-9)^2 + (y-7)^2 = 34$$

