

December 7th

A circle with centre (2, -3) has the line $4y - 3x = 7$ as a tangent.

Find the radius of the circle.

Tangent has gradient $\frac{3}{4}$

Therefore radius from the point of intersection has gradient $-\frac{4}{3}$

Hence $\frac{y+3}{x-2} = -\frac{4}{3}$

Rearranging gives

$$3y + 9 = 8 - 4x$$

Solving $3y + 4x = -1$

$$4y - 3x = 7$$

Gives

$$x = -1, y = 1$$

Therefore the radius is the distance between (-1,1) and (2,-3)

$$= \sqrt{4^2 + 3^2} = \mathbf{5}$$