Q1. On the grid, construct the graph of $x^2 + y^2 = 16$
Q2. Here is a circle, centre $O$, and the tangent to the circle at the point $P(4, 3)$ on the circle.

Find an equation of the radius $OP$.

Q3. Using the diagram in question 2, find an equation of the tangent at the point $P$. 
Q4. The line $l$ is a tangent to the circle $x^2 + y^2 = 40$ at the point $A$.
$A$ is the point $(2, 6)$.
Find an equation of the tangent at the point $A$.

Q5. The line $l$ in question 4 crosses the $x$–axis at the point $P$.
Work out the area of triangle $OAP$. 
**Topics listed in objectives**

- Select and apply construction techniques and understanding of loci to draw graphs based on circles and perpendiculars of lines;
- Find the equation of a tangent to a circle at a given point, by:
  - finding the gradient of the radius that meets the circle at that point (circles all centre the origin);
  - finding the gradient of the tangent perpendicular to it;
  - using the given point;
- Recognise and construct the graph of a circle using $x^2 + y^2 = r^2$ for radius $r$ centred at the origin of coordinates.

**Answers**

Q1. circle correctly drawn, centre (0, 0), radius 4

Q2. $y = \frac{3}{4}x$

Q3. $y = -\frac{4}{3}x + \frac{25}{3}$

Q4. $y = -\frac{1}{3}x + \frac{2}{3}$

Q5. P (20, 0), so area triangle OAP = $\frac{1}{2} \times 20 \times 6 = 60$