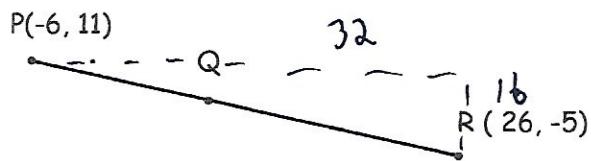


## 26th March



PQR is a straight line.

$$16 \div 8 = 2$$

$$PQ : PR = 3 : 8$$

$$\begin{aligned} 2 \times 3 &= 6 \\ 16 - 6 &= 10 \end{aligned}$$

Work out the coordinates of the point Q

$$\begin{aligned} 32 \div 8 &= 4 & 4 \times 3 &= 12 \\ -6 + 12 &= 6 \end{aligned}$$

$$(6, 5)$$

A circle has equation

$$(x + 7)^2 + (y - 5)^2 = 4$$

Write down the equation of a tangent to the circle

Centre  $(-7, 5)$        $r = 2$

$$y = 7, y = 3$$

$$x = -9, x = -5$$

The transformation matrix  $\begin{pmatrix} a & b \\ -a & 2b \end{pmatrix}$ maps the point  $(2, -4)$  onto the point  $(10, 40)$ Find the values of  $a$  and  $b$ 

$$\begin{pmatrix} a & b \\ -a & 2b \end{pmatrix} \begin{pmatrix} 2 \\ -4 \end{pmatrix} = \begin{pmatrix} 10 \\ 40 \end{pmatrix}$$

$$\begin{aligned} 2a - 4b &= 10 \\ -2a - 8b &= 40 \quad \text{add} \\ -12b &= 50 \end{aligned}$$

$$b = -\frac{25}{6}$$

$$a = -\frac{10}{3}$$

$$y = \frac{2}{3}x^9 - \frac{1}{2}x^4 \quad \frac{dy}{dx} = 6x^8 - 2x^3$$

Work out the value of  $\frac{d^2y}{dx^2}$  when  $x = -1$ 

$$\frac{d^2y}{dx^2} = 48x^7 - 6x^1$$

$$\text{when } x = -1 \quad \frac{d^2y}{dx^2} = -54$$

$$\boxed{-54}$$