



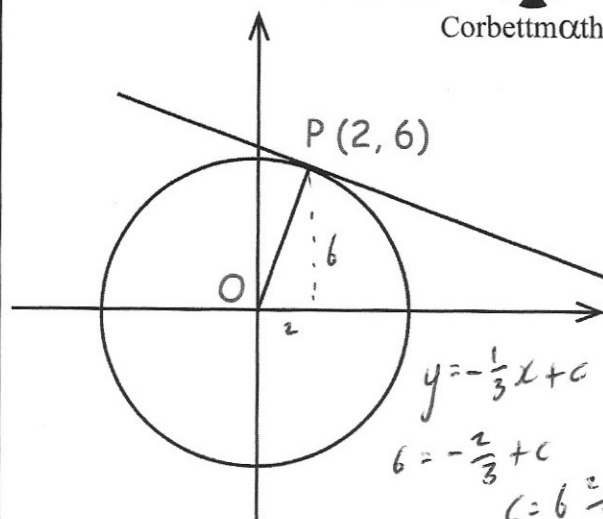
The diagram shows the circle $x^2 + y^2 = 40$ with a tangent at the point (2, 6)

Find the gradient of the line OP

3

Find the gradient of the tangent

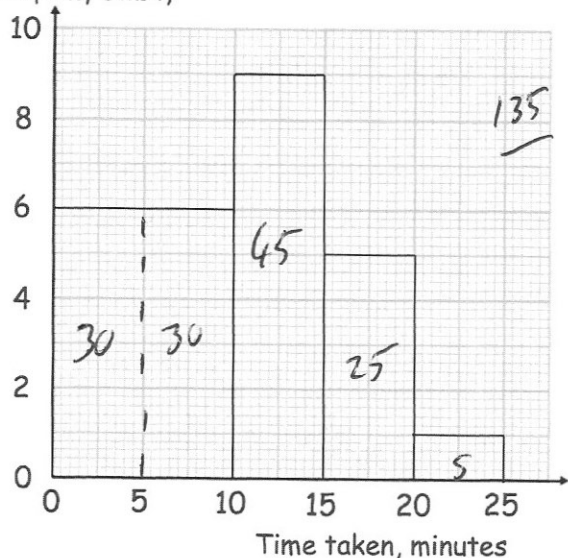
$-\frac{1}{3}$



Find the equation of the tangent

$$y = -\frac{1}{3}x + 6\frac{2}{3}$$

Frequency Density



The histogram shows the time taken to travel to school by 135 students.

Two students are chosen at random.

Work out an estimate to the probability that both students take more than 5 minutes to travel to school.

$$P(\text{more than 5 mins}) = \frac{105}{135}$$

$$\frac{105}{135} \times \frac{104}{134} = \frac{364}{603}$$

Prove that if two consecutive integers are squared, that the sum always gives a remainder of 1 when divided by 4.

$$\begin{aligned} & n^2 + (n+1)^2 \\ &= n^2 + n^2 + 2n + 1 \\ &= 2n^2 + 2n + 1 \end{aligned}$$

$= 2(n^2 + n) + 1$
 even even
 even \times even = multiple of 4
 $n^2 + n$
 $n(n+1) \rightarrow$ even
 as product of two consecutive numbers

(multiple of 4 plus 1) leaves a remainder of 1 when divided by 4.