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*Straight Lines - Lesson 1*

**Investigating Gradients**

**LI**

- Calculate gradients in 2 ways.
- Calculate the angle a line makes with the +ve x-axis.

**SC**

- Simplify fractions.
- Use a calculator.
\[ m = \frac{y_2 - y_1}{x_2 - x_1} \]

\[ \tan \theta = \frac{y_2 - y_1}{x_2 - x_1} \]

\[ m = \tan \theta \]

\theta \text{ is the angle the line makes with the positive } x\text{-axis}
Example 1

A line makes an angle of $37\cdot 9^\circ$ with the positive x-axis.

Calculate its gradient (to 2 d.p.).

\[ m = \tan \theta \]
\[ m = \tan 37\cdot 9^\circ \]
\[ m = 0.78 \]
Example 2

Calculate the angle (in radians) a line with gradient \(-4\) makes with the positive \(x\)-axis (to 2 d.p.).

\[
m = \tan \theta
\]
\[
-4 = \tan \theta
\]
\[
\text{RAA} = \tan^{-1} 4
\]
\[
\text{RAA} = 1.325 \ldots
\]

The graph shows that the gradient is negative, so the angle is between 0 and \(\pi\) radians; hence, \(\pi - \text{RAA}\).

\[
\therefore \theta = \pi - 1.325 \ldots
\]
\[
\Rightarrow \theta = 3.141 \ldots - 1.325 \ldots
\]
\[
\Rightarrow \theta = 1.82
\]
CfE Higher Maths

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