Parallel and Perpendicular Lines

1) Equation of a line \( m \) is \( y = 3x + 5 \). Slope of a line \( n \) is 3. Prove that the lines are parallel.

2) Equation of \( AB \) is \( 5y - 15x = -20 \). Equation of \( CD \) is \( y = -\frac{1}{3}x + 15 \). Prove that \( AB \perp CD \).

3) Equation of the lines are \( 3y + 12x + 6 = 0 \) and \( y = -4x + 2 \). Are the lines parallel or perpendicular? Justify.

4) Equation of line \( p \) is \( y = x + 7 \). Equation of line \( q \) is \( y = -x + 11 \). Prove that the lines are perpendicular.

5) Equation of two lines are \( y + 6x = -3 \) and \( 18y = 3x + 13 \). Are the lines parallel? Justify your answer.
Parallel and Perpendicular Lines

1) Equation of a line \( m \) is \( y = 3x + 5 \). Slope of a line \( n \) is 3. Prove that the lines are parallel.

\[
\text{slope of } m = 3 \;; \text{ slope of } n = 3 \\
\text{slope of } m = \text{slope of } n \\
The lines } m \text{ and } n \text{ are parallel.}
\]

2) Equation of \( AB \) is \( 5y - 15x = -20 \). Equation of \( CD \) is \( y = -\frac{1}{3}x + 15 \). Prove that \( AB \perp CD \).

\[
\text{slope of } AB = 3 \;; \text{ slope of } CD = -\frac{1}{3} \\
\text{slope of } AB \times \text{slope of } CD = -1 \\
\text{AB is perpendicular to CD}
\]

3) Equation of the lines are \( 3y + 12x + 6 = 0 \) and \( y = -4x + 2 \). Are the lines parallel or perpendicular? Justify.

\[
\text{slope of } 3y + 12x + 6 \text{ is } -4 \\
\text{slope of } y = -4x + 2 \text{ is } -4 \\
\text{As the slopes are equal, the lines are parallel.}
\]

4) Equation of line \( p \) is \( y = x + 7 \). Equation of line \( q \) is \( y = -x + 11 \). Prove that the lines are perpendicular.

\[
\text{slope of } p = 1 \;; \text{ slope of } q = -1 \\
\text{slope of } p \times \text{slope of } q = -1 \\
The lines } p \text{ and } q \text{ are perpendicular.}
\]

5) Equation of two lines are \( y + 6x = -3 \) and \( 18y = 3x + 13 \). Are the lines parallel? Justify your answer.

\[
\text{slope of } y + 6x = -3 \text{ is } -6 \\
\text{slope of } 3y = -18x + 13 \text{ is } \frac{1}{6} \\
\text{No. As the slopes are not equal, the lines are not parallel.}
\]