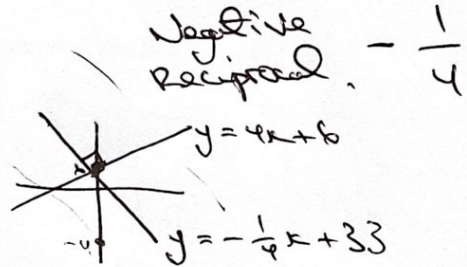




QT Perpendicular lines

1. Write down the equation of a line perpendicular to $y = 4x + 6$

$$y = -\frac{1}{4}x + 3$$



2. Write down the equation of a line perpendicular to $y = 4x + 6$ which passes through $(0, -4)$

$$y = -\frac{1}{4}x - 4$$

3. Find the equation of a line perpendicular to $4y - 2x + 8 = 0$

$$4y = 2x - 8$$

$$y = \frac{2x - 8}{4}$$

$$y = \frac{2}{4}x - \frac{8}{4}$$

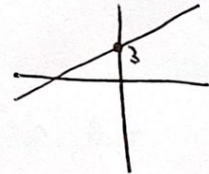
$$y = \frac{1}{2}x - 2$$

$$y = -2x + 4$$

negative reciprocal

4. Find the equation of a line perpendicular to $y = -\frac{4}{3}x - 6$ which passes through $(0, 3)$

$$y = \frac{3}{4}x + 3$$



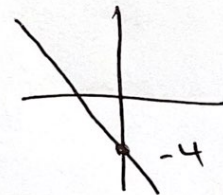
5. Find the equation of a line perpendicular to $2y - 3x + 5 = 0$ which passes through $(0, -4)$

$$2y = 3x - 5$$

$$y = \frac{3x - 5}{2}$$

$$y = \frac{3}{2}x - \frac{5}{2}$$

$$y = -\frac{2}{3}x - 4$$





6. Line A passes through the points (4,3) and (8,6). Find the equation of the line perpendicular to line A that passes through (6,12)

$$\begin{aligned} \text{Line A Gradient} &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{6 - 3}{8 - 4} \\ &= \frac{3}{4} \end{aligned}$$

Perpendicular $\Rightarrow -\frac{4}{3}$

$$\begin{aligned} y &= mx + c \\ y &= -\frac{4}{3}x + c \\ 12 &= -\frac{4}{3}(6) + c \\ 12 &= -8 + c \\ 20 &= c \\ y &= \underline{\underline{-\frac{4}{3}x + 20}} \end{aligned}$$

7. Line A passes through the points (1,1) and (4,7)
Line B passes through the points (7,4) and (11,6)
Determine whether Line A and line B are perpendicular.

$$\begin{aligned} \text{Gradient Line A} &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{7 - 1}{4 - 1} \\ &= \frac{6}{3} = \underline{\underline{2}} \end{aligned}$$
$$\begin{aligned} \text{Gradient Line B} &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{6 - 4}{11 - 7} \\ &= \frac{2}{4} = \underline{\underline{\frac{1}{2}}} \end{aligned}$$

Not perpendicular as not negative.

8. Line A passes through the points (-5,-1) and (-1,11)
Line B passes through the points (-4,1) and (k, 5)
Line A and B are ~~parallel~~ perpendicular.
Find the value of k.

$$\begin{aligned} \text{Line A Gradient} &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{11 - (-1)}{-1 - (-5)} \\ &= \frac{12}{4} = \underline{\underline{3}} \end{aligned}$$

Line B: $-\frac{1}{3}$ perpendicular

$$\begin{aligned} -\frac{1}{3} &= \frac{5 - 1}{k - (-4)} \\ -\frac{1}{3} &= \frac{4}{k + 4} \\ -1(k + 4) &= 12 \\ -k - 4 &= 12 \\ -4 &= 12 + k \\ -16 &= k \\ k &= \underline{\underline{-16}} \end{aligned}$$