(11) Find the equation of the line through (3 -5) that is

(a) Orthogonal to the line $3x-6y-5=0$

$3x - 6y - 5 = 0$

$3x - 6y = 5$

$-6y = -3x + 5$

$y = \frac{1}{2}x - \frac{5}{6}$

Gradient $(m) = \frac{1}{2}$.

$m_1 m_2 = -1$

$\frac{1}{2} m_2 = -1$

$m_2 = -2$

Points (x, y) and $(3, -5)$

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

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

$y - 5 = -2x + 6$

$y = -2x + 11$

$2x + y - 11 = 0$

(b) Parallel to the line $3x - 6y - 5 = 0$

From the above

Gradient $(m) = \frac{1}{2}$

$m_1 = m_2 = \frac{1}{2}$

(x, y) $(3 -5)$

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

$$\frac{y+5}{x-3} = \frac{1}{2}$$

$y + 5 = \frac{1}{2}x - \frac{3}{2}$.

$2 \times y = (\frac{1}{2}x + \frac{7}{2}) \times 2$

$2y - x - 7 = 0$

(14) Find the range of value of c such that (-3, 6) and (7, 20) are on opposite sides of the line $y = 4x + c$

From the equation $y = mx + c$

c = is the y intercept
m = gradient

Gradient = 4 and is Parallel to:

$\frac{\Delta y}{\Delta x}$ = Gradient

$\frac{20-6}{7+3} = \frac{14}{10}$

$= \cancel{1.4}\ \frac{7}{5}$

Equation
$(x, y)\ (-3, 6)$

$\frac{y-6}{x+3} = \frac{7}{5}$

$5y - 30 = 7x + 21$

$5y = 7x + 51$

$y = 4x + c$

at y intercep $x = 0$

$y = c$ --(i)

at y intercept $x = 0$

$\frac{\cancel{5}y}{\cancel{5}} = \frac{51}{5}$ --(ii)

$y = \frac{51}{5}$ but $y = c$

$c = 10.2.$