Between

To find the missing coordinate in any case, we need the equation of the line, and this can be found using the equation:

$$y - y_1 = m(x - x_1)$$

- We have y_1 and x_1, so we need m. We know that m is the gradient so we know

$$m = \frac{dx}{dy}$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

(1)

$$m = \frac{8-3}{8-2} = \frac{5}{6}$$

$$\therefore y - 3 = \frac{5}{6}(x - 2)$$

$$y - 3 = \frac{5x - 10}{6}$$

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

$$y = \frac{5x}{6} - \frac{5}{3} + \frac{9}{3} \quad \therefore y = \frac{5x}{6} + \frac{4}{3}$$

Now we now the line equation, we can just substitute the x or y value into it.

$$y = \frac{5 \times 4}{6} - \frac{4}{3}$$

$$y = 4.\dot{6}$$

(2)

$$m = \frac{16-5}{13-8} = \frac{11}{5}$$

$$y - 8 = \frac{11}{5}(x - 5)$$

$$y - 8 = \frac{11x}{5} - \frac{55}{5}$$

$$y - 8 = \frac{11x}{5} - 11$$

$$y = \frac{11x}{5} - 3$$

$$10 = \frac{11x}{5} - 3$$

$$13 = \frac{11x}{5} \qquad 11x = 65 \qquad x = 5.\dot{9}0$$

Between III

(3)

(a) $m = \frac{63-37}{8.9-4.1} = \frac{26}{4.8} = \frac{65}{12}$

$y - 37 = \frac{65}{12}(x - 4.1)$

$y - 37 = \frac{65x}{12} - \frac{\left(\frac{533}{2}\right)}{12}$

$y - 37 = \frac{65x}{12} - \frac{533}{24}$

line equation $y = \frac{65x}{12} + \frac{355}{24}$

$y = \frac{(65 \times 7.3)}{12} + \frac{355}{24}$

$y = \frac{163}{3} = 54.\dot{3}$

(b)

$m = \frac{56-42}{17.55-15.05} = \frac{14}{2.5} = 5.6$

$y - 42 = 5.6(x - 15.05)$

$= 5.6x - 84.28$

line equation $y = 5.6x - 42.28$

$47.5 = 5.6x - 42.28$

$5.6x = 89.78$

$x = 16.03214286$

16.0 (3sf)

(c)

$$M = \frac{20-1}{8-17} = \frac{19}{-9} = -2.\dot{1}$$

$$y - 20 = -2.\dot{1}(x-8)$$

$$y - 20 = -2.\dot{1}x + \frac{152}{9}$$

line equation $y = -2.\dot{1}x + \frac{332}{9}$

$$y = (-2.\dot{1} \times 12) + \frac{332}{9}$$

$$y = -\frac{76}{3} + \frac{332}{9}$$

$$= \frac{104}{9} = 11.\dot{5}$$