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Straight line graphs - 5

5.1

① a) $(4, 3)$, $(8, 6)$
$x_1\ y_1 \quad x_2\ y_2$

$$\frac{6-3}{8-4} = \frac{3}{4}$$

$$m = \frac{3}{4}$$

b) $(5, 2)$, $(7, -1)$
$x_1\ y_1 \quad x_2\ y_2$

$$\frac{-1-2}{7-5} = -\frac{3}{2}$$

$$m = -\frac{3}{2}$$

c) $(3p, -4p)$, $(8p, -2p)$
$x_1 \quad y_1 \quad x_2 \quad y_2$

$$\frac{-2p \overset{+}{\ominus} 4p}{8p - 3p} = \frac{2p}{5p} = \frac{2}{5}$$

$$m = \frac{2}{5}$$

② a) $m = \frac{1}{3}$ and $(0, 7)$ is y-intercept

$$y = \frac{1}{3}x + 7$$

b) $(\times 3)\ y = \frac{1}{3}x + 7\ (\times 3)$

$$3y = x + 21$$

$$\underset{A}{x} - \underset{B}{3y} + 21 = 0$$

③ a) $(1, 2)$ $(4, 1)$
$x_1\ y_1 \quad x_2\ y_2$

$$\frac{1-2}{4-1} = -\frac{1}{3}$$

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

substitute $(4, 1)$

$$1 = -\frac{1}{3}(4) + c$$

$$c = \frac{7}{3}$$

$$y = -\frac{1}{3}x + \frac{7}{3}$$

substitute $(12, k)$

$$k = -\frac{1}{3}(12) + \frac{7}{3}$$

$$k = -\frac{5}{3}$$

④ a) $4x - 5y + 12 = 0$

$\frac{5y}{5} = \frac{4x}{5} + \frac{12}{5}$

$y = \frac{4}{5}x + \frac{12}{5}$

$m = \frac{4}{5}$

b) $y = \frac{4}{5}x + \frac{12}{5}$ → y-intercept

$(0, \frac{12}{5})$

c) $0 = \frac{4}{5}x + \frac{12}{5}$

$(\div 4/5) \quad -\frac{12}{5} = \frac{4}{5}x \quad (\div 4/5)$

$x = -3$

$(-3, 0)$

⑤ $(2, 3a), (5a, -2)$
$x_1 \; y_1 \quad x_2 \; y_2$

$\times(5a-2) \quad \frac{-2-3a}{5a-2} = -1 \quad \times(5a-2)$

$-2 - 3a = -5a + 2$

$-3a + 5a = 2 + 2$

$\frac{2a}{2} = \frac{4}{2}$

$a = 2$

⑥ $L_1 : y = -\frac{1}{5}x + 3$

$L_2 : 3x - 4y + 7 = 0$

$\frac{4y}{4} = \frac{3}{4}x + \frac{7}{4}$

$y = \frac{3}{4}x + \frac{7}{4}$

$\frac{3}{4}x + \frac{7}{4} = -\frac{1}{5}x + 3$

$\frac{3}{4}x + \frac{1}{5}x = -\frac{7}{4} + 3$

$\frac{19}{20}x = \frac{5}{4}$

$x = \frac{25}{19}$

Substitute x into in either L_1 or L_2

$y = -\frac{1}{5}(\frac{25}{19}) + 3$

$y = \frac{52}{19}$

$= (\frac{25}{19}, \frac{52}{19})$

⑦ a) A $(-3p-3, 2p)$, B $(-5p+1, 0)$

$x_1 \quad y_1 \qquad x_2 \quad y_2$

$$\frac{0-2p}{(-5p+1)-(-3p-31)} = \frac{-2p}{-2p+4}$$

slope between A and B

$$= \frac{-2p}{-2p+4}$$

B $(-5p+1, 0)$ C $(0, 8p)$

$x_1 \quad y_1 \qquad x_2 \quad y_2$

$$\frac{8p-0}{0--5p+1} = \frac{8p}{5p-1} \rightarrow \text{slope between B and C}$$

$$\frac{-2p}{-2p+4} = \frac{8p}{5p-1}$$

$$(-2p)(5p-1) = (8p)(-2p+4)$$

$$-10p^2+2p = -16p^2+32p$$

$$-10p^2+2p+16p^2-32p = 0$$

$$6p^2-30p = 0$$

$$6p(p-5) = 0$$

$$p = 5$$

b) B: $(-5(5)+1, 0) = (-24, 0)$

$x_1 \quad y_1$

C: $(0, 8(5)) = (0, 40)$

$x_2 \quad y_2$

$$\frac{40-0}{0--24} = \frac{40}{24} = \frac{5}{3}$$

$$m = \frac{5}{3}$$

⑧ a) $y = \frac{2}{3}x - 4 \quad (\times 3)$

$$3y = 2x - 12$$

$$0 = 2x - 3y - 12$$

(8) b) Substitute $(p, -2)$

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

$$-2 = \frac{2}{3}p - 4$$

$$-2 + 4 = \frac{2}{3}p$$

$$\left(\div \frac{2}{3}\right) 2 = \frac{2}{3}p \left(\div \frac{2}{3}\right)$$

$$p = 3$$

c) $$\frac{ky}{k} = \frac{3}{k}x + \frac{25}{k}$$

$$y = \frac{3}{k}x + \frac{25}{k}$$

$(3, -2)$ $$-2 = \frac{3}{k}(3) + \frac{25}{k}$$

$$-2 = \frac{9}{k} + \frac{25}{k}$$

$$-2 = \frac{34}{k}$$

$$k = -17$$

(9) a) A $(-2, k+1)$ and B $(3k-2, 6)$

x_1 y_1 x_2 y_2

$$\frac{6 - (k+1)}{(3k-2) - (-2)} = \frac{5-k}{3k}$$

$$\frac{5-k}{3k} = -\frac{1}{2}$$

$$5 - k = -\frac{1}{2}(3k)$$

$$5 - k = -\frac{3}{2}k$$

$$5 = -\frac{3}{2}k + k$$

$$\left(\div -\frac{1}{2}\right) 5 = -\frac{1}{2}k \left(\div -\frac{1}{2}\right)$$

$$k = -10$$

(9) b) $y = -\frac{1}{2}x + c$

$A: (-2, k+1) = (-2, -9)$

Substitute $(-2, -9)$

$-9 = -\frac{1}{2}(-2) + c$

$-9 = 1 + c$

$c = -10$

c) $y = -\frac{1}{2}x - 10 \quad (\times 2)$

$2y = -x - 20$

$x + 2y + 20 = 0$