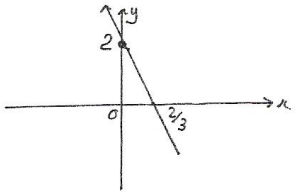
① 

(2)

② (a) $m = -3$ $b = 4$
(b) $m = 3$ $b = 5/2$
(c) $m = 5/3$ $b = 8/3$ (6)

③ $m = 3 \therefore \tan\theta = 3$
$\theta = 72°$ (2)

④ (a) $m = \frac{-1-3}{5+1} = \frac{-4}{6} = \frac{-2}{3}$
(b) Midpoint $= \left(\frac{-1+5}{2}, \frac{3-1}{2}\right) = (2,1)$ (3)
(c) $d = \sqrt{(-1-5)^2 + (3+1)^2} = \sqrt{52} = 2\sqrt{13}$ units

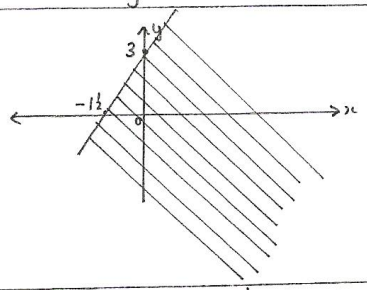
⑤ (a) $y - 3 = -1(x-1)$
$y - 3 = -x + 1$
$x + y - 4 = 0$ 2
(b) $\frac{y-0}{x-5} = \frac{3-0}{-2-5} = \frac{3}{-7}$
$-7y = 3x - 15$ 2
$3x + 7y - 15 = 0$
(c) $y = 5x + 7$ 1
(d) $\frac{x}{6} + \frac{y}{3} = 1$ 2
$3x + 6y - 18 = 0$
$x + 2y - 6 = 0$
(e) $y - 4 = -\frac{1}{3}(x+2)$ (9)
$3y - 12 = -x - 2$ 2
$x + 3y - 10 = 0$

⑥ $m_1 = \frac{2+3}{-2+1} = \frac{5}{-1} = -5$
$5x + y = 7 \therefore y = 7 - 5x \therefore m_2 = -5$ (3)
Since $m_1 = m_2$ they are parallel

⑦ $7x - y = 2 \quad \ldots ①$
$x + y = 6 \quad \ldots ②$
① + ② $8x = 8$
$x = 1$
subs in ② $1 + y = 6 \therefore y = 5$ (2)
$\therefore$ point is $(1,5)$

⑧ $8x - 3y + 5 = 0 \quad \ldots ①$
$5x - 2y + 4 = 0 \quad \ldots ②$
① × 5 $40x - 15y + 25 = 0 \quad \ldots ③$
② × 8 $40x - 16y + 32 = 0 \quad \ldots ④$
③ − ④ $y - 7 = 0 \therefore y = 7$
subs in ① $8x - 21 + 5 = 0$
$8x = 16 \therefore x = 2$

$\therefore$ points are $(2,7)$ and $(-2,1)$ 2
$\frac{y-1}{x+2} = \frac{7-1}{2+2} = \frac{6}{4} = \frac{3}{2}$
$2y - 2 = 3x + 6$
$3x - 2y + 8 = 0$ 1 (3)

⑨ 

(2)

⑩ $d = \left|\frac{4(-1) - 3(2) + 2}{\sqrt{4^2 + 3^2}}\right| = \left|\frac{-11}{5}\right| = 2\frac{1}{5}$ units (2)

⑪ $d_1 = \left|\frac{2(1) - 1(4) + 12}{\sqrt{2^2 + 1^2}}\right| = \left|\frac{10}{\sqrt{5}}\right| = 2\sqrt{5}$ units (3)
$d_2 = \sqrt{(1+3)^2 + (4-2)^2} = \sqrt{16+4} = \sqrt{20} = 2\sqrt{5}$ units
$\therefore$ they are equidistant

⑫ $\frac{1+x}{2} = 6 \qquad \frac{5+y}{2} = -1$
$1 + x = 12 \qquad 5 + y = -2$
$x = 11 \qquad y = -7$ (2)
$\therefore P$ is $(11, -7)$

⑬ $x + y = 2 \quad \ldots ①$
$2x - y = -5 \quad \ldots ②$
① + ② $3x = -3$
$x = -1$
subs in ① $-1 + y = 2$
$y = 3$ 2
$\therefore$ intersection at $(-1,3)$
NOW subs into $5x + 2y = 1$ (3)
$5(-1) + 2(3) = -5 + 6 = 1$
$\therefore$ lines are concurrent

⑭ $3x - 4y = 3$
$4y = 3x - 3$
$y = \frac{3}{4}x - \frac{3}{4} \quad \therefore m_1 = \frac{3}{4}$ 1

$x - 2y = 11$
$2y = x - 11$
$y = \frac{1}{2}x - \frac{11}{2} \quad \therefore m_2 = \frac{1}{2}$ 1

$\therefore \tan\theta = \left|\frac{\frac{3}{4} - \frac{1}{2}}{1 + \frac{3}{4}\cdot\frac{1}{2}}\right| = \left|\frac{\frac{1}{4}}{11/8}\right| = \frac{2}{11}$ (3)

$\theta \quad 10°18'$

(15) (a) $\left(\frac{2(4)+1(-5)}{2+1}, \frac{2(-3)+1(6)}{2+1}\right) = (1, 0)$

(b) $\left[\frac{3(-2)-2(-5)}{3-2}, \frac{3(3)-2(6)}{3-2}\right] = (4, -3)$ (2)

(16) (a) grad $PR = \frac{0-4}{1+1} = \frac{-4}{2} = -2$

grad $QS = \frac{-1-5}{-8-6} = \frac{-6}{-12} = \frac{1}{2}$

$\therefore PR \perp QS$ 2

(b) Mid point $PR = \left(\frac{-1+1}{2}, \frac{4+0}{2}\right) = (0, 2)$ 2

midpoint $QS = \left(\frac{6-6}{2}, \frac{5-1}{2}\right) = (0, 2)$

(c) $PR = \sqrt{(-1-1)^2 + (4-0)^2} = \sqrt{4+16} = 2\sqrt{5}$ units

$QS = \sqrt{(6+6)^2 + (5+1)^2} = \sqrt{144+36} = 6\sqrt{5}$ units 2

(d) $A = \frac{1}{2} \times 2\sqrt{5} \times 6\sqrt{5} = 30 \text{ units}^2$ 1 (7)