

(1)[3 points] Find the equation of the line through $(-1, -2)$ and $(4, 3)$.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-2 - 3}{-1 - 4} = \frac{-5}{-5} = 1$$

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

$$y - 3 = 1(x - 4)$$

$$\equiv y = x - 1$$

(2)[4 points] Find the equation of the line through $(-1, -2)$ which is perpendicular to the line $2x + 5y + 8 = 0$.

$$2x + 5y + 8 = 0$$

$$y = -\frac{2}{5}x - \frac{8}{5}, \text{ slope } -\frac{2}{5}.$$

$$\therefore m = \frac{-1}{(-\frac{2}{5})} = \frac{5}{2}$$

$$\therefore y - (-2) = \frac{5}{2}(x - (-1))$$

$$y + 2 = \frac{5}{2}(x + 1)$$

(3)[4 points] Put the following equation of a circle into standard form and state the centre and radius:

$$x^2 + y^2 - 4x + 10y + 13 = 0.$$

$$x^2 - 4x + y^2 + 10y + 13 = 0$$

$$(x-2)^2 - 4 + (y+5)^2 - 25 + 13 = 0$$

$$(x-2)^2 + (y+5)^2 = 16$$

∴ centre (2, -5)

$$\text{radius } r = \sqrt{16} = 4$$

(4)[4 points] Find the x and y intercepts of the graph of $f(x) = \frac{3}{2}\sqrt{4-x^2}$. (Do not graph.)

x intercepts: solve $f(x) = 0$

$$\frac{3}{2}\sqrt{4-x^2} = 0$$

$$\therefore 4 - x^2 = 0$$

$$(2-x)(2+x) = 0$$

$$x = 2, -2$$

$$\therefore (2, 0), (-2, 0)$$

y -intercepts:

$$y = f(0) = \frac{3}{2}\sqrt{4-0^2} = 3$$

$$\therefore (0, 3).$$