(1) [4] Determine the break-even point if $C = 10x + 600$ and $R = 30x$.

Solve $C = R$

$10x + 600 = 30x$

$20x = 600$

$x = 30$

$\therefore R = 30x = 30(30) = 900$

$\therefore$ Break even point is $(30, 900)$.

(2) [4] Solve the following system of equations or say that it is inconsistent:

$$\left.\begin{array}{ll} ① & 2x + y = 1 \\ ② & 4x + 2y = 3 \end{array}\right\}$$

new ① = -2(old ①) :

$$\begin{array}{ll} ① & -4x - 2y = -2 \\ ② & 4x + 2y = 3 \end{array}$$

new ② = old ① + old ② :

$$\left.\begin{array}{ll} ① & -4x - 2y = -2 \\ ② & 0x + 0y = 1 \end{array}\right\}$$ system is inconsistent: no solution.

(3) [7] For a certain commodity the supply equation is

$$S = 2p + 5$$

At a price of \$1 there is a demand for 19 units of the commodity. Find the demand equation if the demand equation is linear and the market price is \$3 .

When $p = 1$, $D = 19$, so $(1, 19)$ is a point on demand line.

When $p = 3$, $S = 2(3) + 5 = 11$, so $(3, 11)$ is a point on supply line. Since $p = 3$ is the market price, $(3, 11)$ is also on the demand line.

∴ Demand equation is line through $(1, 19)$ and $(3, 11)$:

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{19 - 11}{1 - 3} = \frac{8}{-2} = -4$$

∴

$$D - 19 = -4(p - 1)$$

$$D - 19 = -4p + 4$$

$$\boxed{D = -4p + 23}$$