Write an equation given two points

Recall, slope formula $m = \frac{y_2 - y_1}{x_2 - x_1}$ and slope-point form $y - y_1 = m(x - x_1)$

Write an equation that goes through:

ex 1) $(-4, 1)$ and $(-2, 2)$ in slope-intercept form.

$x_1\ y_1 \qquad x_2\ y_2$

Step 1: Find m using 2 points

$$m = \frac{2-1}{-2-(-4)} = \frac{1}{2}$$

Step 2: Plug into point-slope form with m and 1 point

$$y - 1 = \frac{1}{2}(x + 4)$$

Step 3: Simplify your equation into y = mx + b form

$$y - 1 = \frac{1}{2}x + 2 \qquad y - 2 = \frac{1}{2}(x+2)$$
$$y = \frac{1}{2}x + 2 + 1 \qquad y - 2 = \frac{1}{2}x + 1$$
$$y = \frac{1}{2}x + 3 \quad \text{or} \quad y = \frac{1}{2}x + 3$$

ex 2) (2, 2) and (6, 8) in slope-intercept form.

$x_1\ y_1 \qquad x_2\ y_2$

$$m = \frac{8-2}{6-2}$$
$$m = \frac{6}{4}$$
$$m = \frac{3}{2}$$

$$y - 2 = \frac{3}{2}(x-2)$$
$$y - 2 = \frac{3}{2}x - 3$$
$$y = \frac{3}{2}x - 1$$

ex 3) (-4, -2) and (4, 7) in general form.

$x_2\ y_2 \qquad x_1\ y_1$

$$m = \frac{-2-7}{-4-4}$$
$$= \frac{-9}{-8}$$
$$= \frac{9}{8}$$

$$y - 7 = \frac{9}{8}(x-4)$$
$$(8)\,y - (8)7 = \frac{9}{8}x(8) - 36\frac{(8)}{8}$$
$$8y - 56 = 9x - 36$$
$$0 = 9x - 8y + 20$$