HW: 6G #2df, 3bc 6H #1bd, 2a, 3ce, 4, 8

6G 2d.) $y = -(x-1)(x-2)$ (0, -2)

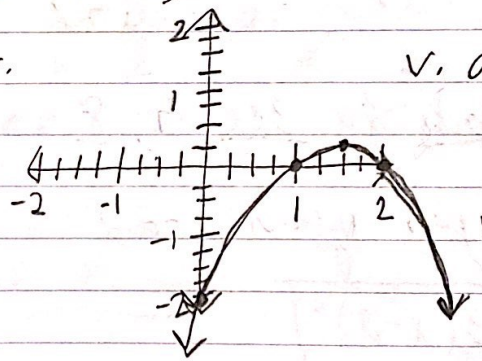
i. $X = \{1, 2\}$

ii. $X = \frac{3}{2}$ $\frac{1+2}{2} = \frac{3}{2}$

iii. $y = -\left(\frac{3}{2}-1\right)\left(\frac{3}{2}-2\right)$

$= -\left(\frac{1}{2}\right)\left(\frac{-1}{2}\right) = \frac{1}{4}$ $\therefore \left(\frac{3}{2}, \frac{1}{4}\right)$

iv.



v. domain $\{x \mid x \in \mathbb{R}\}$

range $\{y \mid y \leq \frac{1}{4}\}$

2f.) $y = -3x^2 + 4x - 1$ $\boxed{(0, -1)}$

i. $(-3x^2 + 3x) + (x - 1) = 0$

$-3x(x-1) + 1(x-1) = 0$

$(-3x+1)(x-1) = 0$

$\boxed{x = \frac{1}{3}}$ $\boxed{x = 1}$

ii. $\frac{-b}{2a} = \frac{-(4)}{2(-3)} = \frac{-4}{-6} = \frac{2}{3}$

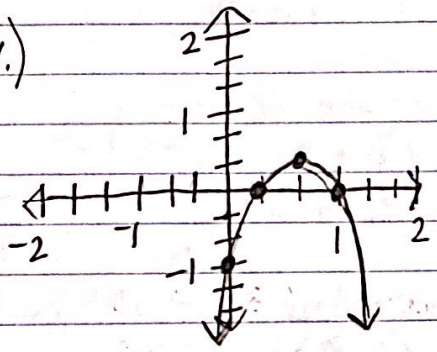
$\therefore \boxed{x = \frac{2}{3}}$

iii. $-3\left(\frac{2}{3}\right)^2 + 4\left(\frac{2}{3}\right) - 1$

$-3\left(\frac{4}{9}\right) + \frac{8}{3} - 1 \Rightarrow \frac{-4}{3} + \frac{8}{3} - \frac{3}{3}$

$= \frac{1}{3}$ $\therefore \boxed{\left(\frac{2}{3}, \frac{1}{3}\right)}$

iv.)



v. domain $\{x \mid x \in R\}$

range $\{y \mid y \leq \frac{1}{3}\}$

3b. $y = -x^2 - 10x + 4$ $\frac{-b}{2a} = \frac{-(-10)}{2(-1)} = \frac{10}{-2} = -5$

$-(-5)^2 - 10(-5) + 4$

$-25 + 50 + 4 = \boxed{29}$

3c.) $y = 3x^2 + 3x - 2$ $\frac{-b}{2a} = \frac{-(3)}{2(3)} = \frac{-3}{6} = \frac{-1}{2}$

$3\left(\frac{-1}{2}\right)^2 + 3\left(\frac{-1}{2}\right) - 2 \Rightarrow 3\left(\frac{1}{4}\right) - \frac{3}{2} - 2 \Rightarrow \frac{3}{4} - \frac{6}{4} - \frac{8}{4} \Rightarrow \boxed{\frac{-11}{4}}$