ALGEBRA HW ① SOLUTIONS

①

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

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

②

$$x^2-6x+t = x^2+2kx+k^2$$

$$\therefore -6 = 2k \qquad t = k^2$$

$$\boxed{k=-3} \qquad \therefore \boxed{t=9}$$

③

$$\sqrt{b^2-4ac} = \sqrt{(-4p-1)^2-4(1)(2p)}$$

$$= \sqrt{16p^2+8p+1-8p} = \sqrt{16p^2+1} > 0$$

$\therefore$ Real roots

④

$x-2$ factor $\Rightarrow x=2$ not

$$\therefore 2^3+5(2^2)+c(2)+d=0 \Rightarrow 8+45+2c+d=0 \quad ①$$

And

$x+1$ factor $\Rightarrow x=-1$ not

$$\therefore (-1)^3+5(-1)^2+c(-1)+d=0 \Rightarrow -1+5-c+d=0 \quad ②$$

① − ②

$$\Rightarrow 9+3b+3c=0$$

$$\therefore 3c=-3b-9$$

$$\therefore \boxed{c=-b-3}$$

Sub in ②

$$-1+b-(-b-3)+d=0$$

$$\therefore -1+2b+3+d=0$$

$$\therefore \boxed{d=-2b-2}$$