Handout 3

③ $\sqrt{3t+4} + t = 8$

$\sqrt{3t+4} = 8 - t$

$3t+4 = (8-t)^2$

$3t+4 = t^2 - 16t + 64$

$t^2 - 19t + 60 = 0$

$(t-15)(t-4)$

$t = 15, 4$

$\sqrt{3(15)+4} + (15) = 8$ $\quad$ $\sqrt{3(4)+4} + (4) = 8$

$\sqrt{45+4} + 15 = 8$ $\quad$ $\sqrt{12+4} + 4 = 8$

$\sqrt{49} + 15 = 8$ $\quad$ $\sqrt{16} + 4 = 8$

$7 + 15 = 8$ $\quad$ $4 + 4 = 8$

$t \neq 15$ $\quad$ $\boxed{t = 4}$

④ $\sqrt[3]{q^2+2q} - 2 = 0$

$\sqrt[3]{q^2+2q} = 2$

$q^2+2q = 8$

$q^2+2q-8 = 0$

$(q-2)(q+4)$

$q = 2, -4$

$\sqrt[3]{(2)^2+2(2)} - 2 = 0$ $\quad$ $\sqrt[3]{(-4)^2+2(-4)} - 2 = 0$

$\sqrt[3]{4+4} - 2 = 0$ $\quad$ $\sqrt[3]{16-8} - 2 = 0$

$\sqrt[3]{8} - 2 = 0$ $\quad$ $\sqrt[3]{8} - 2 = 0$

$2 - 2 = 0$ $\quad$ $2 - 2 = 0$

$q = 2$ $\quad$ $q = -4$

$\boxed{q = 2, -4}$

(5) $\frac{6p-12}{p+3} + \frac{5}{p-2} = 6$

$(6p-12)(p-2) + 5(p+3) = 6(p+3)(p-2)$

$6p^2 - 12p - 12p + 24 + 5p + 15 = 6(p^2 + 3p - 2p - 6)$

$6p^2 - 24p + 39 + 5p = 6p^2 + 18p - 12p - 36$

$6p^2 - 19p + 39 = 6p^2 + 6p - 36$

$0 = 6p^2 + 25p - 75$

$25p = 75$

$p = 3$

(6) $\frac{1}{y^2+3y+2} + \frac{1}{y+2} = \frac{2}{y^2-1}$

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

$1(y-1) + 1(y+1)(y-1) = 2(y+2)$

$y - 1 + y^2 - 1y + 1y - 1 = 2y + 4$

$y^2 - 1 + y - 1 = 2y + 4$

$y^2 + y - 2 = 2y + 4$

$y^2 - y - 6 = 0$

$(y-3)(y+2) = 0$

$y = 3, -2$

$\boxed{y = 3}$