1. $a = 2,\ b = 2+h,\ c = 2$

$(2+h)^2 - 4(2)(2) = 0$

$(2+h)(2+h) - 16 = 0$

$4 + 4h + h^2 - 16 = 0$

$h^2 + 4h - 12 = 0$

$(h+6)(h-2) = 0$

$h = -6, 2$

2. $(\sqrt{x-2})^2 = (8-x)^2$

$x - 2 = (8-x)(8-x)$

$x - 2 = 64 - 16x + x^2$

$x^2 - 17x + 66 = 0$

$(x-11)(x-6) = 0$

$x = 11, 6$

3. $\sqrt{2x+3} - \sqrt{x+2} = 2$

$(\sqrt{2x+3})^2 = (2 + \sqrt{x+2})^2$

$2x+3 = (2+\sqrt{x+2})(2+\sqrt{x+2})$

$2x+3 = 4 + 4\sqrt{x+2} + x+2$

$(x-3)^2 = (4\sqrt{x+2})^2$

$(x-3)(x-3) = 16(x+2)$

$x^2 - 6x + 9 = 16x + 32$

$x^2 - 22x - 23 = 0$

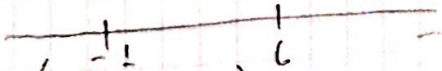
$(x-23)(x+1) = 0$

$x = 23, -1$

4. $|x-6| = |2x+1| - 3$

$x - 6 \geq 0$ $\quad 2x+1 \geq 0$

$x \geq 6$ $\quad x \geq -\frac{1}{2}$



$-(x-6) = -(2x+1) - 3$

$-x + 6 = -2x - 1 - 3$

$-x + 6 = -2x - 4$

$x = -10$ ✓

$-(x-6) = 2x+1-3$

$-x + 6 = 2x - 2$

$3x = 8$

$x = \frac{8}{3}$ ✓

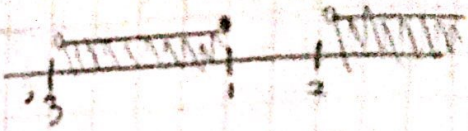
$x - 6 = 2x + 1 - 3$

$x - 6 = 2x - 2$

$x = -4$ ×

$x = -10, \frac{8}{3}$

5. $\frac{x-1}{(x-2)(x+3)} \geq 0$



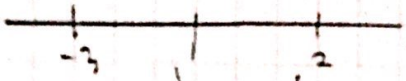
$(-3, 1] \cup (2, \infty)$

$\frac{x-1}{x^2+x-6} \geq 0$

$x-1=0$ $\quad$ $x^2+x-6=0$

$x=1$ $\quad$ $(x-2)(x+3)=0$

$x=2, -3$



$\frac{-2-1}{(-2-2)(-2+3)} \geq 0$

$\frac{-1}{(-2)(3)} \geq 0$

$\frac{1.5-1}{(1.5-2)(1.5+3)} \geq 0$

$\frac{3-1}{(3-2)(3+3)} \geq 0$

6. $\left|\frac{1}{2}x-6\right| < 4$

$= -4 < \frac{1}{2}x - 6 < 4$

$= 2 < \frac{1}{2}x < 10$

$= 4 < x < 20$

$= (4, 20)$

7. $\left|\frac{1}{2}x-6\right| > 4$

$\frac{1}{2}x-6 > 4$ $\quad$ or $\quad$ $\frac{1}{2}x-6 < -4$

$\frac{1}{2}x > 10$ $\quad$ $\frac{1}{2}x < 2$

$x > 20$ $\quad$ $x < 4$

$= (-\infty, 4) \cup (20, \infty)$