

a) -1 solution

b) = 2 solution ±

3) ~~2 or 1?~~

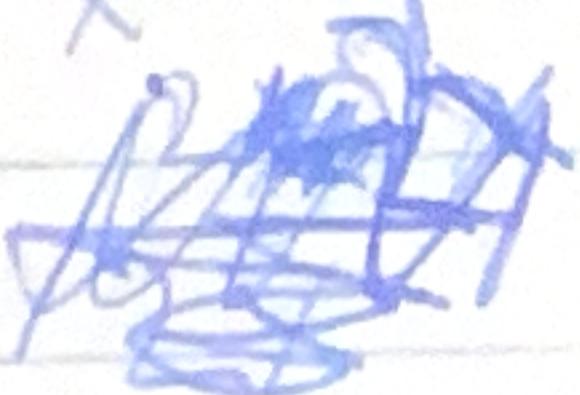
2) injective

3) surjective

4) ②

5) $f(x) = \frac{1}{x+2} \quad |x \neq -2| \quad g = f^{-1}$

$$g(x) = \frac{1}{x} - 2 \quad x \neq 0$$



$$\frac{1-2x}{2x}$$

$$g(f(x)) = \frac{1}{\left(\frac{1}{x+2}\right) - 2}$$

$$= x + 2 - 2$$

$$\cancel{x}$$

$$\frac{f(g(x))}{f(g(x))} = \frac{1}{\frac{1}{x+2} - 2}$$

$$\textcircled{7}$$

6) $F(x) = 2 + \sqrt{x-4}$

 $y-2 = \sqrt{x-4} \quad \text{- undef}$

$$(y-2)^2 = x-4$$

$$x = (y-2)^2 + 4$$

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

7) $C = \frac{5}{3}(F - 32)$

 $F - 32 = \frac{9}{5}C$

$$F = \frac{9}{5}C + 32$$

$$F = h^{-1}(C) = \frac{9}{5}C + 32$$

8) $g(x) = 2\sqrt{x-4}$

$$x-4 \geq 0 \quad x \geq 4$$

W: $[4, +\infty)$

9) $f(x) = -2x^2 + 4x - 9$

$$2x^2 - 4x + 9 = 0$$

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

$$x^2 - 2x + 4.5 = 0$$

$$x = \frac{2 \pm \sqrt{14}}{2} = 1 \pm \sqrt{\frac{14}{2}}$$

$$x_{1,2} = \frac{-4 \pm \sqrt{14}}{2(-2)}$$

10) $F(x) = \frac{x-4}{x^2 - 2x - 15}$

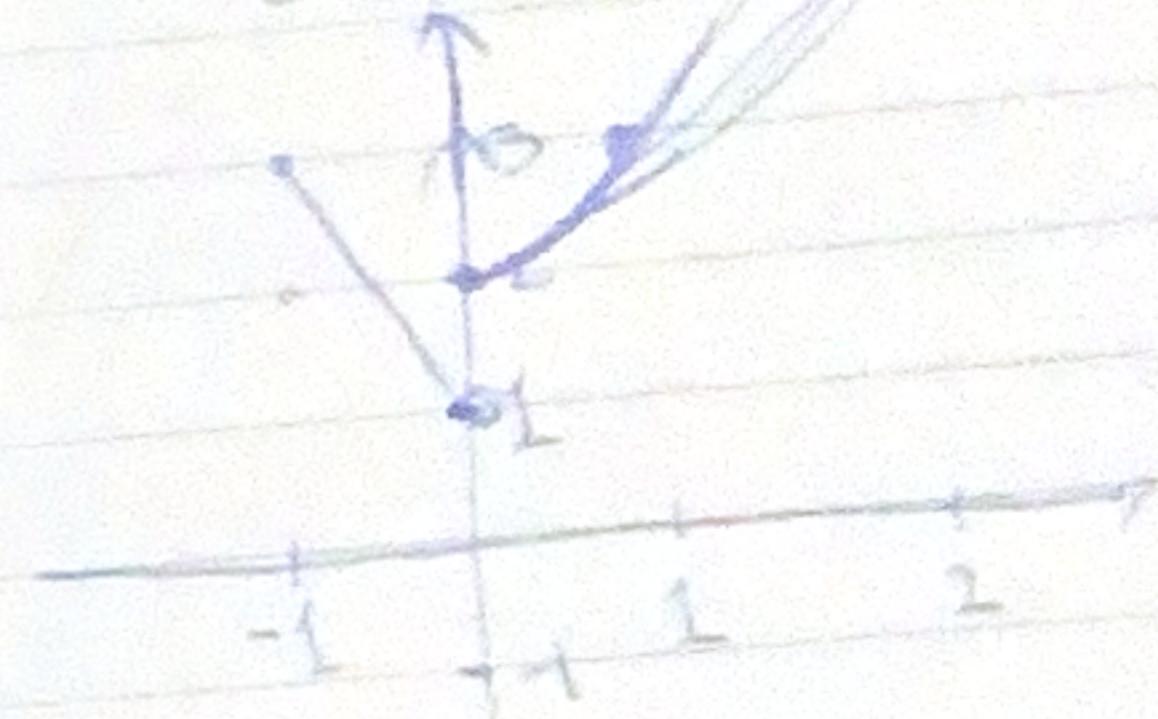
~~8) $x=4$ (o point)~~

$$x^2 - 2x - 15 = 0$$

$$(x-5)(x+3) \quad x \neq 5, x \neq -3$$

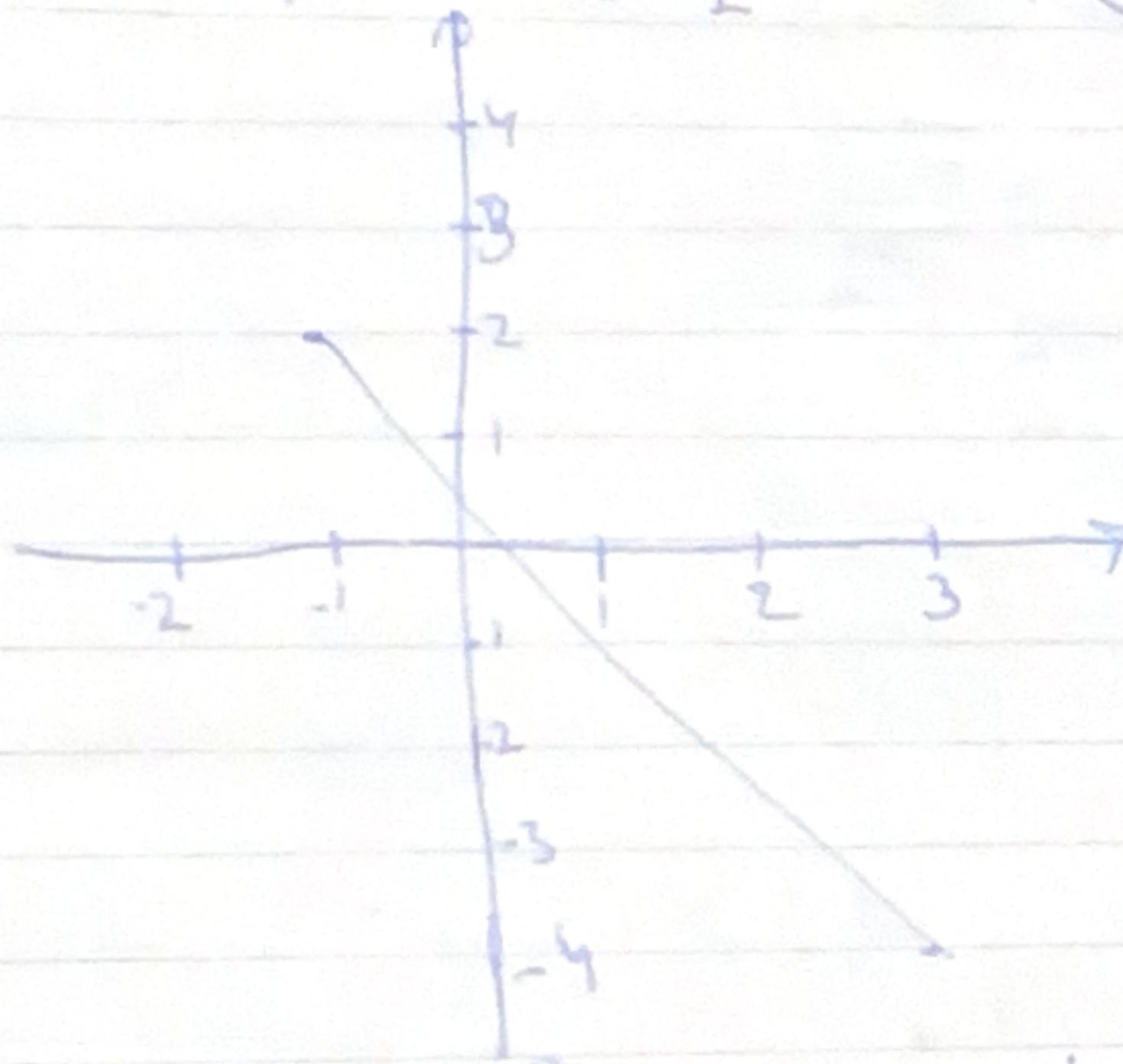
$$x^2 + 3x - 5x - 15 \neq 0$$

11) $f(x) = \begin{cases} -2x+1 & x < 2 \\ x^2-2 & x \geq 2 \end{cases}$

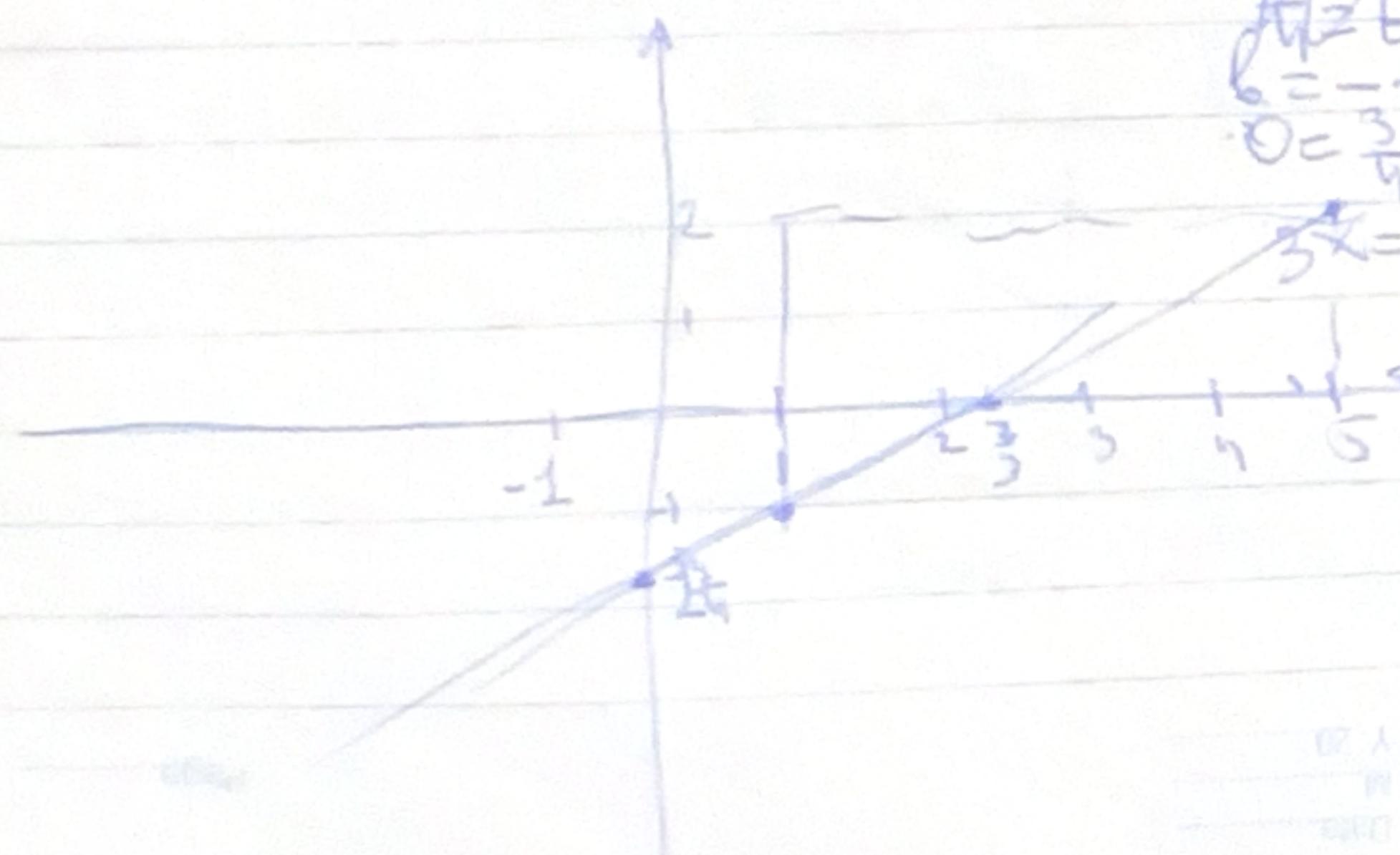


$$12) (-1, 2) \quad (3, -4)$$

$$\text{slope} = \frac{\Delta y}{\Delta x} = \frac{-4-2}{3+1} = -\frac{6}{4} = -1.5$$



$$13) (1, -1) \quad \text{slope} = \frac{3}{4}$$



$$y = mx + b$$

$$\cancel{y = mx + b} = \cancel{y = mx}$$

$$6 = -\frac{3}{4}x - \frac{3}{4} = -\frac{3}{4}$$

$$0 = \frac{3}{4}x - \frac{3}{4}$$

$$3x = 7 \quad x = \frac{7}{3}$$

$$14) g(t) \quad [-1, 2]$$

$$g(t) \text{ for } x=0, y=1 \\ y=0, x=1$$

(14)

$$[-1, 2] \quad y = \cancel{x^2}$$

$$(1, 4) \quad (2, 1)$$

$$=\frac{-1+1}{2+2} = 0$$

$$15) f(x) = x^2 - \frac{1}{x} \quad [2, 43]$$

$$(2, 3, 5) \quad (4, 15, 35)$$

$$\frac{15-3}{4-2} = \frac{12}{2} = 6$$

(15) 6, 125

~~$$\frac{f(4)-f(2)}{4-2} = \frac{15-3}{4-2} = 6$$~~

$$16) f(t) = t^2 + 2, \quad g(t) = 3t + 2 \quad f(g(t))$$

$$f(g(t)) = 5(5-4) = 20$$

$$(f \cdot g)(x), \quad f(x) = 1, \quad g(x) = 5x - 2$$

$$(f \cdot g)(x) = \frac{20}{(x-1)(5x-2)}$$

$$(-\infty, 1) \cup (\frac{2}{5}, 1) \cup (1, +\infty)$$

(16)

$$17) (g-f)(x), \left(\frac{g}{f}\right)(x)$$

$f(x) = x-1$, linear

$g(x) = x^2 - 1$ - parabola (square)

$$x^2 - 1 = x+1$$

$$x^2 - x = 0$$

$$x^2 - x = x(x-1)$$

$$D(-\infty, +\infty)$$

$$18) (1, 2), (2, 3), (5, 4)$$

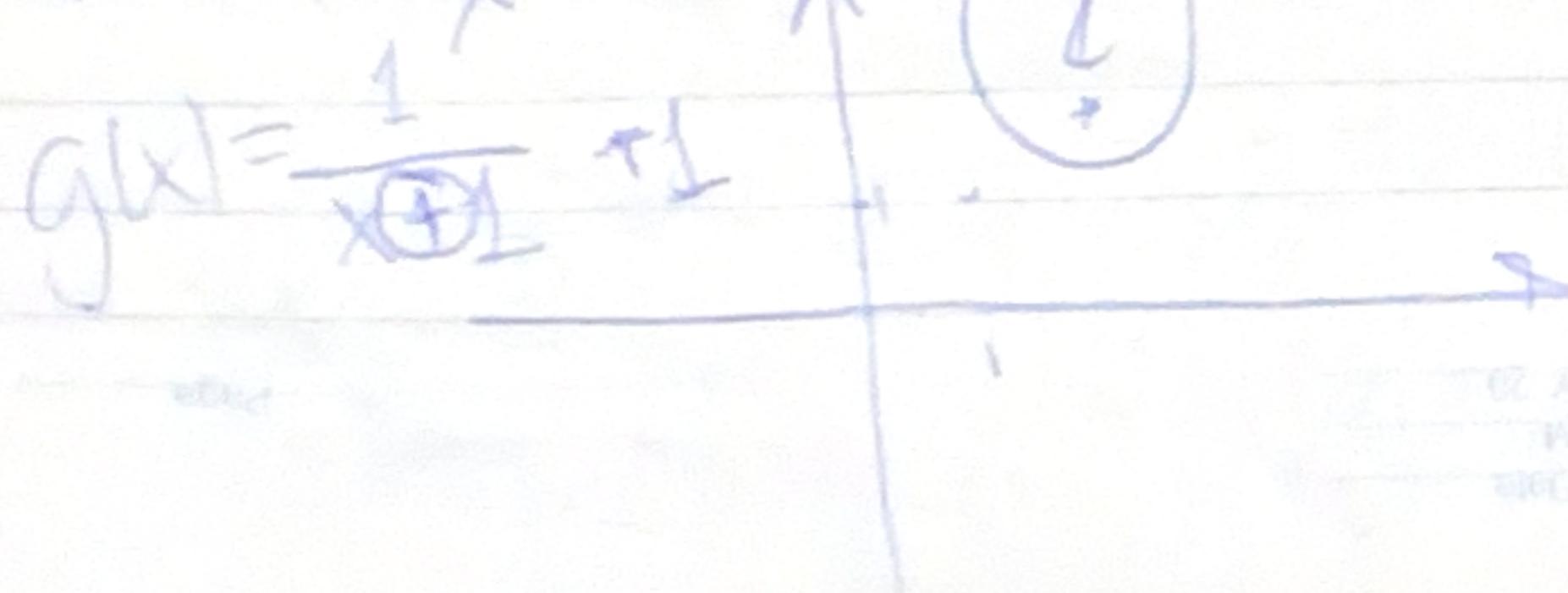
$$f(x) = 1+x^2$$

$$h(x) = f(x-1) + 2$$

$$h(x) = (x-1)^2 + 2$$

$$D(L, L; +\infty), R[2, +\infty)$$

$$19) f(x) = \frac{1}{x}$$



$$\frac{x^2-1}{x-1} \neq 0 \Rightarrow x \neq 1$$

$$x \neq 1, x \neq -1$$

$$x^2 - 1 = 0$$

$$D(-\infty, 1) \cup (1, \infty)$$

$$20) f(x) = x^3 + 2x = x(x^2 + 2)$$

$$f(x) = -x^3 + 2(-x) = -x^3 - 2x$$

$$-f(-x) = -(-x^3 - 2x) = x^3 + 2x$$

$$-f(-x) = f(x)$$

$$21) f(x) = s^4 + 3s^2 - 7$$

$$-f(-x) = -(s^4 + 3s^2 - 7) = -s^4 - 3s^2 + 7$$

$$+f(-x) = +s^4 + 3s^2 - 7$$

$$f(x) \neq -f(-x)$$

$$22) y - y_1 = m(x - x_1)$$

$$m = \frac{y-y_1}{x-x_1} = \frac{7-1}{3-2} = 6$$

$$y = mx + b \rightarrow 1 = 5 \cdot 2 + b \rightarrow b = -9$$

$$y = 2x - 9$$

$$23) m = \frac{4+2}{6-3} = \frac{6}{3} = 2 \quad \text{increase}$$

$$24) \max(2, 6, 12, 16)$$

$$\min = 2, 6$$

$$25) \max(-25, 8) \quad \text{loc } (-2)$$

$$\min(25, -8) \quad \text{loc } (-1-2)$$

$$26) f(x) = 2x + 3, h(x) = \dots, g(x) = \frac{1}{2}x - 4, j(x) = 2x - 6$$

parallel

?

$$27) \begin{cases} x+y=7 \\ x-2y=6 \end{cases}$$

$$\begin{cases} y=7-x \\ x-14+4x=6 \end{cases}$$

$$\begin{cases} y=7-2x \\ x=4 \end{cases}$$

$$\begin{cases} y=-1 \\ x=4 \end{cases}$$

$$\begin{cases} y=-1 \\ x=4 \end{cases}$$

$$28) f(x)=2x^2-6x+7$$

$$a=2, b=-6, c=7$$

$$\frac{6}{4} = 1.5 = h$$

$$29) f\left(\frac{3}{2}\right) = 2\left(\frac{3}{2}\right)^2 - 6\left(\frac{3}{2}\right) + 7 =$$

$$k =$$

$$2\left(\frac{9}{4}\right) - 9 + 7 =$$

$$\frac{9}{2} - \frac{9}{2} = \frac{5}{2}$$

$$f(x) = 2\left(x - \frac{3}{2}\right)^2 + \frac{5}{2}$$

$$30) f(x) = -5x^2 + 9x - 1; a = -5, b = 9, c = -1$$

$$h = \frac{-9}{-10} = 0.9$$

$$k = f\left(\frac{9}{10}\right) = -5\left(\frac{9}{10}\right)^2 + \frac{9 \cdot 9}{10} - 1 =$$

$$= -\frac{(0.1 \cdot 81)}{100} + \frac{810}{100} - \frac{100}{100} = \frac{505}{100} +$$

$$5\left(-2, \frac{505}{100}\right)$$

$$28) \begin{cases} 4x+2y=4 \\ 6x-y=8 \end{cases}$$

$$\begin{cases} 4x+2y=4 \\ 6x-y=8 \end{cases}$$

$$31) f(x) = 3x^2 + 5x - 2$$

$$f(0) = 2$$

$$0 = 3x^2 + 5x - 2$$

$$x_{1,2} = \frac{-5 \pm \sqrt{25-24}}{6} = \frac{-5 \pm 1}{6} \Rightarrow \begin{cases} x_1 = -1 \\ x_2 = \frac{1}{3} \end{cases}$$

$$\Delta = \sqrt{b^2 - 4ac} = \sqrt{25 - 4 \cdot 3 \cdot 2} = \sqrt{9} = 3$$

$$x_{1,2} = \frac{-b \pm \sqrt{\Delta}}{2a}$$

$$\textcircled{a} \left(\frac{1}{3}, 0\right), (-2, 0)$$

$$32) a) -1 \leq 2x-5 \leq 7$$

$$\begin{cases} 4 \leq 2x \leq 12 \\ (2, 6) \end{cases}$$

$$b) x^2 + 7x + 10 \leq 0$$

$$(x+2)(x+5) \leq 0$$

$$x < -2 \quad x > -5$$

$$(-5, -2)$$

$$-5 \leq x \leq -2 \quad \textcircled{b}$$

$$c) -6 \leq x - 2 \leq 1$$

$$-4 \leq x \leq 6$$

$$(-4, 6)$$

$$33) 10 \cdot (2y+1) \leq -4(3y+2) - 3$$

$$9 \cdot 2y \leq -12y - 11$$

$$10y \leq -20$$

$$y \leq -2 \quad D(-\infty, -2]$$

$$34) (x+3)(x-4) \leq 0$$

$$x < 0 \quad (x+3) \leq 0, \quad (x-4) \leq 0$$

$$X: (0, 4)$$

$$35) 2x^4 \geq 3x^3 + 9x^2$$

$$2x^4 - 3x^3 - 9x^2 \geq 0$$

$$x^2(2x^2 - 3x - 9) \geq 0 \quad x \geq 0, \quad (-\infty, +\infty)$$

$$2x^2 - 3x - 9 \geq 0$$

$$(2x+3)(x-3) \geq 0$$

$$\begin{array}{c} -1 \quad 3 \\ \hline -2 \quad 3 \\ \hline 3 \end{array} \quad x > -\frac{3}{2}$$

$$(-\infty, -\frac{3}{2}] \cup [3, +\infty)$$

$$36) f(x) = \frac{1}{2} |4x-5| - 3$$

$$-\frac{1}{2} |4x-5| < -3$$

$$|4x-5| > +6$$

$$-6 > 4x-5 > 6$$

$$-1 > 4x > 11$$

$$-\frac{1}{4} > x > \frac{11}{4}$$

$$(-\frac{1}{4}, \frac{11}{4})$$

$$57) 13-2 \quad |4x+1| \leq 3$$

$$-2 \quad |4x-7| \leq -10$$

$$|4x-7| \geq 5$$

$$5 \leq 4x-7 \leq 5$$

$$2 \leq 4x \leq 12$$

$$0.5 \leq x \leq 3$$

$$[-\infty, 0.5] \cup [3, +\infty)$$