DEC 16, 2018. MATH 1375

FINAL EXAM REVIEW SHEET:

QUESTION 1:

a) $x^2 - 2x - 3 \geq 0$

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

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

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

$x = 3$, $x = -1$

$\Rightarrow$ If $x = -2$

$(-2)^2 - 2(-2) - 3 \geq 0$

$4 + 4 - 3 \geq 0$

$\boxed{5 \geq 0}$ ✓

$\Rightarrow$ If $x = 0$

$(0)^2 - 2(0) - 3 \geq 0$

$\boxed{-3 \geq 0}$ X

$\Rightarrow$ If $x = 4$

$(4)^2 - 2(4) - 3 \geq 0$

$16 - 8 - 3 \geq 0$

$s \geq 0$ ✓

$(-\infty, -1] \cup [3, \infty)$ Answer.

(b) $6x - 2x^2 \geq 0$

$x(6 - 2x) = 0$

$x = 0, \quad 6 - 2x = 0$

$x = 0, \quad -2x = -6$

$x = 0, \quad x = \frac{-6}{-2}$

$x = 0, \quad x = 3$

⇒ If $x = -1$, $6(-1) - 2(-1)^2 \geq 0$

$-8 \geq 0$ ✗

⇒ If $x = 1$, $6(1) - 2(1)^2 \geq 0$

$4 \geq 0$ ✓

⇒ If $x = 4$, $6(4) - 2(4)^2 \geq 0$

$-8 \geq 0$ ✗

$[0, 3]$ Ans

(c) $x^2 + x \geq 0$

$x(x + 1) = 0$

$x = 0, \quad x = -1$

⇒ If $x = -2$, $(-2)^2 + (-2) \geq 0$

$2 \geq 0$ ✓

⇒ If $x = -0.5$, $(-0.5)^2 + (-0.5) \geq 0$

$-0.25 \geq 0$ ✗

⇒ If $x = 1$, $(1)^2 + 1 \geq 0$

$2 \geq 0$ ✓

$\boxed{(-\infty, -1) \cup (0, \infty)}$ Ans.

x ~~~~ x ~~~~ x

(d) $\dfrac{x+3}{x-4} \leq 0$

$\dfrac{x+3}{x-4} = 0$

$x+3 = (0)(x-4)$

$x+3 = 0$

$x = -3$

V.A.:

$x-4 = 0$

$x = 4$

Not included in the domain.

$\Rightarrow$ If $x = -4$

$$\frac{-4+3}{-4-4} \leq 0$$

$$\frac{+1}{+8} \leq 0$$

$$\boxed{\frac{1}{8} \leq 0} \times$$

$\Rightarrow$ If $x = 0$

$$\frac{0+3}{0-4} \leq 0$$

$$\boxed{\frac{3}{-4} \leq 0} \checkmark$$

$\Rightarrow$ If $x = 5$

$$\frac{5+3}{5-4} \leq 0$$

$$\frac{8}{1} \leq 0$$

$$\boxed{8 < 0} \times$$

$[-3, 4)$ Ans

(k) QUESTION 2 :

(a) $|3x - 2| < 4$

$3x - 2 = 4$, $3x - 2 = -4$

$3x = 4 + 2$, $3x = -4 + 2$

$\frac{3x}{3} = \frac{6}{3}$, $\frac{3x}{3} = \frac{-2}{3}$

$x = 2$, $x = -\frac{2}{3}$

$\frac{6}{-9} = -0.6$

$\Rightarrow$ Let $x = -2$

$|3(-2) - 2| < 4$

$|-6 - 2| < 4$

$|-8| < 4$

$8 < 4$ X

$\Rightarrow$ If $x = 1$

$|3(1) - 2| < 4$

$|3 - 2| < 4$

$\boxed{1 < 4}$ ✓

$\Rightarrow$ If $x = 3$

$|3(3) - 2| < 4$

$|9 - 2| < 4$

$\boxed{7 < 4}$ ✗

$\boxed{\left(-\frac{2}{3}, 2\right)}$ Ans

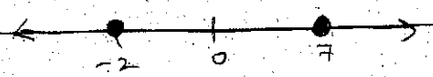
(b) $|5 - 2x| \geq 9$

$5 - 2x = 9$, $5 - 2x = -9$

$-2x = 9 - 5$, $-2x = -9 - 5$

$\frac{-2x}{-2} = \frac{4}{-2}$, $\frac{-2x}{-2} = \frac{-14}{-2}$

$x = -2$, $x = 7$



⇒ If $u = -3$

$|5 - 2(-3)| \geq 9$

$|5 + 6| \geq 9$

$\boxed{11 \geq 9}$ ✓

⇒ If $u = 0$

$|5 - 2(0)| \geq 9$

$\boxed{5 \geq 9}$ ×

⇒ If $u = 8$

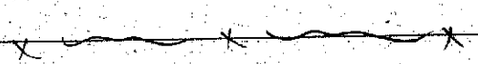
$|5 - 2(8)| \geq 9$

$|5 - 16| \geq 9$

$|-11| \geq 9$

$\boxed{11 \geq 9}$ ✓

$\boxed{(-\infty, -2] \cup [7, \infty)}$ Ans.



(*) QUESTION 3:

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

Domain:

$x + 2 \neq 0$

$x \neq -2$

$\boxed{(-\infty, -2) \cup (-2, \infty)}$

y-intercept:

If $x = 0$

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

$y = \frac{1}{2}$

$\boxed{(0, 1/2)}$

x-intercept:

If $y = 0$

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

$(0)(x+2) = 1-x$

$1 - x = 0$

$-x = -1$

$x = 1$

$\boxed{(1, 0)}$

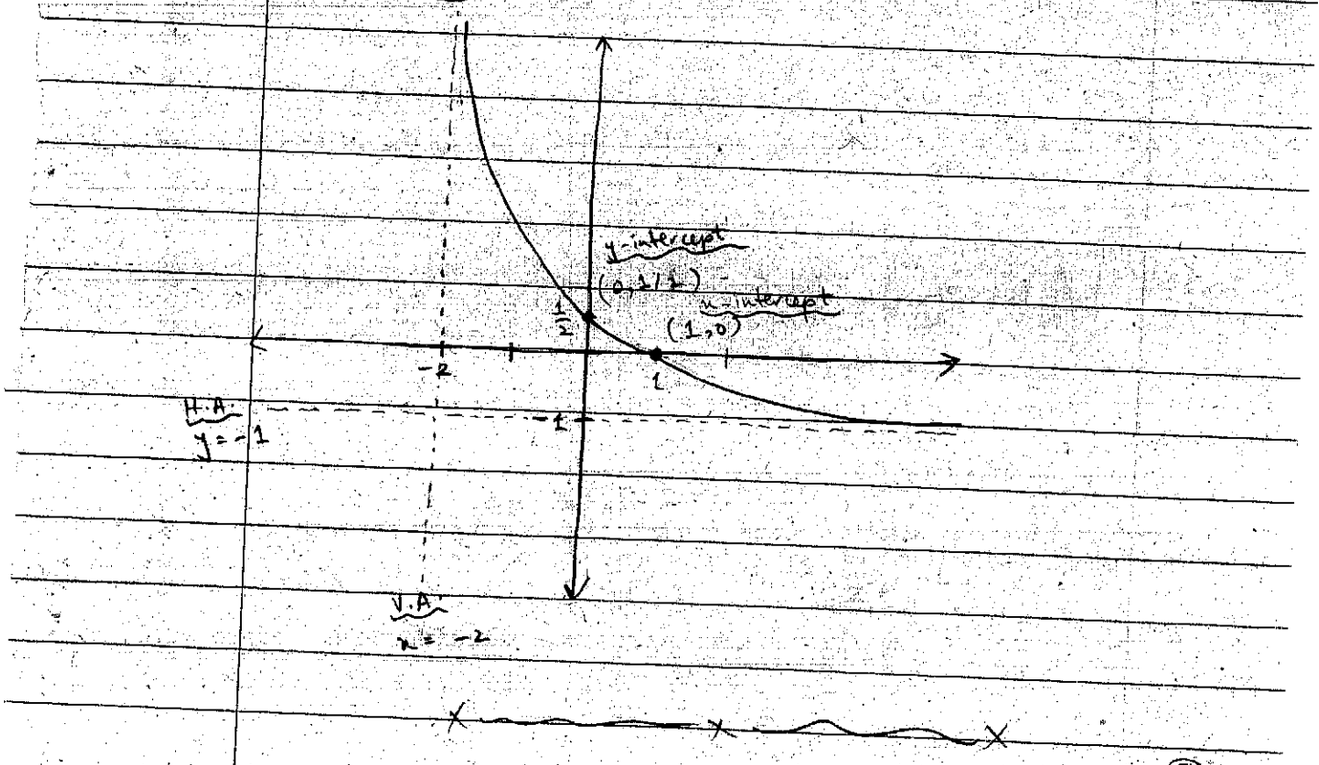
V.A.:

$x + 2 = 0$

$\boxed{x = -2}$

H.A.:

$\boxed{y = -1}$



(b) $f(x) = \dfrac{x+2}{3-x}$

Domain:

$3 - x \neq 0$

$-x \neq -3$

$x \neq 3$

$\boxed{(-\infty, 3) \cup (3, \infty)}$

y-intercept:

If $x = 0$

$y = \dfrac{0+2}{3-0}$

$y = \dfrac{2}{3}$

$\boxed{\left(0, \dfrac{2}{3}\right)}$

Rough 0.6

x-intercept:

If $y = 0$

$0 = \dfrac{x+2}{3-x}$

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

$0 = x+2$

$x = -2$

$\boxed{(-2, 0)}$

V.A.:

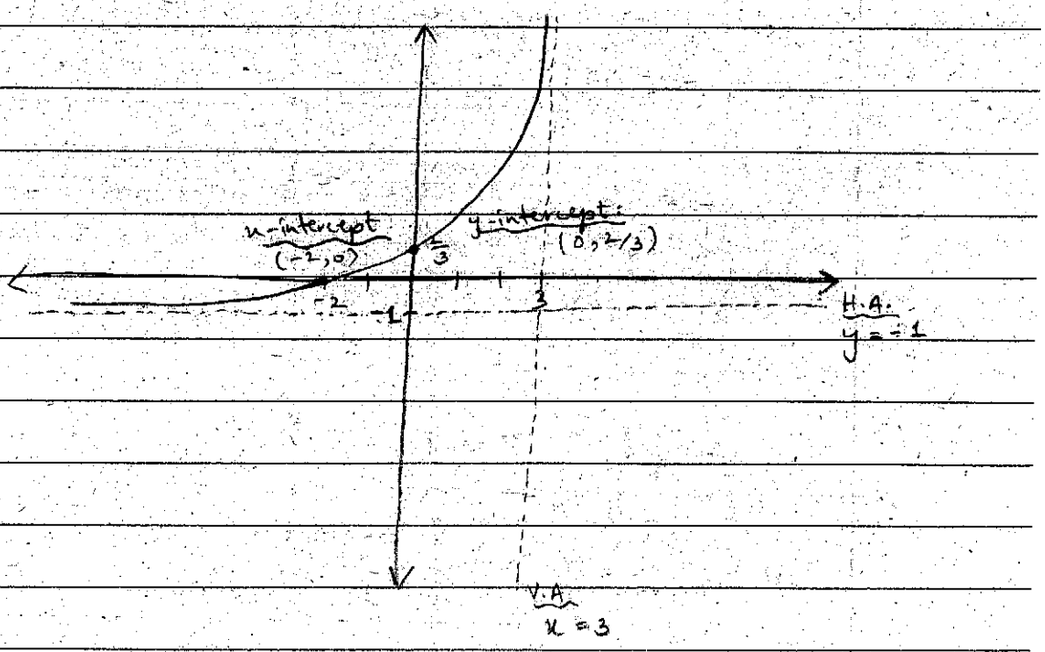
$3 - x = 0$

$-x = -3$

$\boxed{x = 3}$

H.A.:

$\boxed{y = -1}$



X ~~~ X ~~~ X

(c) $f(x) = \frac{2x-4}{1-x}$

Domain:

$1 - x \neq 0$

$-x \neq -1$

$x \neq 1$

$\boxed{(-\infty, 1) \cup (1, \infty)}$

y-intercept:

If $x = 0$

$y = \frac{2(0)-4}{1-0}$

$y = \frac{-4}{1}$

$y = -4$

$\boxed{(0, -4)}$

x-intercept:

If $y = 0$

$0 = \frac{2x-4}{1-x}$

$(0)(1-x) = 2x-4$

$0 = 2x-4$

$\frac{12x}{12} = \frac{4+2}{2}$

$x = 2$

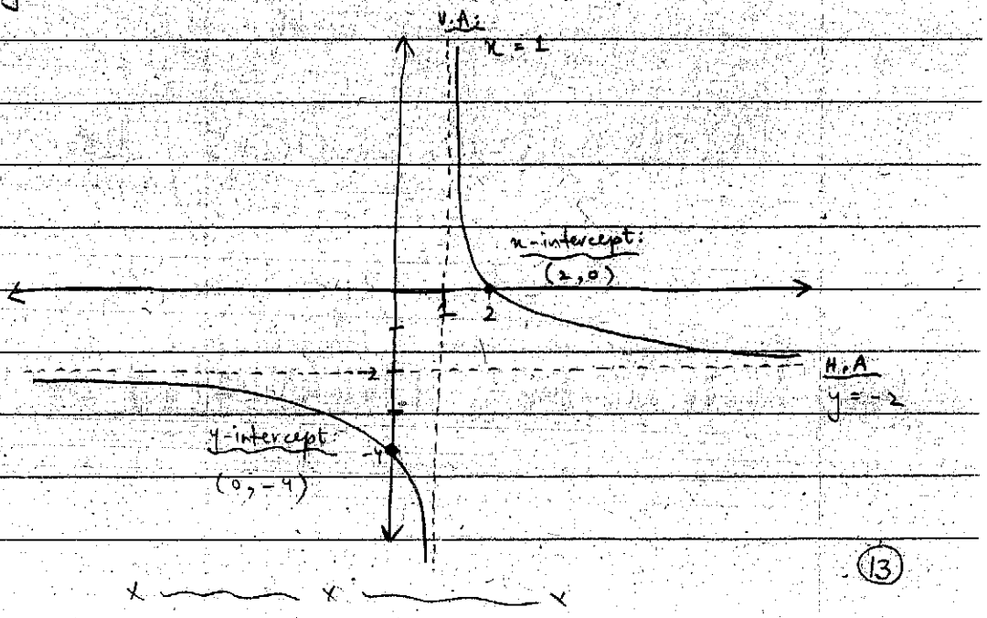
$\boxed{(2,0)}$

V.A.:

$1-x=0$

$-x=-1$

$\boxed{x=1}$

H.A.:

$\boxed{y=-2}$