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$f(x) = \frac{x-1}{2x^2-3x+1}$  } factored

$= \frac{x-1}{(2x-1)(x-1)}$  when dividing  
 $\frac{x-1}{x-1} \Rightarrow \frac{1}{1}$ ,  
 otherwise  $\frac{1-1}{1-1} = \frac{0}{0} \neq 1$ , we assume  $x \neq 1$ ,  
 so add a hole @  $x=1$

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

x-int!:  $0 = \frac{1}{2x-1}$   
 $0 = 1$ , **NO x-int**

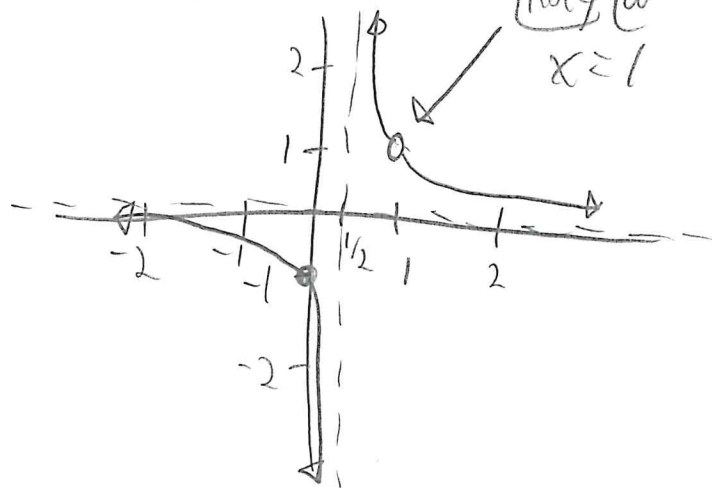
y-int!:  $y = \frac{1}{2(0)-1} = -1$ , **(0, -1)**

V.A. @!:  $2x-1 = 0$  **V.A. @  $x = 1/2$**

H.A. @!: Deg denom > Deg num,  
 therefore **H.A. @  $y = 0$**

Domain!:  $(-\infty, 1/2) \cup (1/2, 1) \cup (1, \infty)$

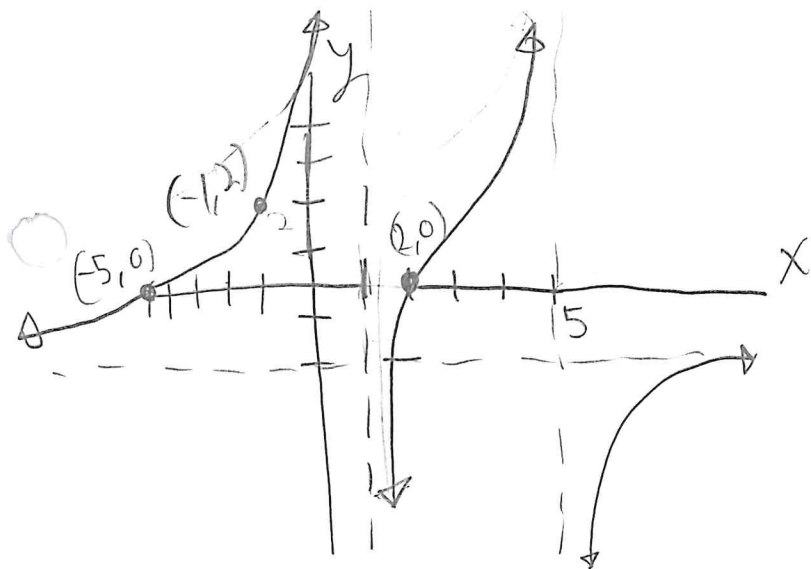
Range!:  $(-\infty, 0) \cup (0, 1) \cup (1, \infty)$



Need a point right of  $x = 1/2$

$f(1) = \frac{1}{2(1)-1} = \frac{1}{1} = 1$ , **(1, 1)**  
 ( $x=1$ )

\*



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Which equation fits the graph? Solve for a, b, c, d variables in your answer choice.

a)  $f(x) = \frac{a}{x-b}$

d)  $f(x) = \frac{a(x-b)}{(x-c)(x-d)}$

b)  $f(x) = \frac{a(x-b)}{x-c}$

e)  $f(x) = \frac{a(x-b)(x-c)}{(x-d)(x-e)}$

c)  $f(x) = \frac{a}{(x-b)(x-c)}$

$f(x) = \frac{a(x-2)(x-(-5))}{(x-1)(x-5)}$

X-Int

$x=2, x=-5$

$x-2=0, x+5=0$

$(x-2)(x+5)$

Numerator

V.A.

@  $x=1, x=5$

$x-1=0, x-5=0$

$(x-1)(x-5)$

Denominator

Need a, set  $x = -1$  (where  $y = 2$ )

then  $y \rightarrow 2 = \frac{a(-1-2)(-1+5)}{(-1-1)(-1-5)}$

$2 = \frac{a(-3)(4)}{(-2)(-6)} = \frac{a(-12)}{12}$

$\Rightarrow 2 = -a, \text{ so } a = -2$

Answer:

e)  $f(x) = \frac{-2(x-2)(x-(-5))}{(x-1)(x-5)}$

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$$79) \frac{x+3}{5x} + \frac{2}{1} = \frac{x-4}{x}$$

$$\Rightarrow \frac{x+3}{5x} + \frac{2(5x)}{1(5x)} = \frac{(x-4)(5)}{x(5)}$$

$$\Rightarrow \frac{x+3}{5x} + \frac{10x}{5x} = \frac{5x-20}{5x}$$

\* assume  $x \neq 0$ , otherwise, division by zero

$$\Rightarrow x+3 + 10x = 5x-20$$

$$\Rightarrow 11x - 5x = -20 - 3$$

$$\Rightarrow 6x = -23$$

$x = -23/6$

$$\frac{n}{(3n+2)} + \frac{1}{1} = \frac{4}{n-2}$$

$$\Rightarrow \frac{n(n-2)}{(3n+2)(n-2)} + \frac{(3n+2)(n-2)}{(3n+2)(n-2)} = \frac{4(3n+2)}{(3n+2)(n-2)}$$

$$\Rightarrow n(n-2) + (3n+2)(n-2) = 4(3n+2) \quad (n \neq 2 \text{ and } n \neq -2/3)$$

$$\Rightarrow n^2 - 2n + 3n^2 - 6n + 2n - 4 = 12n + 8$$

$$\Rightarrow 4n^2 - 18n - 12 = 0$$

$$\Rightarrow 2(2n^2 - 9n - 6) = 0$$

$$\Rightarrow 2n^2 - 9n - 6 = 0, \text{ No easy factor, use quadratic formula}$$

$$a=2, \quad b=-9, \quad c=-6$$

$$= \frac{-(-9) \pm \sqrt{(-9)^2 - 4(2)(-6)}}{2(2)} = \frac{9 \pm \sqrt{81+48}}{4}$$

$$n = \frac{9 \pm \sqrt{129}}{4} \quad (\text{cannot simplify further})$$