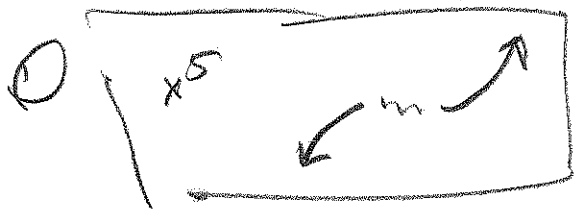


$$f(x) = x^5 - x^4 - 5x^3 + 9x^2 - 16x - 60$$

F2F Class



② 3 or 1 positive zeros

$$f(-x) = -x^5 - x^4 + 5x^3 + 9x^2 + 16x - 60$$

2 or 0 negative zeros.

③ $p \leq 60$ $\pm 1, \pm 2, \pm 3, \pm 4, \pm 5, \pm 6, \pm 10, \pm 12,$
 $q \leq 1$ $\pm 15, \pm 20, \pm 30, \pm 60$

④ Grapher says $x = -2, m = \text{even}, x = 3, m = \text{odd}$

$$\begin{array}{r|rrrrrr} -2 & 1 & -1 & -5 & 9 & -16 & -60 \\ & & -2 & 6 & -2 & -14 & 60 \\ \hline -2 & 1 & -3 & 1 & 7 & -30 & \\ & & -2 & 10 & -22 & 30 & \\ \hline 3 & 1 & -5 & 11 & -15 & & \\ & & 3 & -6 & 15 & & \\ \hline & 1 & -2 & 5 & 0 & & \end{array}$$

$$x^2 = 2x + 5$$

$$a = 1, b = -2, c = 5$$

$$b^2 - 4ac = (-2)^2 - 4(1)(5) = 4 - 20 = -16$$

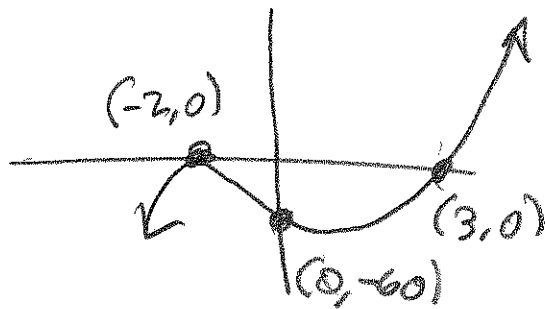
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{2 \pm \sqrt{-16}}{2(1)} = \frac{2 \pm 4i}{2} = 1 \pm 2i$$

$x = -2, m = 2; x = 3,$
 $x = 1 \pm 2i$

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

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

7)



8) $R(x) = \frac{x^2-5x-6}{x^2-5x+6} = \frac{(x-6)(x+1)}{(x-2)(x-3)}$

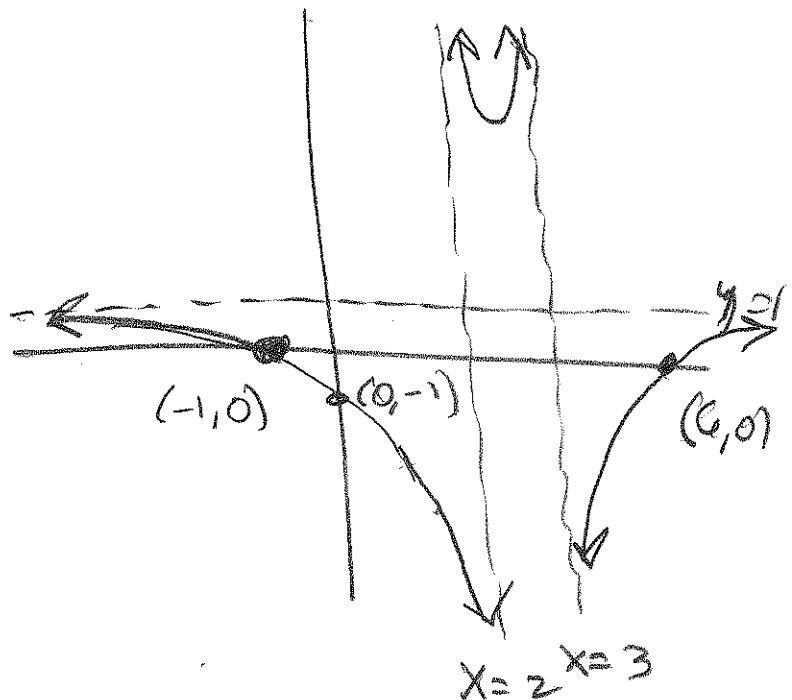
$D = \mathbb{R} \setminus \{2, 3\}$

V.A.: $x=2, x=3$

x-int: $(6, 0), (-1, 0)$

y-int: $\frac{-6}{6} = -1$
 $(0, -1)$

H.A.: $y = \frac{x^2}{x^2} = 1$
 $y = 1$



$$\textcircled{9} \frac{x^3 - 9x^2 + 14x + 24}{x^3 - 9x^2 + 26x - 24}$$

$$\begin{array}{r|rrrr} -1 & 1 & -9 & 14 & 24 \\ & & -1 & 10 & -24 \\ \hline & 1 & -10 & 24 & 0 \end{array}$$

$$x^2 - 10x + 24 = 0$$

$$x^2 - 10x = -24$$

$$x^2 - 10x + 5^2 = -24 + 25$$

$$(x-5)^2 = 1$$

$$x-5 = \pm 1$$

$$x = 5 \pm 1 \begin{cases} \rightarrow 6 \\ \downarrow 4 \end{cases}$$

$$\circ \circ x^3 - 9x^2 + 14x + 24$$

$$= (x+1)(x-6)(x-4)$$

$$\circ \circ R(x) = \frac{(x+1)(x-6)(x-4)}{(x-2)(x-4)(x-3)}$$

$$= \frac{(x+1)(x-6)}{(x-2)(x-3)}, \quad x \neq 4$$

Same as previous, with hole @ $x=4$!

$$\frac{(4+1)(4-6)}{(4-2)(4-3)} = \frac{(5)(-2)}{(2)(1)} = \frac{-10}{2} = -5$$

HOLE @ $(4, -5)$

$$\begin{array}{r|rrrr} 2 & 1 & -9 & 26 & -24 \\ & & 2 & -14 & 24 \\ \hline & 1 & -7 & 12 & 0 \end{array}$$

$$x^2 - 7x + 12 = 0$$

$$x^2 - 7x = -12$$

$$x^2 - 7x + \left(\frac{7}{2}\right)^2 = -12 + \frac{49}{4}$$

$$\left(x - \frac{7}{2}\right)^2 = \frac{-48 + 49}{4} = \frac{1}{4}$$

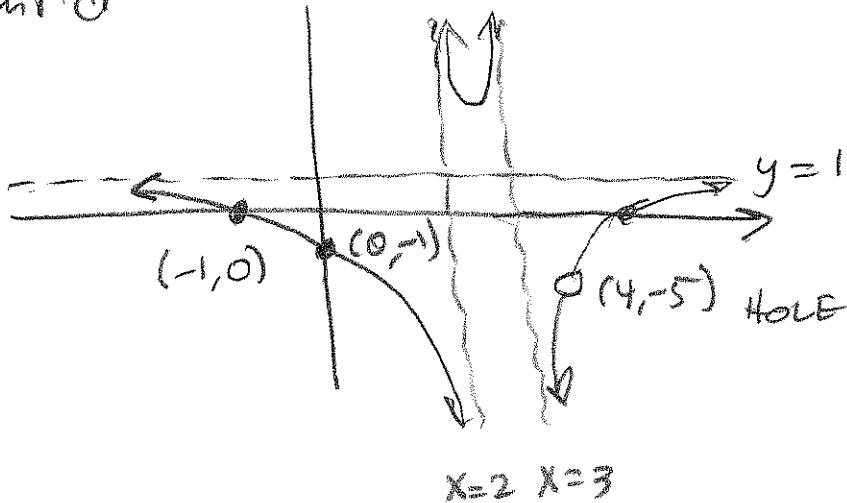
$$x - \frac{7}{2} = \pm \frac{1}{2}$$

$$x = \frac{7 \pm 1}{2} \begin{cases} \rightarrow \frac{8}{2} = 4 \\ \rightarrow \frac{6}{2} = 3 \end{cases}$$

$$\circ \circ x^3 - 9x^2 + 26x - 24$$

$$= (x-2)(x-4)(x-3)$$

#9 cont'd



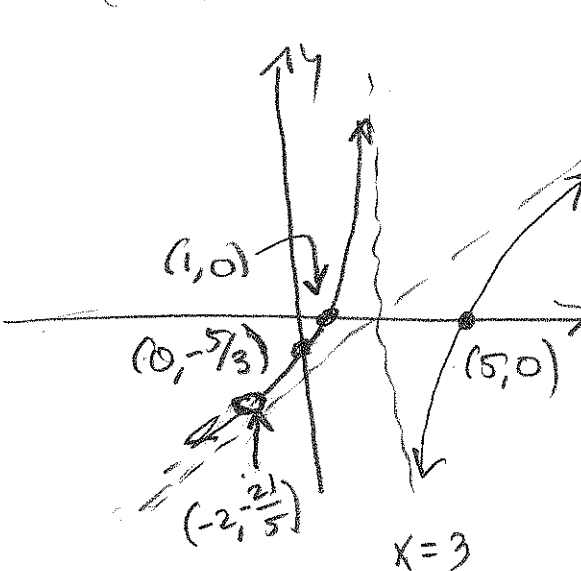
$$\textcircled{10} R(x) = \frac{x^3 - 4x^2 - 7x + 10}{x^2 - x - 6} = \frac{(x-1)(x-5)(x+2)}{(x-3)(x+2)} = \frac{(x-1)(x-5)}{x-3} \quad x \neq -2$$

$$\begin{array}{r} 1 \quad -4 \quad -7 \quad 10 \\ \quad 1 \quad -3 \quad -10 \\ \hline 1 \quad -3 \quad -10 \end{array}$$

$$(x-5)(x+2)(x-1)$$

$$\begin{array}{r} x-3 \overline{) x^2 - 6x - 5} \\ \underline{-(x^2 - 3x)} \\ -3x - 5 \end{array}$$

$y = x-3$ is O.A.



- u.A. @ $x=3$
- y -int @ $(0, -5/3)$
- x -int @ $(1,0), (5,0)$

HOLE @ $x=-2$

$$= \frac{(-2-1)(-2-5)}{-2-3} = \frac{(-3)(-7)}{-5} = -\frac{21}{5}$$