

Rational Functions Review

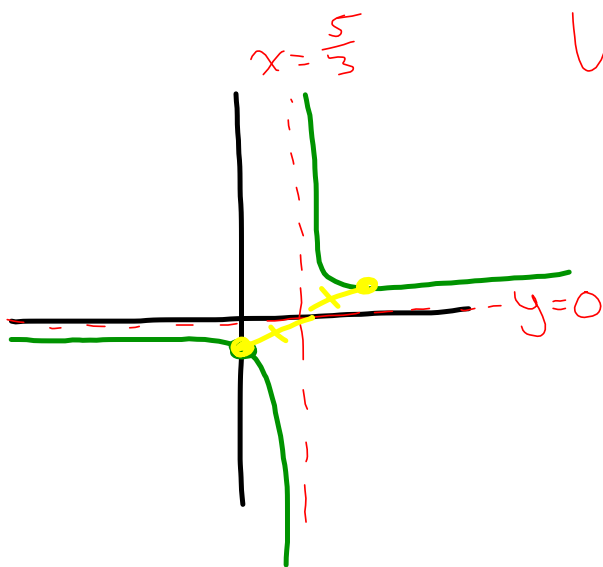
Reciprocal of a Linear Function

$$\text{ex } \frac{2}{3x-5}$$

$$\text{H.A.} \rightarrow y=0$$

$$\text{V.A.} \rightarrow \text{where denominator} \\ = 0$$

$$x = \frac{5}{3}$$



$$\text{y-int (x=0)}$$

$$y = \frac{2}{3(0)-5}$$

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

Reciprocal of a Quadratic Function

$$f(x) = \frac{1}{x^2 - 3x - 28}$$

$$f(x) = \frac{1}{(x-7)(x+4)}$$

\therefore V.A. are at
 $x=7$ and $x=-4$

$$H.A. \rightarrow y=0$$

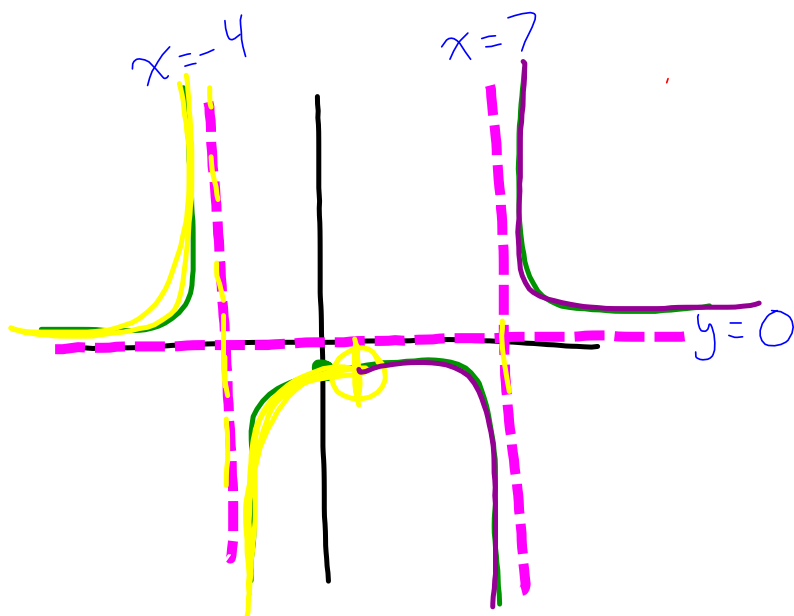
V.A. \rightarrow occur where
 denominator
 $= 0$

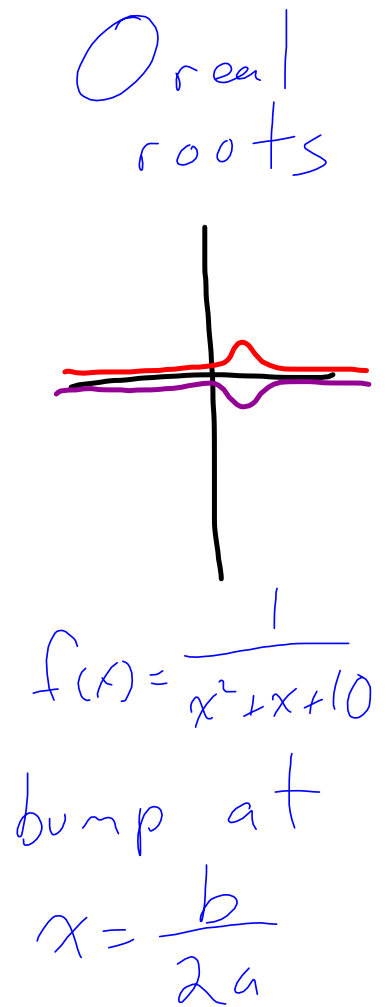
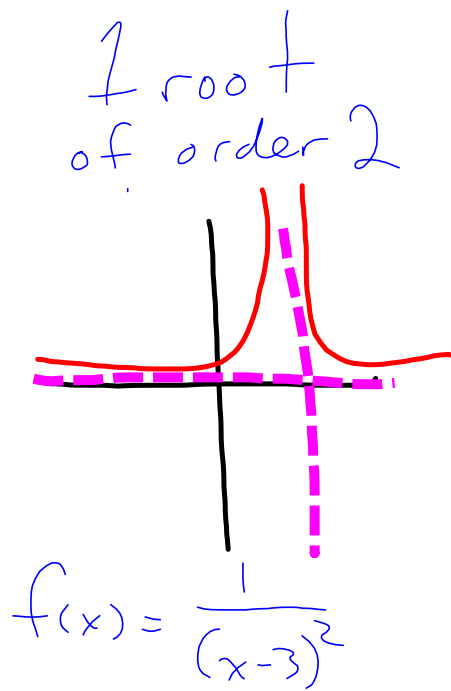
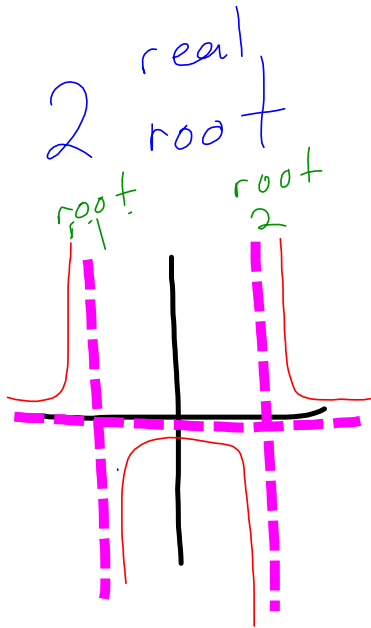
$$x^2 - 3x - 28 = 0$$

$$(x-7)(x+4) = 0$$

$$y\text{-int (}x=0\text{)}$$

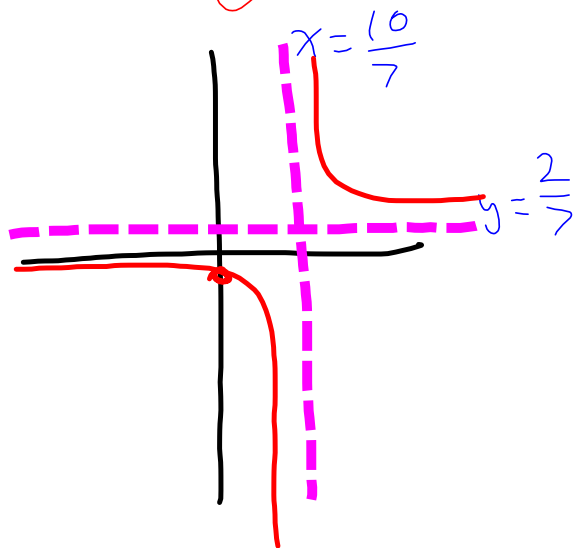
$$y = -\frac{1}{28}$$





Rational Functions in the form $\frac{ax + b}{cx + d}$

$$f(x) = \frac{2x + 5}{7x - 10}$$



$$y\text{-int } (x=0)$$

$$= -\frac{5}{10}$$

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

$$V.A. \Rightarrow \text{Denominator} = 0$$

$$7x - 10 = 0$$

$$7x = 10$$

$$x = \frac{10}{7}$$

$$H.A. \rightarrow y = \frac{2}{7}$$

$$\frac{2x + 5}{7x - 10}$$

as $x \rightarrow \infty$

Solve Rational Equations

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

$$3x(3x+4) = x(2x-5)$$

$$9x^2 + 12x = 2x^2 - 5x$$

* set one
side = 0 *

$$7x^2 + 17x = 0$$

$$x(7x+17) = 0$$

$$x=0$$

$$7x+17=0$$

$$7x = -17$$

$$x = \frac{-17}{7}$$

Solve Rational Inequalities

Get your function to look like

$$\frac{(x-3)(x+2)}{(x-1)(x+4)} \geq 0$$

Key x-values
 $x=3, -2, 1, -4$

	$(-\infty, -4)$	-4	$(-4, -2)$	-2	$(-2, 1)$	1	$(1, 3)$	3	$(3, \infty)$
$(x-3)$	-	-	-	-	-	-	-	0	+
$(x+2)$	-	-	-	0	+	+	+	+	+
$(x-1)$	-	+	-	-	-	0	+	+	+
$(x+4)$	-	0	+	+	+	+	+	+	+
$f(x)$	+	und	-	0	+	und	-	0	+
	✓			✓	✓			✓	✓

$$x \in (-\infty, -4) \cup [-2, 1) \cup [3, \infty)$$

$$\frac{2x}{3x+10} \geq \frac{5x+1}{x-3}$$

$$\frac{2x}{(3x+10)} - \frac{5x+1}{(x-3)} \geq 0$$

$$\frac{2x(x-3) - (5x+1)(3x+10)}{(3x+10)(x-3)}$$

Review on pg. 192 - 193
* #15 on test *