9.3 Warmup

Analyse each of the functions below and then match the equations with their corresponding graphs. Do not use the graphical feature of your calculator.

a) $y = \dfrac{-2(x^2+1)}{x^2-4}$

$x = \pm 2$ ↑ v. asymptotes

end behaviour

$y = \dfrac{-2x^2}{x^2} = -2$

b) $y = \dfrac{-2x^2}{x^3-4x}$

NPV: $x \neq 0, \pm 2$ ↑ P.o.D ↑ asymptotes

end behaviour

$y = \dfrac{-2x^2}{x^3} = \dfrac{-2}{x} = 0$

c) $y = \dfrac{x^3}{2x^2-8}$

NPV. $2(x^2-4)$

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

$x \neq \pm 2$ asymptotes

end behaviour.

$y = \dfrac{x^3}{2x^2} = \dfrac{x}{2} = \frac{1}{2}x$

diagonal with slope of $\frac{1}{2}$

d) $y = \dfrac{2x^2-8}{x^2+4}$

NPV: $x^2+4=0$

$x^2 = -4$

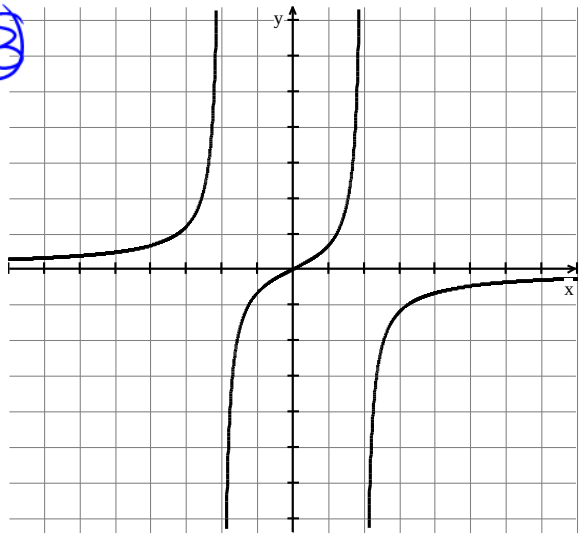
no solution

∴ no NPV.

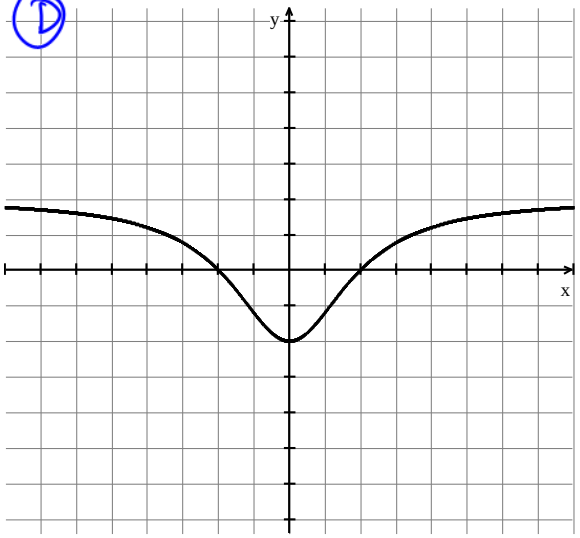
end behaviour

$y = \dfrac{2x^2}{x^2} = 2$

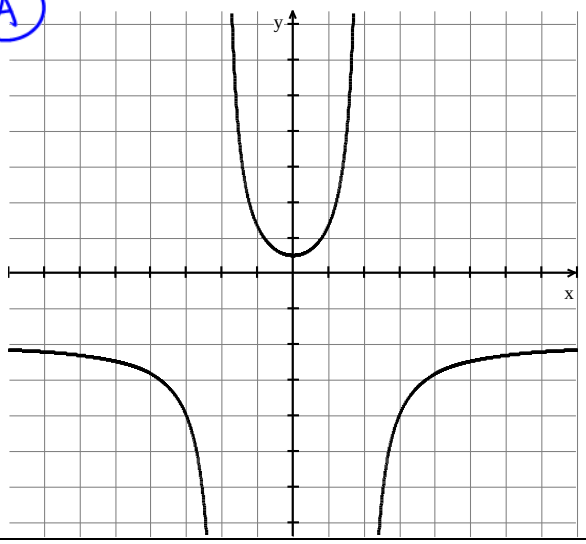
1. (B)



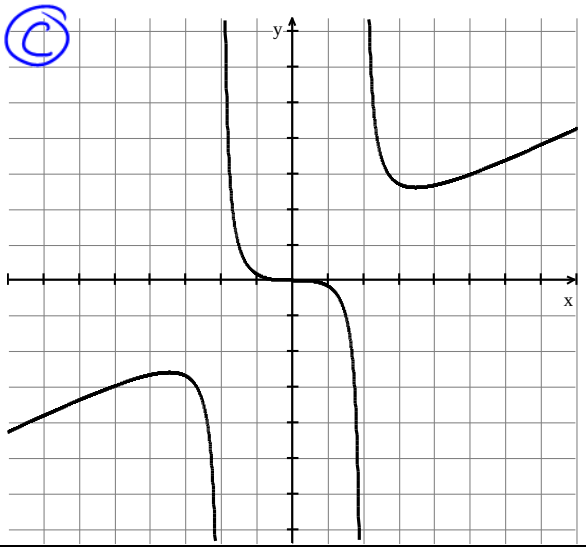
2. (D)



3. (A)



4. (C)



9.3 Rational Equations

1. Find the roots to the equation $\frac{8}{x+1} - 3 = x$ a) algebraically b) graphically

- y_1 = one side
- y_2 = other side

} Solution is intersection

a) Algebraically

(1) Determine the non-permissible values first. If a solution matches one of the excluded values, it must be extraneous, and thus discarded.

Convert everything to a common denominator and then remove the denominator or multiply everything by a common denominator.

LCM = $(x+1)$

$$\frac{8(x+1)}{x+1} - \frac{3(x+1)}{1} = \frac{x(x+1)}{1}$$

$$(8) - (3x+3) = (x^2+x)$$

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

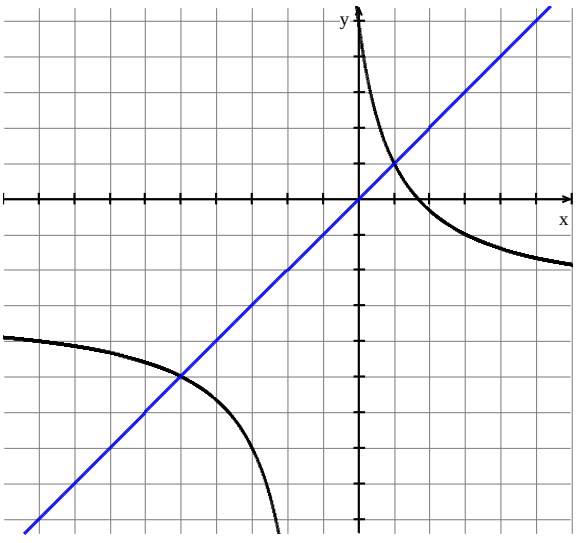
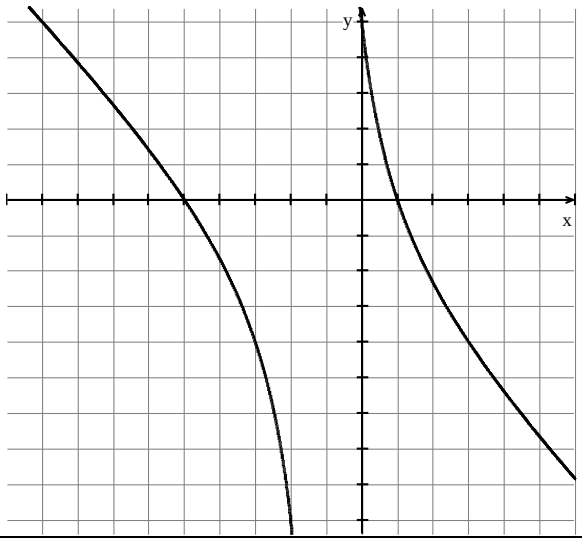
$$0 = x^2+4x-5$$

$$0 = (x+5)(x-1)$$

NPV: $x=-1$

$x = -5, 1$

b) Graphical solution

Intersection method	*Zero Method*
Graph the two sides of the equation and find the x coordinate of any intersection points.	Move everything to one side of the equation and then graph only this one function. Find the zeros of the resulting graph.
	

2. Solve: $2-\frac{3x}{2}=\frac{1+4x-x^2}{4x+10}$ a) algebraically b) graphically

$4x+10 = 2(2x+5)$

LCM $2(2x+5)$

NPV: $x=-\frac{5}{2}$ $2x+5=0$, $-5\ -5$, $2x=-5$

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

$(8x+20)-(6x^2+15x) = 1+4x-x^2$

$8x+20-6x^2-15x = -x^2+4x+1$

$-6x^2-7x+20 = -x^2+4x+1$

$0 = 5x^2+11x-19$ $-1,95$ $-5,19$ -95

Can't be factored.; quadratic formula

$x=\frac{-11\pm\sqrt{(11)^2-4(5)(-19)}}{2(5)}$

$x=\frac{-11\pm\sqrt{501}}{10}=$ 1.14 or −3.34 ✓

3. Solve: $\frac{x+3}{2x-6}=2x-\frac{x}{3-x}$ a) algebraically b) graphically

$2x-6 = 2(x-3)$ $3-x = -1(x-3)$

NPV: $x\neq 3$ LCM $= -2(x-3)$

$\frac{x+3}{2(x-3)}\cdot\frac{-1}{-1} = \frac{2x}{1}\cdot\frac{(-2)(x-3)}{(-2)(x-3)} - \frac{x}{(-1)(x-3)}\cdot\frac{2}{2}$

$(-1)(x+3) = 2x(-2)(x-3) - 2x$

$-x-3 = -4x^2+12x-2x$

$-x-3 = -4x^2+10x$

$4x^2-11x-3=0$ -12

$4x^2-12x+x-3=0$

$4x(x-3)+1(x-3)=0$

$(4x+1)(x-3)=0$ $x=-\frac{1}{4}$, ~~3~~ NPV: $x\neq 3$

p465 # 1, 2, 3, 4, 8, 11,

4. It usually takes Dan five days to get a quote on the board. Working together with Matthew, one of them is usually able to get a quote every 3 days. How many days on average does it take for Matthew to get on the Quote Board?

5. Matthew currently has 25 of the 120 quotes over the year. He has set a goal of obtaining 80% of the quotes for the rest of the year. How many quotes would have to be made so that he could end the year off with 50% of the year's quotes?