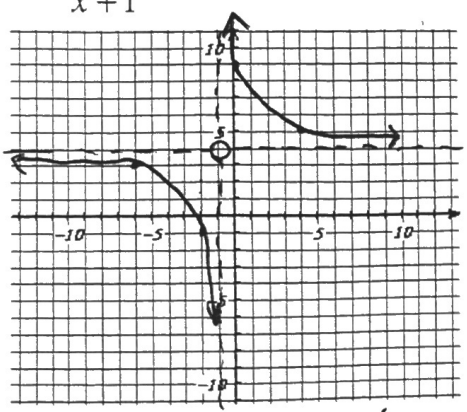
Graphing Rational TEST REVIEW name Key pd ____

#1-16 Are non-calculator questions

1. $y = \frac{5}{x+1} + 4$



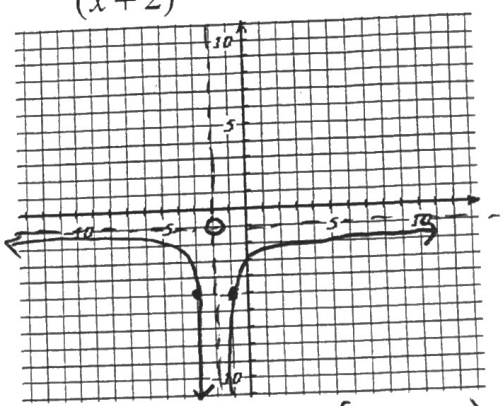
Domain: $(-\infty,-1)\cup(-1,\infty)$

Range: $(-\infty,4)\cup(4,\infty)$

Equation of Vertical Asymptote: $x=-1$

Equation of Horizontal Asymptote: $y=4$

2. $y = \frac{-4}{(x+2)^2} - 1$



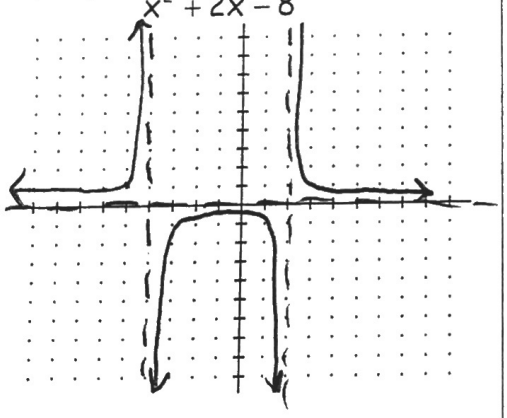
Domain: $(-\infty,-2)\cup(-2,\infty)$

Range: $(-\infty,-1)$

Equation of Vertical Asymptote: $x=-2$

Equation of Horizontal Asymptote: $y=-1$

3) $y = \frac{1}{x^2+2x-8}$ *Hint: factor first!



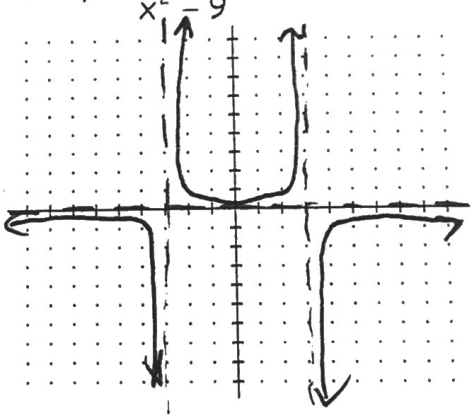
VA: $x=-4, 2$ & HA: $y=0$

Domain: $(-\infty,-4)\cup(-4,2)\cup(2,\infty)$

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

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

4) $y = \frac{-1}{x^2-9}$



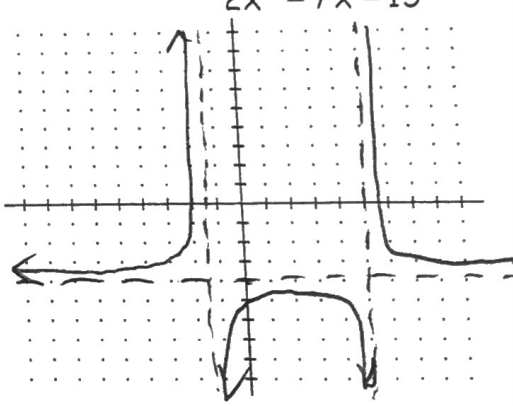
VA: $x=-3,3$ & HA: $y=0$

Domain: $(-\infty,-3)\cup(-3,3)\cup(3,\infty)$

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

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

5) $y = \frac{1}{2x^2-7x-15} - 4$



VA: $x=-\frac{3}{2}, 5$ & HA: $y=-4$

Domain: $(-\infty,-\frac{3}{2})\cup(-\frac{3}{2},5)\cup($

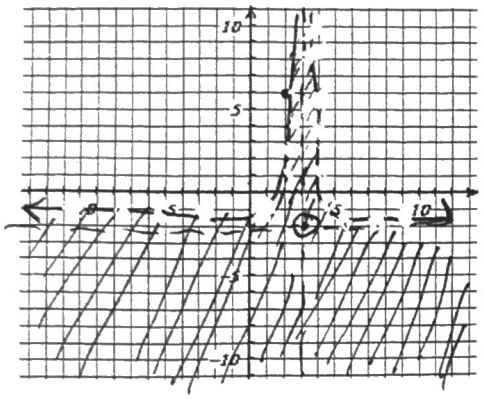
Range: $(-\infty,-4)\cup(-4,\infty)$

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

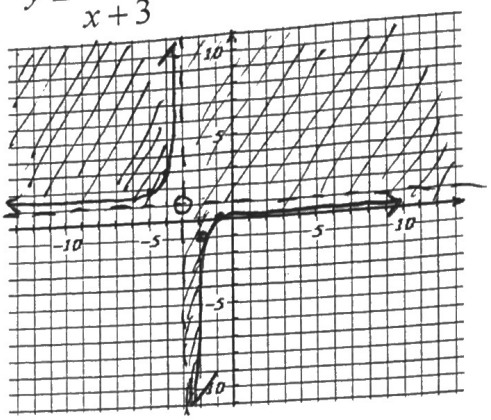
$\frac{-5}{1}$ $\frac{-10}{2}$

2A.10A

6. $y < \dfrac{8}{(x-3)^2} - 2$



7. $y \geq \dfrac{-2}{x+3} + 1$



8. Describe the similarities and differences between the graphs of $f(x) = \dfrac{8}{x-3}$ and $f(x) = \dfrac{-8}{(x-3)^2} + 2$.

stretch 8 | up 2
Rt 3 | Reflect x

9. $\dfrac{49x+21}{6x} \div \dfrac{42x+18}{6}$

$\dfrac{7(7x+3)}{6x} \cdot \dfrac{6}{6(7x+3)} = \boxed{\dfrac{7}{6x}}$

10. $\dfrac{10b^2+42b+36}{6b^2-2b-60} \div \dfrac{40b+48}{3b^2-13b+10}$

$2(5b^2+21b+18)$, $2(3b^2-b-30)$

$\dfrac{2(x+3)(5x+6)}{2(3x-10)(x+3)} \div \dfrac{8(5b+6)}{(x-1)(3x-10)}$

$\dfrac{2(x+3)(5x+6)}{2(3x-10)(x+3)} \cdot \dfrac{(x-1)(3x-10)}{8(5b+6)} = \boxed{\dfrac{x-1}{8}}$

11. $\dfrac{8-7x-x^2}{x+8} \times \dfrac{x+5}{9x-9}$

$\dfrac{-(x^2+7x-8)}{x+8} \cdot \dfrac{x+5}{9(x-1)}$

$\dfrac{-(x+8)(x-1)}{x+8} \cdot \dfrac{x+5}{9(x-1)} = \boxed{-\dfrac{x+5}{9}}$

12. $\dfrac{x^2-11x+28}{21x^4-x^3} \times \dfrac{9x^2+36x}{4-x}$

$\dfrac{(x-4)(x-7)}{x^3(21x-1)} \cdot \dfrac{9x(x+4)}{-(x-4)}$

$\boxed{-\dfrac{9(x-7)(x+4)}{x^2(21x-1)}}$

13. $\frac{x+4}{x^2-4}+\frac{15(x+2)}{x-2(x+2)}$

$\frac{(x+4)+15(x+2)}{cd}$

$x+4+15x+30$

$\boxed{\frac{16x+34}{(x+2)(x-2)}}$

15. $\frac{5x(2x+5)}{6x^2}+\frac{(4)(6x^2)}{5x}+\frac{(3-8x)3}{(10x^3)}$ $cd=30x^3$

$\frac{5x(2x+5)+4(6x^2)+3(3-8x)}{cd}$

$\frac{10x^2+25x+24x^2+9-24x}{cd}$

$\boxed{\frac{34x^2+x+9}{30x^3}}$

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

$(x-3)(x-1)$

$\frac{x-5(x-1)}{cd}$

$x-5x+5$

$\boxed{\frac{-4x+5}{(x-3)(x-1)}}$

16. $\frac{x^2(3)}{x}-\frac{(x+2)x}{x^2}+\frac{(x^2+3)}{x^3}$ $cd=x^3$

$\frac{3x^2-x(x+2)+(x^2+3)}{cd}$

$3x^2-x^2-2x+x^2+3$

$\boxed{\frac{3x^2-2x+3}{x^3}}$

#17-25 Are calculator questions

17) $\frac{18}{x+5}=\frac{2x+7}{x+5}$

$18=2x+7$

$11=2x$

$\boxed{x=\frac{11}{2}}$

18) $\frac{3(p+2)}{5p^2-52p+20}=\frac{2p(p-10)}{15p-6}+\frac{1(5p-2)}{3p-30}$

$(5p-2)(p-10)\quad 3(5p-2)\quad 3(p-10)$

$3(p+2)=2p(p-10)+(5p-2)$

$3p+6=2p^2-20p+5p-2$

$\rightarrow 0=2p^2-18p-8$

$0=2(p^2-9p-4)$ → - Go to calcu - find zero

$\boxed{x=-.4244,\ x=9.4244}$

19) $\frac{6(x-9)}{x+3}+\frac{4(x+3)}{x-9}=\frac{2}{x^2-6x-27}$

$6(x-9)+4(x+3)=2$

$6x-54+4x+12=2$

$10x-42=2$

$10x=44$

$\boxed{x=\frac{22}{5}}$

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

$x(x+2)$

$(x+2)(x-1)-5x=3$

$x^2+x-2-5x-3=0$

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

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

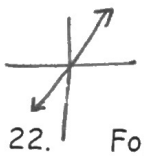
$\boxed{x=5,\ x=-1}$

21. Give an example of table, graph, and equations that are Direct, Indirect/Inverse, and Neither.

Direct

$y = 7x$

x	y
2	14
1	7
4	28



Indirect

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

x	y
1	7
2	3.5
-1	-7

Neither

$y = \sqrt{x}$

$y = \log_3 x$

22. For the Choir fundraiser, the number of tickets Allie can buy is **inversely proportional** to the price of the tickets. She can afford 15 tickets that cost $5 each. **How many tickets can Allie buy if each cost $3?**

$y = \frac{a}{x}$ $\quad y = \frac{75}{a}$

$15 = \frac{a}{5}$ $\quad y = \frac{75}{3}$

$75 = a$ $\quad \boxed{y = 25}$

23. The value of y **varies inversely** with x, If $y = 4$ when $x = 3$. **Find x when $y = 6$.**

$y = \frac{a}{x}$ $\quad y = \frac{12}{x}$

$4 = \frac{a}{3}$ $\quad 6 = \frac{12}{x}$

$a = 12$ $\quad \boxed{x = 2}$

24. The volume of wood in a tree (V) varies directly as the height (h) and inversely as the square of the girth (g). If the volume of a tree is 144 cubic meters when the height is 20 meters and the girth is 1.5 meters, what is the height of a tree with a volume of 1000 and girth of 2 meters?

$V = \frac{ah}{g^2}$ $\quad 1000 = \frac{16.2 \cdot h}{2^2}$

$144 = \frac{a \cdot 20}{(1.5)^2}$ $\quad h = 246.9$

$a = 16.2$

25. The concentration C(in mg/dl) of a certain antibiotic in a patient's bloodstream is given by $C(t) = \frac{50t}{t^2 + 25}$ where t is the time (in hours) after taking the antibiotic.

(a) What is the concentration 4 hours after taking the antibiotic?

$C(4) = \frac{50(4)}{4^2 + 25} = \frac{200}{41} = \boxed{4.878 \text{ hours}}$

(b) In order for the antibiotic to be effective, 4 or more mg/dl must be present in the bloodstream. When do you have to take the antibiotic again?

$4 = \frac{50t}{t^2 + 25}$

$(t^2 + 25)4 = \frac{50t}{t^2 + 25} \cdot t^2 + 25$

$4t^2 + 100 = 50t$

$\frac{4t^2}{2} - \frac{50t}{2} + \frac{100}{2} = \frac{0}{2}$

$2t^2 - 25t + 50 = 0$

$(t - \frac{20}{2})(t - \frac{5}{2}) = 0$

$(t - 10)(2t - 5) = 0$

$t = 10 \quad t = \frac{5}{2} = 2.5$

$\boxed{10 \text{ hours}}$

This is when it building so not answe

100

-20 | 5