I. Find the domain.

1. $f(x)=\dfrac{x}{x^2+3x-4}$

2. $f(x)=\dfrac{5x+1}{x^2+25}$

II. Simplify Expressions AND Solve Equations. Follow the steps in your notes!!!

3. $\dfrac{x^2+4x+3}{x^2+6x+9}\bullet\dfrac{2x+6}{x+1}$

4. $\dfrac{x^2-4}{x^2-7x+10}\div\dfrac{x^2+6x+5}{x^2-25}$

5. $\dfrac{y}{9y^2-9}+\dfrac{4}{y^2+2y+1}$

6. $\dfrac{1+\dfrac{3}{x}}{1+\dfrac{4}{x}+\dfrac{3}{x^2}}$

7. $\dfrac{2n}{4+n}-\dfrac{2}{5}=4$

8. $\dfrac{k}{k-4}+k=\dfrac{12-4k}{k-4}$

9. *Given* $P(x)=\dfrac{3-x^2}{x^3-2x^2+4}$, *find* $P(-1)$.

10. $\dfrac{-7a^5-14a^4+21a^3}{-7a^3}$

11. $\frac{3x^2+6x}{4x^2-16} \bullet \frac{2x+8}{x^2+2x} \div \frac{3x-9}{5x-20}$

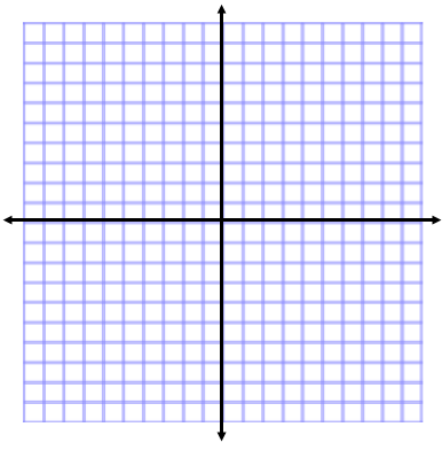
12. $\frac{x-2}{5} = \frac{1}{x+2}$

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

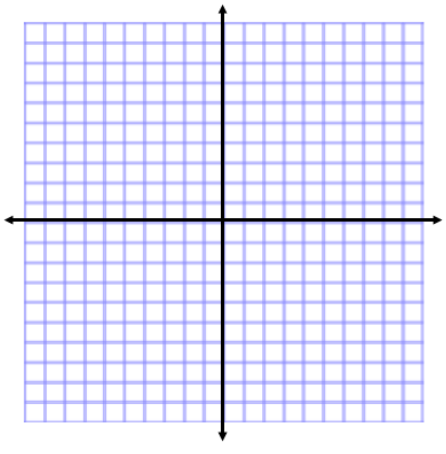
17. To balance a seesaw, the distance, d (in feet), a person is from the fulcrum is inversely proportional to his or her weight, w (in pounds). Roger, who weighs 120 pounds, is sitting 6 feet away from the fulcrum. Ellen weighs 108 pounds. How far from the fulcrum must she sit to balance the seesaw?

Graph a sketch of the following polynomial

19. $y = 1 - \frac{3}{x-1}$



20. $y = \frac{1}{x+3} - 2$



21. Determine the **equations** for the horizontal **and** vertical asymptotes for each function below.

a) $f(x)=\dfrac{1}{4+x}$

b) $f(x)=\dfrac{2}{2x^2-5x-3}$

22. The radius of a sphere **varies directly** as the square root of the surface area. The radius is 5 cm when the surface area is 100π cm^2. Determine the surface area when the radius is 6.3 cm. (leave in terms of π).

23. The volume of a certain gas **varies directly** as the temperature **and inversely** as the pressure. When the temperature is 480°K and the pressure is 12 $\dfrac{lb}{in^2}$, the gas occupies a volume of 200in^3. Find the volume when the temperature is 360°K and the pressure is 15 $\dfrac{lb}{in^2}$.

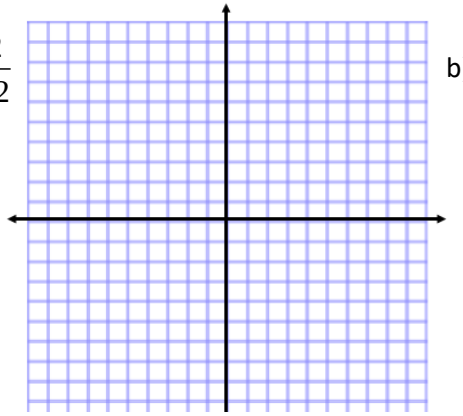
24. Simplify the following fractions.

a) $\dfrac{\dfrac{x-1}{4x+24}}{\dfrac{1-x}{3x+18}}$

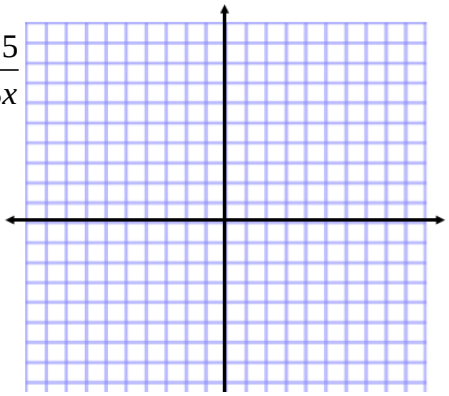
b) $\dfrac{\dfrac{9}{x^2}+\dfrac{2}{x-2}}{\dfrac{1}{x^2}+\dfrac{1}{x-2}}$

25. Graph the following on graph paper labeling x & y intercepts, vertical asymptotes, horizontal asymptotes, and holes if any.

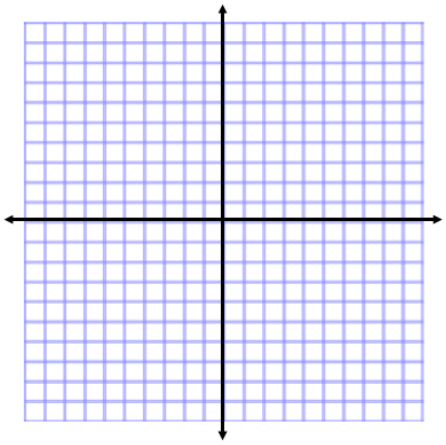
a) $f(x)=\dfrac{x^2+x-2}{x^2-3x+2}$



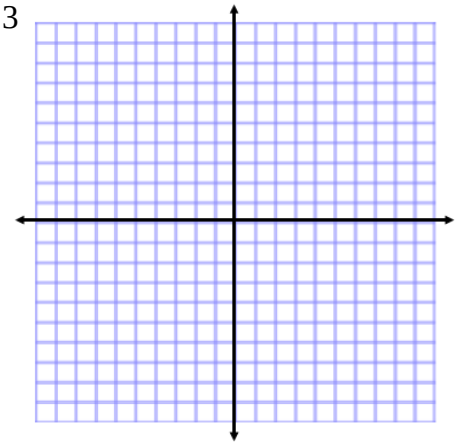
b) $g(x)=\dfrac{6x-5}{2-3x}$



c) $f(x)=\dfrac{x-3}{x^2+6x+5}$



d) $g(x)=\dfrac{2x-4}{x+3}$



26. Simplify.

a) $\dfrac{1}{x^2z^3}+\dfrac{2}{4xyz}-\dfrac{1}{24xy^2}$

b) $\dfrac{2}{12a^2b}+\dfrac{1}{20ab^2}$

27. What affects your domain and range?