Chapter 8 Review 2 **Name** ____________________

The variables x and y vary inversely. Use the given values to write an equation relating x and y. Solve for y when

x = 2

1. $x = 7, y = -4$ $y=\frac{a}{x}$ $a=xy$ $a=-28$

$\boxed{y=\frac{-28}{x}}$ $\boxed{y(2)=-14}$

2. $x = -4, y = 18$

$y=\frac{a}{x}$ $a=xy$ $a=-72$

$\boxed{y=\frac{-72}{x}}$ $\boxed{y(2)=-36}$

Use the given values to write an equation relating x, y, and z given that z varies jointly with x and y. Solve for z when x = 2 and y = 5 $z=axy$ $a=\frac{z}{xy}$

3. $x = 3, y = 2, z = 2.4$

$\boxed{z=.4xy}$

$a=\frac{2.4}{(3)(2)}=\frac{2.4}{6}=\frac{1.2}{3}=.4$ $z=\frac{12}{3}(2)(5)=\frac{12}{3}=\boxed{4}$

4. $x = 8, y = 90, z = 3.6$

$a=\frac{3.6}{(8)(90)}=\frac{5}{1000}=\boxed{\frac{1}{200}}$ $z=\frac{5}{1000}xy=\frac{5}{1000}(2)(5)=\frac{5}{100}=\boxed{\frac{1}{20}\text{ or } .05}$

or 0.005

Sketch the graph of the function. Include any vertical or horizontal asymptotes. Give domain and range.

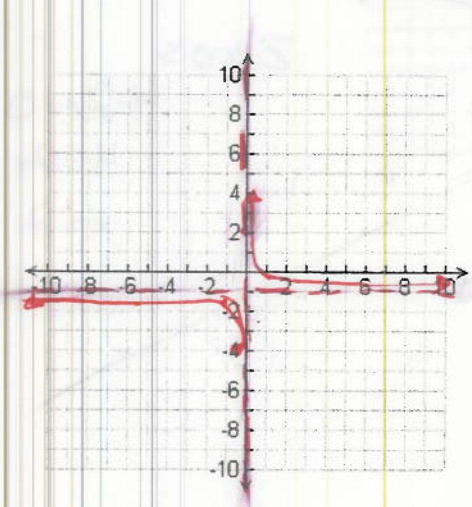
5. $y=\frac{1}{2x}-1$

vertical $x=0$

horizontal $y=-1$

Domain $\mathbb{R}$ $x\neq 0$

Range $\mathbb{R}$ $y\neq -1$



6. $y = \dfrac{5}{x+2}$

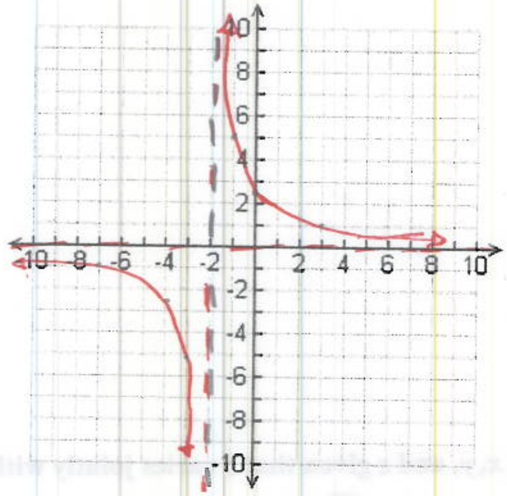
domain $\mathbb{R},\ x \neq -2$

Range $\mathbb{R},\ y \neq 0$

asymptotes

horizontal $y = 0$

vertical $x = -2$



7. $f(x) = \dfrac{4-2x}{x-3}$

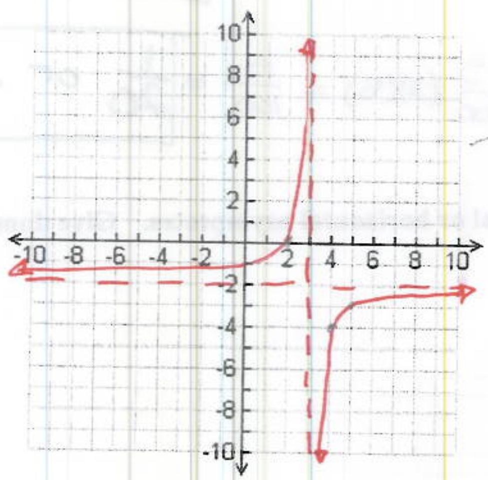
domain $\mathbb{R}\ x \neq 3, 2$

Range $\mathbb{R}\ y \neq -2$

asymptotes

horizontal $y = -2$ $\quad -\frac{2}{1} = -2$

vertical $x = 3$ $\quad x-3=0$, $x = 3$



Zero's

$4-2x=0$

$4=2x$

$x=2$

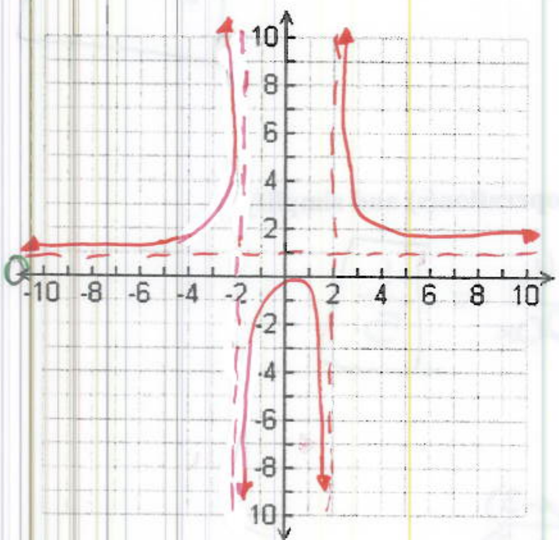
Identify the vertical and horizontal asymptote(s) and zeros of the graph of the function.

8. $f(x) = \dfrac{x^2}{x^2 - 4}$

Asymptotes
vertical $x = 2, -2$
horizontal $y = 1$

Domain $\mathbb{R}, x \neq 2, -2,$
Range $\mathbb{R}, y \neq 1$

Zero @ $x = 0$



Simplify the rational expression, if possible.

9. $\dfrac{n^2 + 2n - 24}{n^2 - 11n + 28}$

$$\frac{(n+6)\cancel{(n-4)}}{(n-7)\cancel{(n-4)}}$$

$$\boxed{\frac{n+6}{n-7}}$$

10. $\dfrac{n^2 + 8n + 15}{n^2 - 25}$

$$\frac{\cancel{(n+5)}(n+3)}{\cancel{(n+5)}(n-5)}$$

$$\boxed{\frac{(n+3)}{(n-5)}}$$

Multiply the expressions. Simplify the result.

11. $\dfrac{3x^3}{6y^3} \cdot \dfrac{y^5}{x^5}$

$$\frac{3x^3y^5}{6x^5y^3} = \frac{3y^2}{6x^2} = \frac{1y^2}{2x^2} = \boxed{\frac{y^2}{2x^2}}$$

Divide the expressions. Simplify the result.

12. $\frac{2k^4}{4z^3} \div \frac{k^8}{z^5}$ $\quad \frac{2k^4 z^5}{4z^3 k^8} = \frac{1z^2}{2k^4} = \boxed{\frac{z^2}{2k^4}}$

Perform the indicated operation(s) and simplify.

13. $\frac{2x-7}{20x} + \frac{2x+7}{20x}$ $\quad \frac{4x}{20x} = \boxed{\frac{1}{5}}$

14. $\left[\frac{9}{x+3} + \frac{2}{x-3}\right] \frac{(x+3)(x-3)}{(x+3)(x-3)}$

$$\frac{9(x-3) + 2(x+3)}{(x+3)(x-3)} = \frac{9x-27+2x+6}{(x+3)(x-3)} = \boxed{\frac{11x-21}{(x+3)(x-3)}}$$

15. $\frac{3x+4}{x^2-16} - \frac{2}{x-4}$

$$\frac{3x+4-2(x+4)}{x^2-16} = \frac{3x+4-2x-8}{x^2-16} = \frac{x-4}{(x+4)(x-4)} = \boxed{\frac{1}{x+4}}$$

Solve the equation. Check for extraneous solutions.

16. $\frac{3}{k^2-1} = \frac{3}{k+1}$

$3k^2-3 = 3k+3$

$3k^2-3k-6$

$3(k^2-k-2)$

$3(k-2)(k+1)$

$\boxed{k=2}$ $\quad k = \cancel{-1}$ extraneous

17. $\frac{x-2}{x-6} = \frac{x+5}{x-4}$

$(x-2)(x-4) = (x-6)(x+5)$

$x^2-2x-4x+8 = x^2-6x+5x-30$

$x^2-6x+8 = x^2-x-30$

$-5x = -38$

$\boxed{x = 38/5 = 7.6}$

18. $\left[\frac{x+2}{4x} - \frac{3}{2x} = \frac{1}{8}\right] \frac{8x}{8x}$

$$\frac{2(x+2)}{8x} - \frac{12}{8x} = \frac{x}{8x}$$

19. $\left[\frac{2x}{x-2} = \frac{1}{x^2-4} + 1\right] \frac{(x-2)(x+2)}{(x-2)(x+2)}$

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

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

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

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

$$(x+3)(x+1)$$

$$\boxed{x = -1, -3}$$

$$\frac{2x+4-12}{8x} = \frac{x}{8x}$$

$$(2x+4-12)\cancel{8x} = x(\cancel{8x})$$

$$2x-8 = x$$

$$x-8 = 0$$

$$\boxed{x = 8}$$