Honors Math II
Unit 8 Review

Name Key
Period _____ Date _____

Find the vertical asymptote(s) and x-intercepts of the graph of the function.

1. $f(x) = \frac{x-4}{2x^2-x-6}$

x-int: $x-4=0$ $x=4$ $(4,0)$

V.A.: $2x^2-x-6=0$

$(2x+3)(x-2)=0$

$x=-3/2$ $x=2$

2. $g(x) = \frac{x^2-3x-10}{3x^2-10x-8}$

x-int: $x^2-3x-10=0$

$(x-5)(x+2)=0$ $(5,0)$ $(-2,0)$

$x=5, -2$

V.A.: $3x^2-10x-8=0$

$(3x+2)(x-4)=0$ $x=-2/3$ $x=4$

3. $f(x) = \frac{6x^2-x-2}{x^2-4}$

x-int: $6x^2-x-2=0$

$(3x-2)(2x+1)=0$ $(2/3,0)$ $(-1/2,0)$

V.A.: $x^2-4=0$

$(x+2)(x-2)=0$ $x=-2, x=2$

4. $f(x) = \frac{3x-7}{x^2-2x-15}$

x int: $3x-7=0$ $(7/3,0)$

$x=7/3$

V.A. $x^2-2x-15=0$

$(x-5)(x+3)=0$

$x=5$ $x=-3$

Graph the function. Show vertical asymptotes and x-intercepts.

5. $f(x) = \frac{1}{x^2-25}$

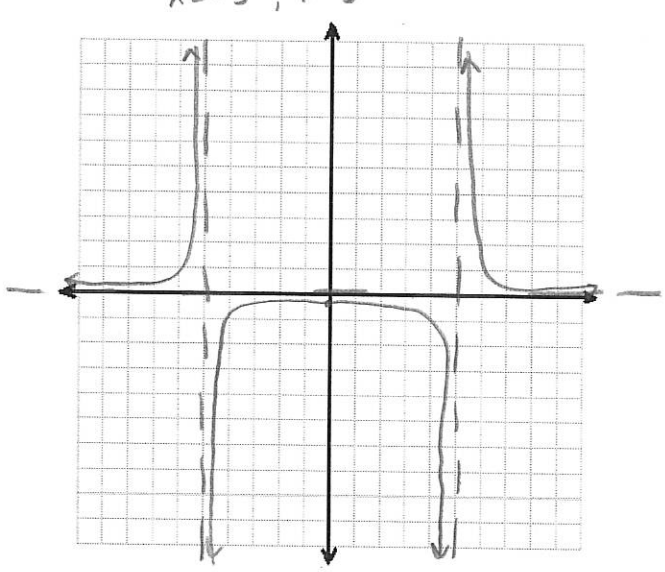
y-int: $(0,-1/25)$

x-int: None H.A: $y=0$

V.A. $x^2-25=0$

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

$x=-5$, $x=5$



6. $f(x) = \frac{x+1}{x^2-2x+1}$

x-int:

$x+1=0$ $x=-1$

$(-1,0)$

V.A.: $x^2-2x+1=0$

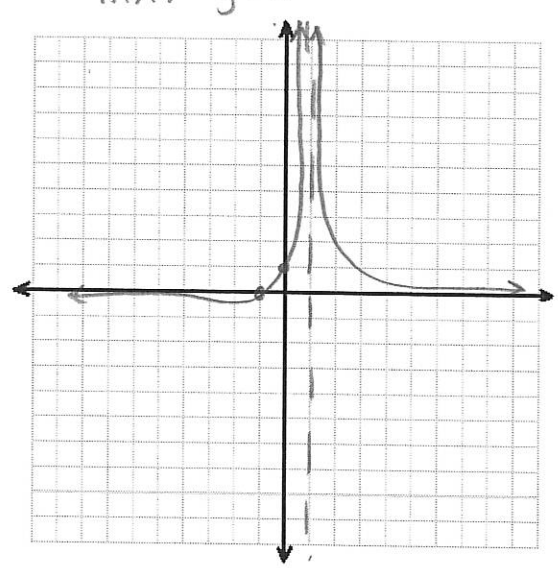
$(x-1)(x-1)=0$

$x=1$

y-int:

$(0,1)$

H.A. $y=0$



Simplify the rational expression, if possible.

7. $\dfrac{x^2+8x+15}{x^2-25} = \dfrac{x+3}{x-5}$

$\dfrac{(x+3)\cancel{(x+5)}}{\cancel{(x+5)}(x-5)}$

8. $\dfrac{2x^2-6x}{x^3-27} = \dfrac{2x}{x^2+3x+9}$

$\dfrac{2x\cancel{(x-3)}}{\cancel{(x-3)}(x^2+3x+9)}$

Perform the indicated operation(s) and simplify.

9. $\dfrac{\cancel{3x^3}}{\cancel{6y^3}} \cdot \dfrac{\cancel{y^5}}{\cancel{x^5}} = \dfrac{y^2}{2x^2}$

$\dfrac{\cancel{3}}{\cancel{6}}$ 2, $\dfrac{\cancel{y^5}}{\cancel{x^5}}$ y^2, x^2

10. $\dfrac{2y^2}{3} \cdot \dfrac{12x}{5y} = \dfrac{8yx}{5}$

$\dfrac{2y^2}{3}$ y, $\dfrac{12x}{5y}$ 4

11. $\dfrac{(2x-3)}{(x+3)^2} \cdot \dfrac{x^2+4x+3}{4x^2-9}$

$\dfrac{(2x-3)}{(x+3)^2}$, $\dfrac{x^2+4x+3}{4x^2-9}$ $\dfrac{(x+3)(x+1)}{(2x-3)(2x+3)}$

$\dfrac{x+1}{(x+3)(2x+3)}$

12. $\dfrac{x^2+4x}{x^2-6x+8} \cdot \dfrac{x^2-x-2}{3x^3+12x^2}$

$\dfrac{x^2+4x}{x^2-6x+8}$ $\dfrac{x\cancel{(x+4)}}{(x-4)\cancel{(x-2)}}$, $\dfrac{x^2-x-2}{3x^3+12x^2}$ $\dfrac{\cancel{(x-2)}(x+1)}{3x^2(x+4)}$, x^2 x

$\dfrac{x+1}{3x(x-4)}$

13. $\dfrac{x^2-25}{x+8} \div (x-5)$

$\dfrac{(x+5)\cancel{(x-5)}}{(x+8)} \cdot \dfrac{1}{\cancel{(x-5)}}$

$\dfrac{x+5}{x+8}$

14. $\dfrac{x^2+8x-20}{5x^3+50x^2} \cdot \dfrac{x^2+9x}{x^2+7x-18} = \dfrac{1}{5x}$

$\dfrac{x^2+8x-20}{5x^3+50x^2}$ $\dfrac{\cancel{(x+10)}\cancel{(x-2)}}{5x^2\cancel{(x+10)}}$, $\dfrac{x^2+9x}{x^2+7x-18}$ $\dfrac{\cancel{x}\cancel{(x+9)}}{\cancel{(x+9)}\cancel{(x-2)}}$, x^2 x

15. $\dfrac{(x+7)}{x^2+5x-14} \div \dfrac{x^2+x-6}{x+3}$

$\dfrac{x+7}{\cancel{(x+7)}(x-2)} \cdot \dfrac{\cancel{(x+3)}}{\cancel{(x+3)}(x-2)}$

$\dfrac{1}{(x-2)^2}$

16. $\dfrac{(2x^2y^3)^2}{(x^3y^2)^3} \div \dfrac{(4x)^2y^3}{(xy)^4}$

$\dfrac{4x^4y^6}{x^9y^6} \cdot \dfrac{x^4y^4}{16x^2y^3} = \dfrac{4x^8y^{10}}{16x^{11}y^9} =$

$\dfrac{y}{4x^3}$

17. $\frac{-3x-7}{-20x} + \frac{x+7}{-20x}$

$\frac{-3x-7+x+7}{-20x} = \frac{-2x}{-20x} = \frac{1}{10}$

18. $\frac{9}{x-3} + \frac{2}{3-x}$

$-1(x-3)$

$= \frac{9}{x-3} + \frac{-2}{x-3}$

$\frac{7}{x-3}$

19. $\frac{3x+4}{x^2-16} + \frac{-2}{(x-4)}$

$(x+4)(x-4)$ $\quad (x+4)(x+4)$

$\frac{3x+4-2x-8}{(x+4)(x-4)} = \frac{\cancel{(x-4)}}{(x+4)\cancel{(x-4)}} =$

$\frac{1}{x+4}$

20. $\frac{(x+6)(2x+1)}{(x+6)\,6} + \frac{-4\,(6)}{(x+6)(6)}$ $\quad 6(x+6)$

$\frac{2x^2+x+12x+6-24}{6(x+6)} = \frac{2x^2+13x-18}{6(x+6)}$

21. $\frac{6x(x+1)}{6x(x+1)}\,\frac{x+1}{2x} + \frac{3x^2}{(3x^2)}\,\frac{(2x+3)}{4(x+1)} + \frac{-5(x+1)}{12x^2(x+1)}$

LCD: $12x^2(x+1)$

$\frac{6x(x^2+2x+1)+6x^3+9x^2-5x-5}{12x^2(x+1)} =$

$\frac{6x^3+12x^2+6x+6x^3+9x^2-5x-5}{12x^2(x+1)} = \frac{12x^3+21x^2+x-5}{12x^2(x+1)}$

22. $\frac{3\,\frac{1}{x} - \frac{2}{3}\,\frac{3x}{3x}}{3\cdot\frac{3}{x} - \frac{1}{3x}}$

LCD: $3x$

$= \frac{\frac{3-6x}{3x}}{\frac{9-1}{3x}} = \frac{3-6x}{8}$

23. $\frac{(3)\,\frac{4}{x-3} + \frac{2}{3}\,\frac{(x-3)}{(x-3)}}{(3)\,\frac{5}{x-3}\,\frac{(3)}{(3)}}$

LCD: $3(x-3)$

$\frac{\frac{12+2x-6}{3(x-3)}}{\frac{15}{3(x-3)}} = \frac{6+2x}{15}$

24. $\frac{(x)\,\frac{2}{x+2} + \frac{-3}{x}\,\frac{(x+2)}{(x+2)}}{(x)\,\frac{3}{x+2} + \frac{2}{x}\,\frac{(x+2)}{(x+2)}}$

LCD: $x(x+2)$

$\frac{\frac{2x-3(x+2)}{x(x+2)}}{\frac{3x+2x+4}{x(x+2)}} = \frac{-x-6}{5x+4}$

Solve the equation. Check for extraneous solutions.

25. $\frac{6}{x-3} = \frac{5}{x^2-9}$

$(x+3)(x-3)$

$6(x+3)\cancel{(x-3)} = 5\cancel{(x-3)}$

$6(x+3) = 5$

$6x + 18 = 5$

$6x = -13$

$x = -13/6$

26. $\frac{x}{30} + \frac{-1}{5x} = \frac{1}{6}$

$(30x)$ $(30x)$ $(30x)$

CD ⇒ 30x

$x^2 - 6 = 5x$

$x^2 - 5x - 6 = 0$

$(x-6)(x+1) = 0$

$x = 6 \quad x = -1$

27. $\frac{x}{x+1} + \frac{1}{x-1} = \frac{4x-3}{(x+1)(x-1)}$

$(x+1)(x-1)$ $(x+1)(x-1)$ $(x+1)(x-1)$ CD ⇒ $(x+1)(x-1)$

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

$x^2 - x + x + 1 = 4x - 3$

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

$(x-2)(x-2) = 0$

$x = 2$

28. $\frac{2x}{x-2} = \frac{1}{x^2-4} + 1$

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

CD ⇒ $(x+2)(x-2)$

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

$2x^2 + 4x = 1 + x^2 - 4$

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

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

$x = -3 \quad x = -1$

29. $\frac{11}{x^2+6x} = \frac{3}{x^2+6x} + \frac{8}{x}$

$x(x+6)$ $x(x+6)$ $x(x+6)$ CD ⇒ $x(x+6)$

$11 = 3 + 8(x+6)$

$11 = 3 + 8x + 48$

$11 = 51 + 8x$

$-40 = 8x$

$x = -5$

30. $\frac{5}{x^2+x-6} = \frac{x-3}{x-2} + 2$

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

CD ⇒ $(x+3)(x-2)$

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

$5 = x^2 - 9 + 2(x^2 + x - 6)$

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

$-5 \quad -5$

$0 = 3x^2 + 2x - 26$

$x = \frac{-2 \pm \sqrt{4 - 4(3)(-26)}}{2(3)} = \frac{-2 \pm \sqrt{316}}{6} = \frac{-2 \pm 2\sqrt{79}}{6}$

$x = \frac{-1 \pm \sqrt{79}}{3}$

Solve the equation. Check for extraneous solutions.

25. $\frac{6}{x-2} = \frac{5}{x-3}$

$6(x-3) = 5(x-2)$

$6x - 18 = 5x - 10$

$x = 8$

26. $\frac{x}{30} + \frac{-1}{5x} = \frac{1}{6}$

$x^2 - 6 = 5x$

$x^2 - 5x - 6 = 0$

$(x-6)(x+1) = 0$

$x = 6 \quad x = -1$

27. $\frac{x}{x+1} + \frac{1}{x-1} = \frac{4x-3}{(x+1)(x-1)}$

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

$x^2 - x + x + 1 = 4x - 3$

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

$(x-2)(x-2) = 0$

$x = 2$

28. $\frac{2x}{x-2} = \frac{1}{x^2-4} + 1$

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

$2x^2 + 4x = 1 + x^2 - 4$

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

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

$x = -3 \quad x = -1$