Honors Math 2
Unit 8 day 4

Name Key
Period_____ Date_____

Identify the x-intercept(s), vertical asymptote(s) and horizontal asymptote of the graph of the function.

1. $y = \frac{x^2 + 2x - 15}{x^2 - 36}$

$(x+5)(x-3)$
$(x+6)(x-6)$

x-intercept: $(-5,0)$ $(3,0)$
V.A.: $x=6$ $x=-6$
H.A.: $y=1$

2. $y = \frac{x^2 - 2x - 3}{2x^2 - 8}$

$(x-3)(x+1)$
$2(x^2-4)$
$2(x+2)(x-2)$

x-intercept: $(3,0)$ $(-1,0)$
V.A.: $x=-2$ $x=2$
H.A: $y = 1/2$

3. $y = \frac{2x-1}{x^2+7}$

x-intercept: $(1/2, 0)$
V.A.: None
H.A: $y=0$

4. $y = \frac{4x-8}{x^2 - 2x + 1}$

$4(x-2)$
$(x-1)(x-1)$

x-intercept: $(2,0)$
V.A.: $x=1$
H.A.: $y=0$

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

$(2x+3)(x-1)$
$(x-5)(x+4)$

x-intercept: $(-3/2, 0)$ $(1,0)$
V.A.: $x=5$ $x=-4$
H.A.: $y=2$

6. $y = \frac{x-3}{x^2-16}$

$(x+4)(x-4)$

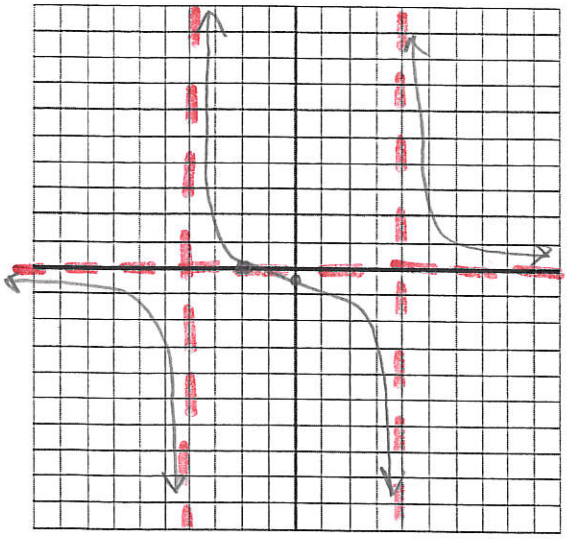
x-intercept: $(3,0)$
V.A.: $x=4$ $x=-4$
H.A: $y=0$

Graph the function. Show all asymptotes and intercepts.

7. $h(x) = \frac{2x+4}{x^2-16}$

$2(x+2)$
$(x+4)(x-4)$

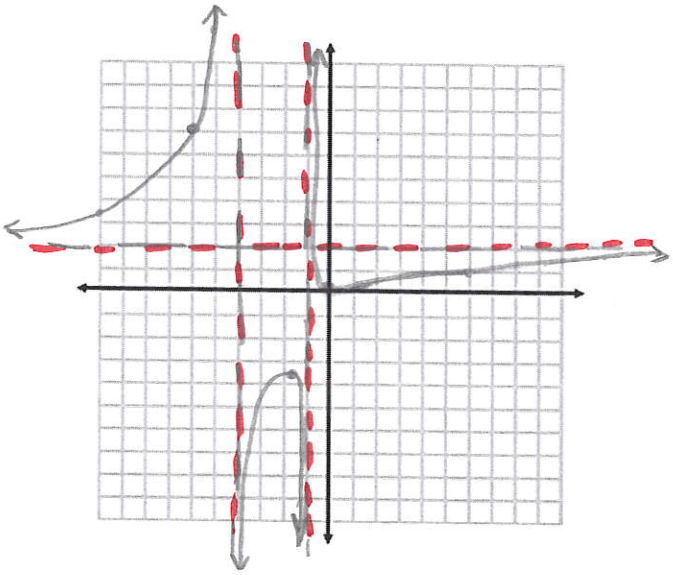
x-intercept: $(-2,0)$
y-intercept: $(0, -1/4)$
VA: $x=4$ $x=-4$
HA: $y=0$



8. $f(x) = \frac{2x^2}{x^2+5x+4}$

$(x+4)(x+1)$

x-intercept: $(0,0)$
y-int: $(0,0)$
VA: $x=-4$ $x=-1$
HA: $y=2$



$(x+\sqrt{3})(x-\sqrt{3})$

9. $f(x) = \dfrac{x^2-3}{2x^2+5x-12}$

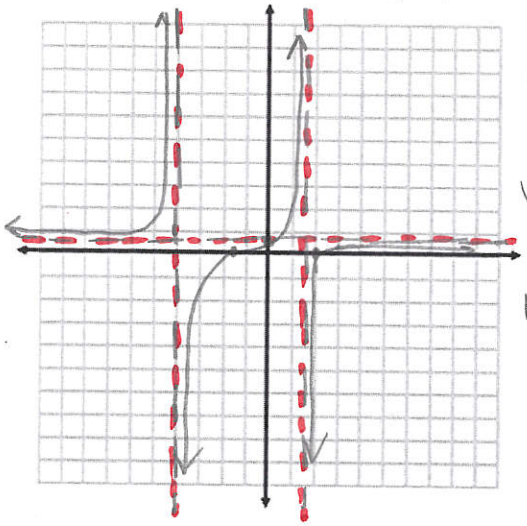
$(2x-3)(x+4)$

x-int: $(\sqrt{3},0)$ $(-\sqrt{3},0)$

y-int: $(0,1/4)$

V.A.: $x=\frac{3}{2}$, $x=-4$

HA: $y=\frac{1}{2}$



$(5x+2)(x+1)$

10. $g(x) = \dfrac{5x^2+7x+2}{2x^2-8}$

$2(x^2-4)$

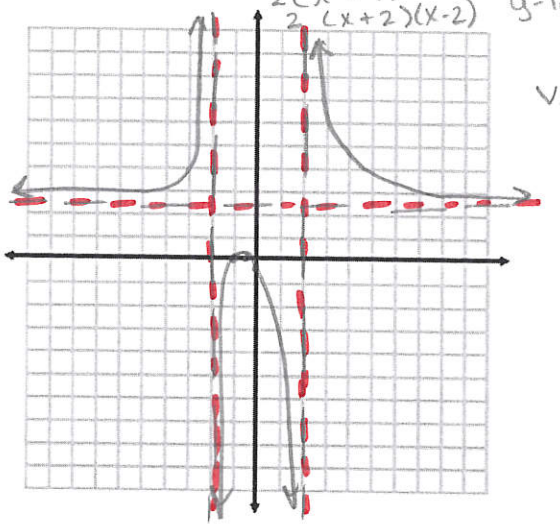
$2(x+2)(x-2)$

x-int: $(-2/5,0)$ $(-1,0)$

y-int: $(0,-1/4)$

VA: $x=2$, $x=-2$

HA: $y=5/2$



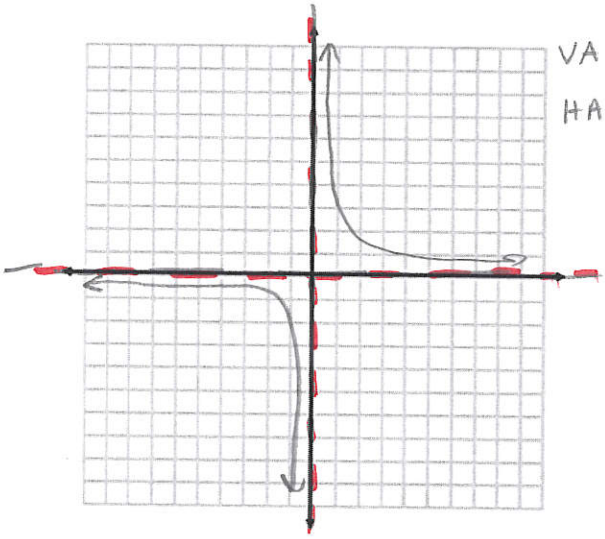
11. $f(x) = \dfrac{2x^2+3}{x^3}$

x-int: None

y-int: None

VA: $x=0$

HA: $y=0$



$(3x-2)(x+4)$

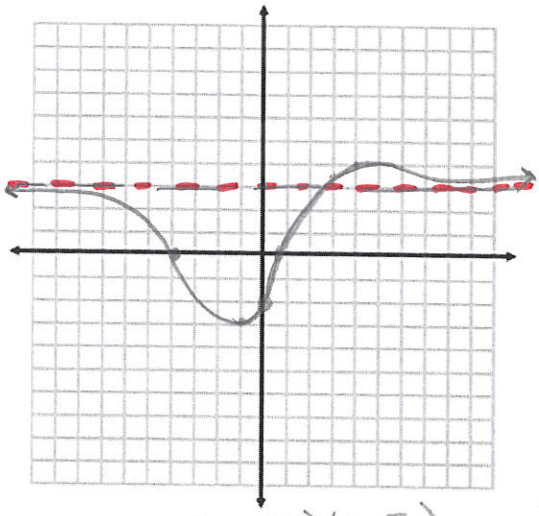
12. $h(x) = \dfrac{3x^2+10x-8}{x^2+4}$

x-int: $(2/3,0)$ $(-4,0)$

y-int: $(0,-2)$

VA: None

HA: $y=3$



13. $g(x) = \dfrac{x-4}{x^2-3x}$

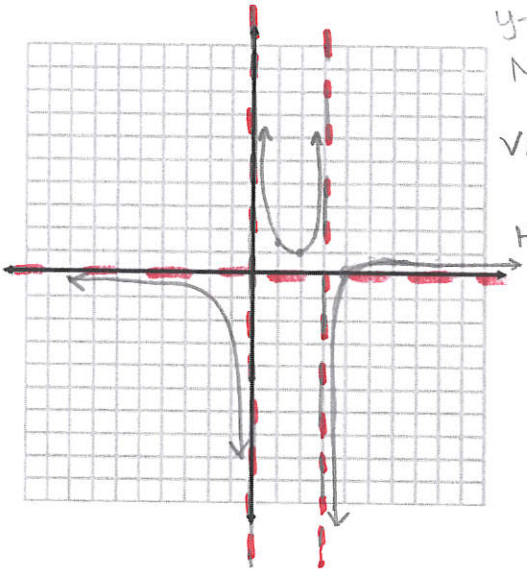
$x(x-3)$

x-int: $(4,0)$

y-int: None

VA: $x=0$, $x=3$

HA: $y=0$



$(x+\sqrt{10})(x-\sqrt{10})$

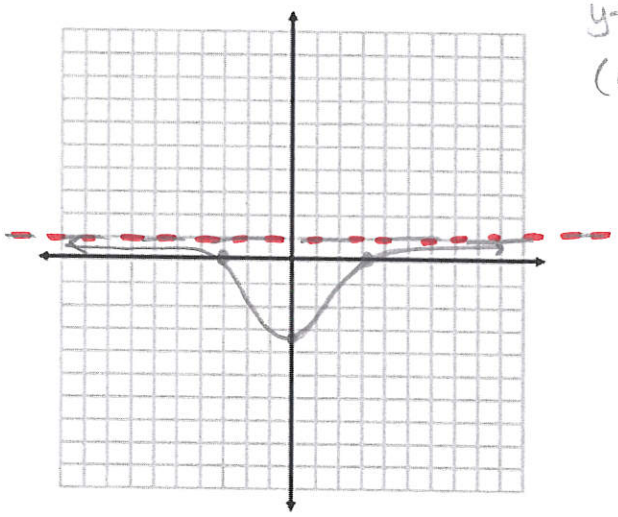
14. $f(x) = \dfrac{x^2-10}{x^2+3}$

x-int: $(\sqrt{10},0)$ $(-\sqrt{10},0)$

y-int: $(0,-10/3)$

VA: None

HA: $y=1$



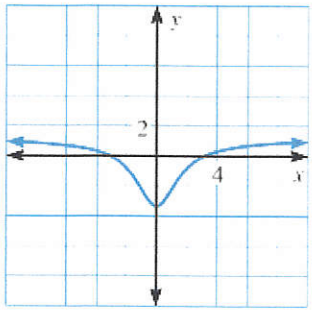
MATCHING GRAPHS Match the function with its graph.

15. $y = \dfrac{-10}{x^2 - 9}$ C

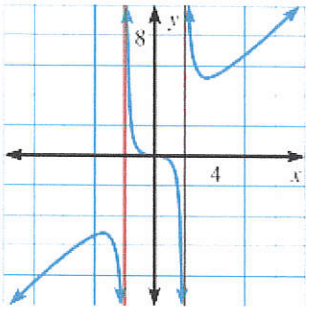
16. $y = \dfrac{x^2 - 10}{x^2 + 3}$ A

17. $y = \dfrac{x^3}{x^2 - 4}$ B

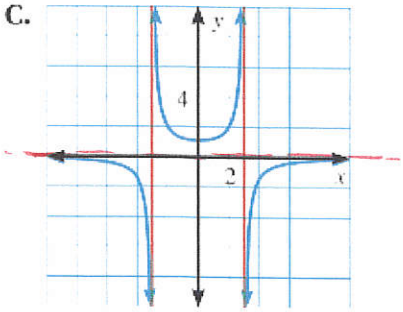
A.



B.



C.



Simplify or perform the indicated operation.

18. $\dfrac{x^2+11x+28}{2x^2+8x}$

$\dfrac{(x+7)\cancel{(x+4)}}{2x\cancel{(x+4)}}$

$\dfrac{x+7}{2x}$

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

$\dfrac{\cancel{(x-2)}\cancel{(x^2+2x+4)}}{(x+4)\cancel{(x-2)}} \cdot \dfrac{\cancel{2x}(3x-4)}{\cancel{2x}\cancel{(x^2+2x+4)}}$

$\dfrac{3x-4}{x+4}$

20. $\dfrac{x}{2(x^3 - 8)} + \dfrac{(x-2)(x-2)}{6x^3 + 12x^2 + 24x}$

$(3)(x)$

$2(x-2)(x^2+2x+4)$ $6x(x^2+2x+4)$

CD $\Rightarrow 6x(x-2)(x^2+2x+4)$

$\dfrac{3x^2+x^2-4x+4}{6x(x-2)(x^2+2x+4)} = \dfrac{4x^2-4x+4}{6x(x-2)(x^2+2x+4)}$

$\dfrac{4(x^2-x+1)}{6x(x-2)(x^2+2x+4)} = \dfrac{2(x^2-x+1)}{3x(x-2)(x^2+2x+4)} = \dfrac{2x^2-2x+2}{3x(x-2)(x^2+2x+4)}$

21. $\dfrac{6}{25x^2} + \dfrac{x}{5x^3 + 5x}$

(x^2+1) $(5x)$

$5x(x^2+1)$

CD $\Rightarrow 25x^2(x^2+1)$

$\dfrac{6x^2+6+5x^2}{25x^2(x^2+1)}$

$\dfrac{11x^2+6}{25x^2(x^2+1)}$

22. $\dfrac{3x^2yz}{4yz^2} \cdot \dfrac{5xy^2z}{x^4y}$

y x

$\dfrac{15y}{4x}$

23. $\dfrac{16x}{4x - 8} \div \dfrac{x^2}{x^2-4} \cdot \dfrac{x+6}{8}$

$4(x-2)$ $(x+2)(x-2)$

$\dfrac{\cancel{16x}^{\,4}}{\cancel{4(x-2)}_{\,2}} \cdot \dfrac{(x+2)\cancel{(x-2)}}{\cancel{x^2}_{\,x}} \cdot \dfrac{(x+6)}{\cancel{8}}$

$\dfrac{(x+2)(x+6)}{2x}$

24. $\frac{4-x^2}{x^2+4x-12}$ $\frac{(2+x)\overset{-1}{\cancel{(2-x)}}}{(x+6)\cancel{(x-2)}}$

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

25. $\frac{1-x^3}{x^2-1}$ $\frac{-1\cancel{(1-x)}(1+x+x^2)}{(x+1)\cancel{(x-1)}}$

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

Solve the system.

26. $-4(x^2+y^2)=(25)(-4)$

$4x^2+25y^2=100$

$-4x^2-4y^2=-100$

$21y^2=0$

$y^2=0$

$y=0$

$x^2+0=25$

$x=\pm\sqrt{25}$

$x=\pm 5$

$\boxed{(5,0) \quad (-5,0)}$

27. $y=x^2-9$

$x^2+y^2=9$

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

$x^2+x^4-18x^2+81=9$

$x^4-17x^2+72=0$

$(x^2-8)(x^2-9)=0$

$x=\pm\sqrt{8} \quad x=\pm 3$

$x=\pm 2\sqrt{2}$

$\boxed{(\pm 2\sqrt{2},-1) \quad (\pm 3,0)}$

Solve. $(x+1)\cancel{(x-1)}$

28. $\frac{6}{\cancel{x-1}}=\frac{9}{\cancel{x+1}}$ $\cancel{(x+1)}(x-1)$ $(x+1)(x-1)$

$6(x+1)=9(x-1)$

$6x+6=9x-9$

$15=3x$

$x=5$

29. $\frac{18}{x^2-3x}+\frac{-6}{x-3}=\frac{5}{x}$ $x(x-3)$

$x(x-3)$

$18-6(x)=5(x-3)$

$18-6x=5x-15$

$+15 \quad +6x \qquad +6x \quad +15$

$\frac{33}{11}=\frac{11x}{11}$

$\cancel{x=3}$ extraneous

No solution