Answer Key

Math 3 Honors Name _____ ID: 1

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Review #1 Day 8 Date _____ Period ____

Simplify each expression.

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

A) $\dfrac{324}{81-8x}$ B) $\dfrac{x^3}{9+2x^2}$

C) $\dfrac{18}{2x^2-27}$ *D) $\dfrac{9-2x^2}{6x^2}$

2) $\dfrac{\left(\frac{1}{2}\right)4}{\left(\frac{x}{4}\right)+\left(\frac{1}{2}\right)4}$ 4 $= \dfrac{2}{x+2}$

A) $\dfrac{4x}{x+32}$ B) $\dfrac{32}{4x+x^2}$

C) $\dfrac{2x-1}{4x^2}$ *D) $\dfrac{2}{x+2}$

3) $\dfrac{\left(\frac{2}{u}\right)36u}{\left(\frac{1}{9}\right)+\left(\frac{u^2}{36}\right)}$ $36u$ $36u$ $= \dfrac{72}{4u+u^3}$

A) $\dfrac{48u^2}{24+u^4}$ *B) $\dfrac{72}{4u+u^3}$

C) $\dfrac{1+u^2}{3}$ D) $\dfrac{3u^2+4}{24}$

4) $\dfrac{(25)\,25x^2}{\left(\frac{x+4}{x^2}\right)+\left(\frac{x}{25}\right)}$ $25x^2$ $25x^2$

A) $\dfrac{x^3+8x^2+16x}{5+x}$

B) $\dfrac{5x^2+20x}{-x^2-8x+9}$

C) $\dfrac{129+x}{5x^2+40x+80}$

*D) $\dfrac{625x^2}{25x+100+x^3}$

5) $\dfrac{5}{15n+10} \div \dfrac{1}{15n^3+10n^2} = \dfrac{5}{5(3n+2)} \cdot \dfrac{5n^2(3n+2)}{1}$ $= 5n^2$

A) n B) $\dfrac{4n^2}{(n-8)(n-3)}$

*C) $5n^2$ D) $\dfrac{7n^2}{4}$

6) $\dfrac{7r^2}{r^2-13r+42} \div \dfrac{1}{r^2-13r+42}$ $= \dfrac{7r^2}{(r-7)(r-6)} \cdot \dfrac{(r-7)(r-6)}{1}$ $= 7r^2$

A) $2r$ B) $\dfrac{r+6}{5}$

*C) $7r^2$ D) $r+3$

Solve each equation. Remember to check for extraneous solutions.

7) $\left(\dfrac{2a+14}{a^2-5a}+\dfrac{1}{a}=\dfrac{a+3}{a}\right)a(a-5)$

A) $\left\{-3, \frac{1}{2}\right\}$ B) $\{-3, -5\}$

C) $\{-3, 5\}$ *D) $\{-3, 8\}$

$2a+14+(a-5) = (a+3)(a-5)$

$2a+14+a-5 = a^2-2a-15$

$0 = a^2-5a-24$

$0 = (a-8)(a+3)$

$a=8$ $a=-3$

8) $\left(\dfrac{4v+12}{v}=\dfrac{v-7}{v}+\dfrac{1}{v^2+7v}\right)v(v+7)$

*A) $\left\{-6, -\frac{22}{3}\right\}$ B) $\left\{-\frac{7}{2}, -\frac{22}{3}\right\}$

C) $\left\{-\frac{22}{3}\right\}$ D) $\left\{\frac{7}{2}, -\frac{22}{3}\right\}$

$(4v+12)(v+7) = (v-7)(v+7)+1$

$4v^2+28v+12v+84 = v^2-49+1$

$4v^2+40v+84 = v^2-48$

$3v^2+40v+132 = 0$

$v = -6, -\frac{22}{3}$

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Solve each equation.

work below

9) $972 = 4 \cdot (3v)^{\frac{5}{4}}$

*A) {27} B) {9, −4}
C) {9, −3} D) {−3}

10) $1 + k^{\frac{3}{2}} = 730$

A) {−10, 23} B) {−10}
C) {5, −10} *D) {81}

11) $(125x)^{-\frac{1}{3}} = \frac{1}{5}$

*A) {1} B) {8, 23}
C) {8, 3} D) {8}

12) $0 = 6 - 3r^{\frac{1}{5}}$

*A) {32} B) {−32, −4}
C) {−32, 4} D) {−4}

(9) $\frac{972}{4} = \frac{4 \cdot (3v)^{\frac{5}{4}}}{4}$

$243 = (3v)^{\frac{5}{4}}$

$(243)^{\frac{4}{5}} = ((3v)^{\frac{5}{4}})^{\frac{4}{5}}$

$\frac{81}{3} = \frac{3v}{3}$

$v = 27$

(10) $1 + k^{\frac{3}{2}} = 730$

$k^{\frac{3}{2}} = 729$

$(k^{\frac{3}{2}})^{\frac{2}{3}} = (729)^{\frac{2}{3}}$

$k = 81$

(11) $(125x)^{-\frac{1}{3}} = \frac{1}{5}$

$((125x)^{-\frac{1}{3}})^{-3} = (\frac{1}{5})^{-3}$

$125x = 125$

$x = 1$

(12) $0 = 6 - 3r^{\frac{1}{5}}$

$-6 \quad -6$

$-6 = -3r^{\frac{1}{5}}$

$2 = r^{\frac{1}{5}}$

$(2)^5 = (r^{\frac{1}{5}})^5$

$32 = r$

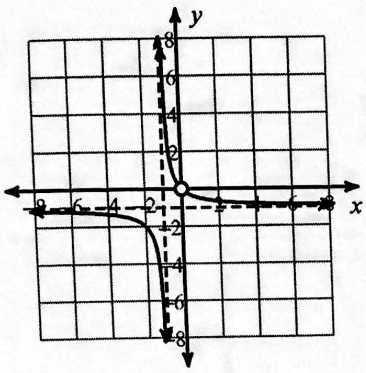
Graph each function.

13) $f(x) = -\frac{1}{x} - 1$

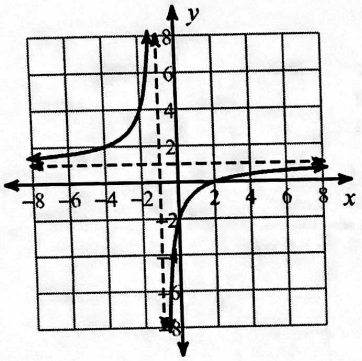
VA: $x = 0$

HA: $y = -1$

A)



B)



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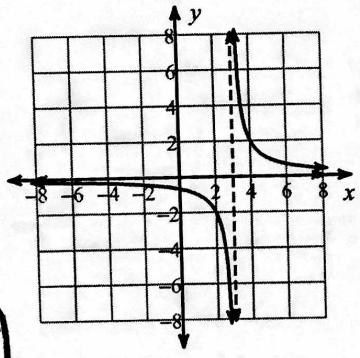
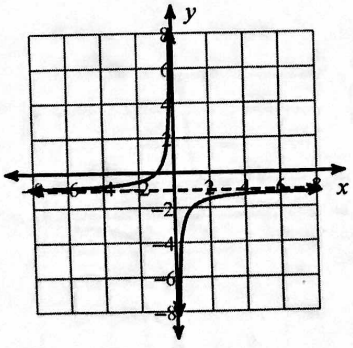


*D)

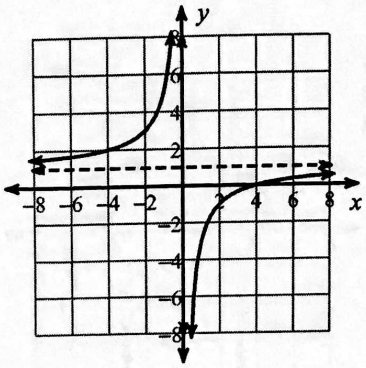


14) $f(x) = \frac{2}{x+1} - 3$

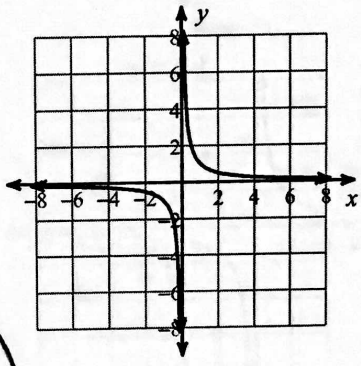
VA: $x = -1$

HA: $y = -3$

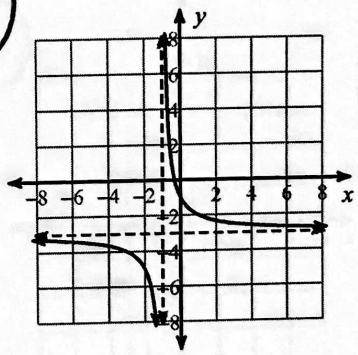
A)



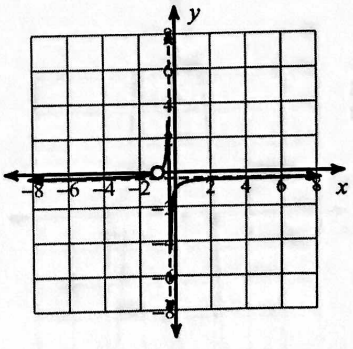
B)



*C)



D)

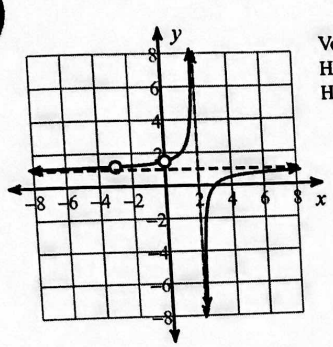


Identify the holes, vertical asymptotes, and horizontal asymptote of each. Then sketch the graph.

15) $f(x) = \dfrac{x^3 - 9x}{x^3 + x^2 - 6x} = \dfrac{x(x^2-9)}{x(x^2+x-6)} = \dfrac{x(x+3)(x-3)}{x(x+3)(x-2)}$

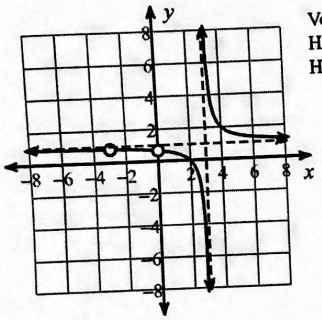
16) $f(x) = \dfrac{1}{-3x^2 - 3x + 18} = \dfrac{1}{-3(x^2+x-6)} = \dfrac{1}{-3(x+3)(x-2)}$

*A)



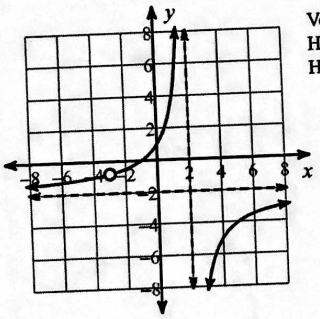
Vertical Asym.: $x = 2$
Holes: $x = 0$, $x = -3$
Horz. Asym.: $y = 1$

B)



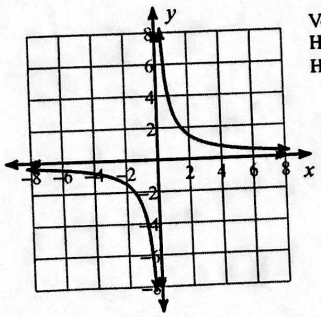
Vertical Asym.: $x = 3$
Holes: $x = 0$, $x = -3$
Horz. Asym.: $y = 1$

C)



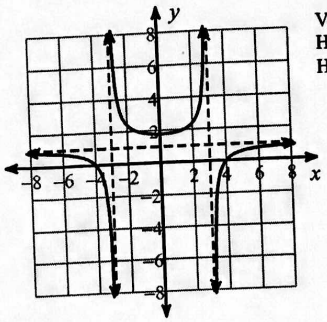
Vertical Asym.: $x = 2$
Holes: $x = -3$
Horz. Asym.: $y = -2$

D)



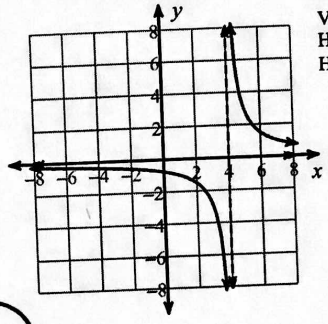
Vertical Asym.: $x = 0$
Holes: None
Horz. Asym.: $y = 0$

A)



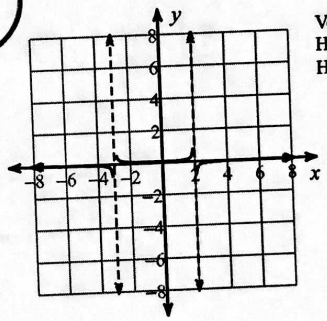
Vertical Asym.: $x = 3$, $x = -3$
Holes: None
Horz. Asym.: $y = 1$

B)



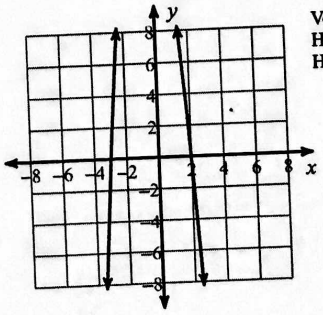
Vertical Asym.: $x = 4$
Holes: None
Horz. Asym.: $y = 0$

*C)



Vertical Asym.: $x = 2$, $x = -3$
Holes: None
Horz. Asym.: $y = 0$

D)



Vertical Asym.: None
Holes: None
Horz. Asym.: None

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Simplify each expression.

17) $\dfrac{1}{b-5} \div \dfrac{b-2}{-b^2+10b-25}$

*A) $\dfrac{-b+5}{b-2}$ B) $\dfrac{b+1}{b+7}$

C) $\dfrac{4b^2}{b+7}$ D) 7

work below ↓

18) $\dfrac{1}{p+7} \div \dfrac{2}{p^2+11p+28}$

A) $\dfrac{p}{2(p-5)}$ B) $\dfrac{p-2}{p+6}$

C) $\dfrac{p+4}{p+3}$ *D) $\dfrac{p+4}{2}$

19) $\dfrac{6n-2}{7n^2-44n+12} + \dfrac{2n}{6}$

A) 0

*B) $\dfrac{30n-6+7n^3-44n^2}{3(n-6)(7n-2)}$

C) $\dfrac{48n-12+7n^3-44n^2}{6(n-6)(7n-2)}$

D) $\dfrac{6n-1}{7n^2-44n+18}$

20) $\dfrac{2k}{3k} - \dfrac{6}{6k^2-18k-24}$ → work on next page for 20

A) $\dfrac{-3k^2+9k+16}{3}$

B) $\dfrac{k^2-3k-5}{(k-4)(k+1)}$

*C) $\dfrac{2k^2-6k-11}{3(k-4)(k+1)}$

D) $\dfrac{1}{(k-4)(k+1)}$

(17) $\dfrac{1}{b-5} \div \dfrac{b-2}{-b^2+10b-25}$

$-1 \cdot -25 = 25$ → $5\ 5$

$-b^2+5b+5b-25$

$-b(b-5)+5(b-5)$

$(-b+5)(b-5)$

$\dfrac{1}{b-5} \cdot \dfrac{(-b+5)(b-5)}{b-2}$

$\boxed{\dfrac{-b+5}{b-2}}$

(18) $\dfrac{1}{p+7} \cdot \dfrac{(p+7)(p+4)}{2}$

$= \boxed{\dfrac{p+4}{2}}$

(19) $7n^2-44n+12$

84 → $7n^2-42n-2n+12$

$-42\ -2$

$7n(n-6)-2(n-6)$

$(7n-2)(n-6)$

$\dfrac{2(3n-1)}{(7n-2)(n-6)} + \dfrac{2n}{6} = \dfrac{2(6)(3n-1)+2n(7n-2)(n-6)}{6(7n-2)(n-6)}$ (3)

$= \dfrac{18n-6+n(7n^2-42n-2n+12)}{3(7n-2)(n-6)} =$

$= \dfrac{18n-6+7n^3-42n^2-2n^2+12n}{3(7n-2)(n-6)} = \boxed{\dfrac{7n^3-44n^2+30n-6}{3(7n-2)(n-6)}}$

(20) $\frac{2k}{3k} - \frac{6}{6k^2-18k-24}$

$= \frac{2k}{3k} - \frac{6}{6(k^2-3k-4)} = \frac{2k}{3k} - \frac{6}{6(k-4)(k+1)}$

$= \frac{2k}{3k} - \frac{1}{(k-4)(k+1)} = \frac{2(k-4)(k+1) - 1(3)}{3(k-4)(k+1)}$

$= \frac{2(k^2+k-4k-4)-3}{3(k^2+k-4k-4)} = \frac{2(k^2-3k-4)-3}{3(k^2-3k-4)}$

$= \frac{2k^2-6k-8-3}{3(k^2-3k-4)} = \boxed{\frac{2k^2-6k-11}{k(k-4)(k+1)}}$