MATH 12 Sec. 3.7 – SOLUTIONS

(51) $r(x) = \dfrac{3x+6}{x^2+2x-8} = \dfrac{3(x+2)}{(x+4)(x-2)}$

1) ASYMPTOTES

VERTICAL: $x = -4$ AND $x = 2$

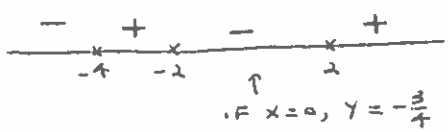
HORIZONTAL: $y = 0$

2) INTERCEPTS

Y-INT.: $x = 0$ GIVES $y = -\frac{3}{4}$

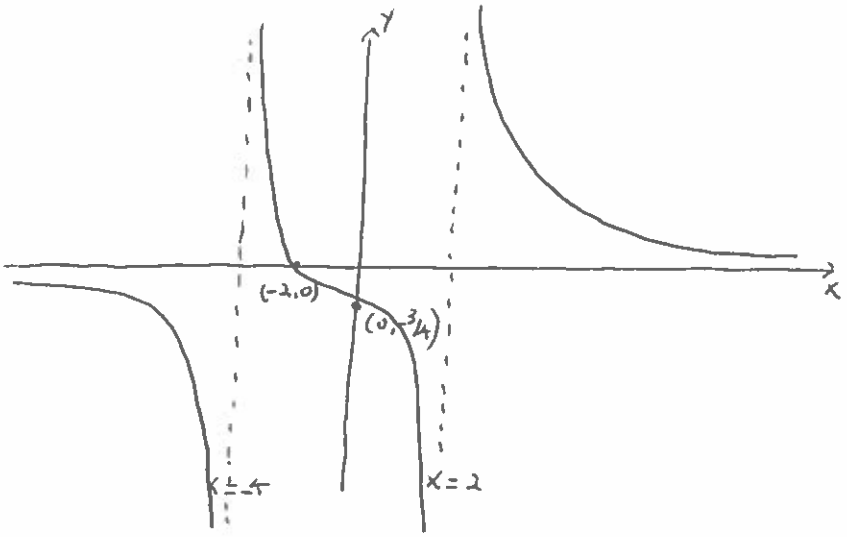
X-INT.: $y = 0$ GIVES $x = -2$

3)




4) INTERSECTION WITH HA

$\dfrac{3x+6}{x^2+2x-8} = 0$ GIVES $x = -2$




DOMAIN: $(-\infty,-4) \cup (-4,2) \cup (2,\infty)$

RANGE: $(-\infty,\infty)$

(53) $r(x) = \dfrac{(x-1)(x+2)}{(x+1)(x-3)} = \dfrac{x^2+x-2}{x^2-2x-3}$

1) ASYMPTOTES

VERTICAL: $x = -1$ AND $x = 3$

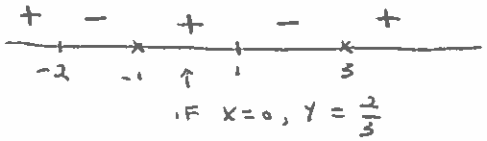
HORIZONTAL: $y = 1$

2) INTERCEPTS

Y-INT.: $x = 0$ GIVES $y = \frac{2}{3}$

X-INT.: $y = 0$ GIVES $x = 1$, $x = -2$

3)

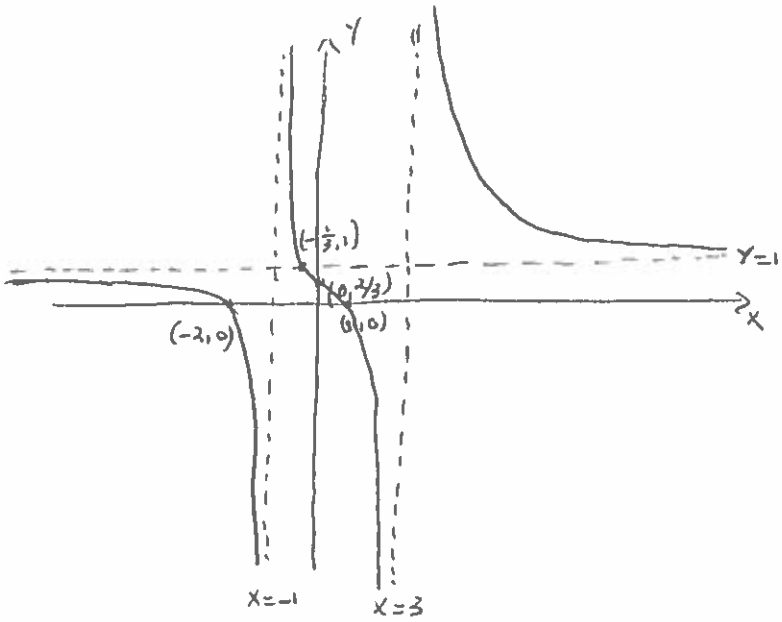



4) INTERSECTION WITH HA

$\dfrac{x^2+x-2}{x^2-2x-3} = 1$ $\qquad x^2+x-2 = x^2-2x-3$

$3x = -1$

$x = -\frac{1}{3}$




DOMAIN = $(-\infty,-1) \cup (-1,3) \cup (3,\infty)$

RANGE = $(-\infty,\infty)$

MATH 12 Sec. 3.7 — SOLUTIONS

(57) $r(x) = \dfrac{2x^2+10x-12}{x^2+x-6} = \dfrac{2(x^2+5x-6)}{(x+3)(x-2)} = \dfrac{2(x+6)(x-1)}{(x+3)(x-2)}$

1) ASYMPTOTES

VERTICAL: $x=-3$ AND $x=2$

HORIZONTAL: $y=2$

2) INTERCEPTS

Y-INT.: $x=0$ GIVES $y=\underline{1}$

X-INT.: $y=0$ GIVES $x=\underline{-6}$, $x=\underline{1}$

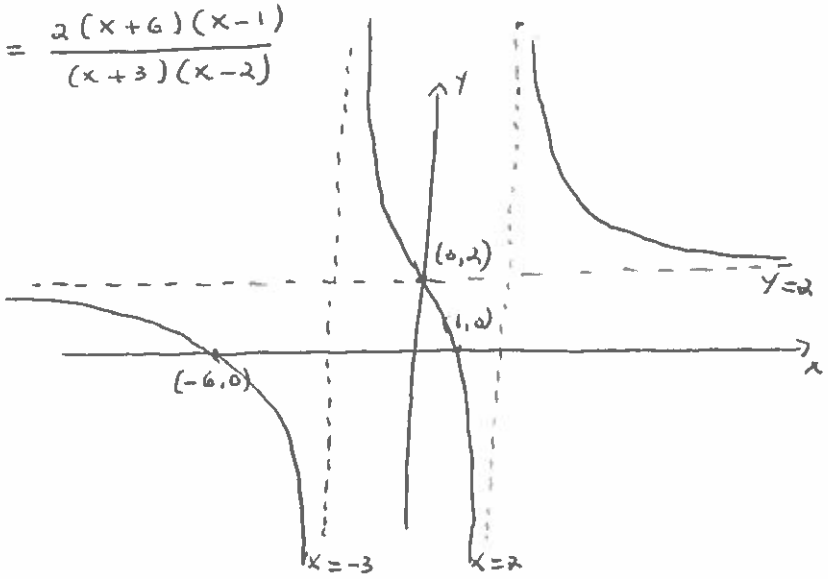
3) $+ \quad - \quad + \quad - \quad +$ on $-6, -3, 1, 2$

IF $x=0$, $y=2$

4) INTERSECTION WITH HA

$\dfrac{2x^2+10x-12}{x^2+x-6} = 2 \qquad 2x^2+10x-12 = 2x^2+2x-12$

$8x = 0 \qquad x=0$




DOMAIN: $(-\infty,-3) \cup (-3,2) \cup (2,\infty)$

RANGE: $(-\infty,\infty)$

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

1) ASYMPTOTES

VERTICAL: $x=0$ AND $x=-3$

HORIZONTAL: $y=1$

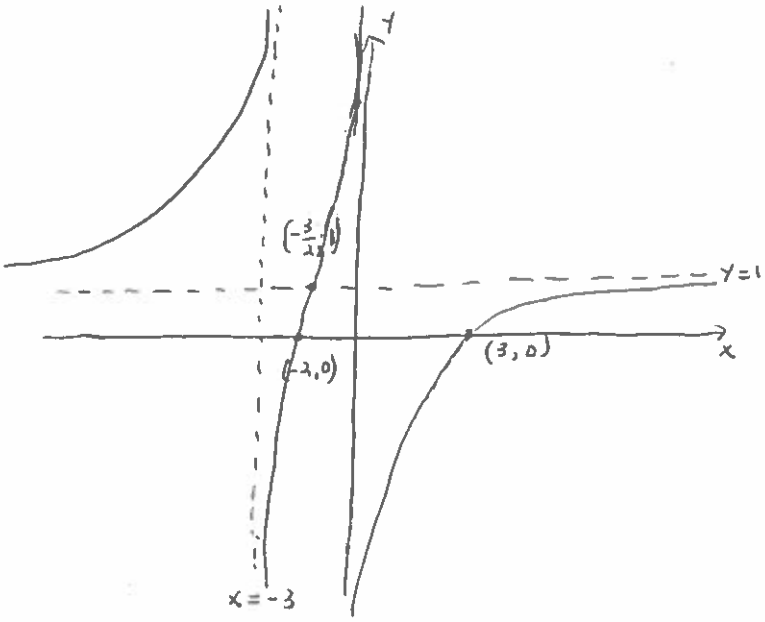
2) INTERCEPTS

Y-INT.: $x=0$ GIVES NO SOL.

X-INT.: $y=0$ GIVES $x=\underline{3}$, $x=\underline{-2}$

3) $+ \quad - \quad + \quad - \quad +$ on $-3, -2, 0, 3$

IF $x=4$, $y = \dfrac{1.6}{4.9}$




4) INTERSECTION WITH HA

$\dfrac{x^2-x-6}{x^2+3x} = 1 \qquad x^2-x-6 = x^2+3x$

$-6 = 4x$

$x = -3/2$

DOMAIN

$(-\infty,-3) \cup (-3,0) \cup (0,\infty)$

RANGE: $(-\infty,\infty)$

MATH 12 Sec. 3.7 — SOLUTIONS

(65) $r(x) = \dfrac{x^2}{x-2} = x+2+\dfrac{4}{x-2}$

$$\begin{array}{r|l} x-2 & x+2 \\ \hline & x^2 \\ & x^2-2x \\ \hline & 2x \\ & 2x-4 \\ \hline & 4 \end{array}$$

1) ASYMPTOTES

VERTICAL: $x=2$

SLANTED: $y=x+2$

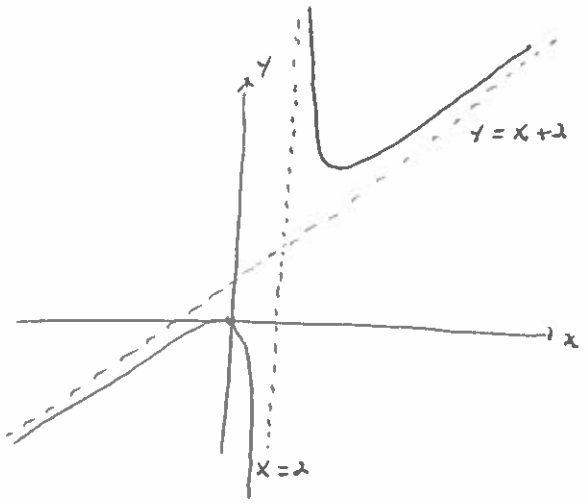
2) INTERCEPTS

Y-INT.: $x=0$ GIVES $y=0$

X-INT.: $y=0$ GIVES $x=0$

3) $-$ $-$ $+$ (0, 2, ↑)

IF $x=3$, $y=9$




(66) $r(x) = \dfrac{x^2+2x}{x-1} = x+3+\dfrac{3}{x-1}$

$$\begin{array}{r|l} x-1 & x+3 \\ \hline & x^2+2x \\ & x^2-x \\ \hline & 3x \\ & 3x-3 \\ \hline & 3 \end{array}$$

1) ASYMPTOTES

VERTICAL: $x=1$

SLANTED: $y=x+3$

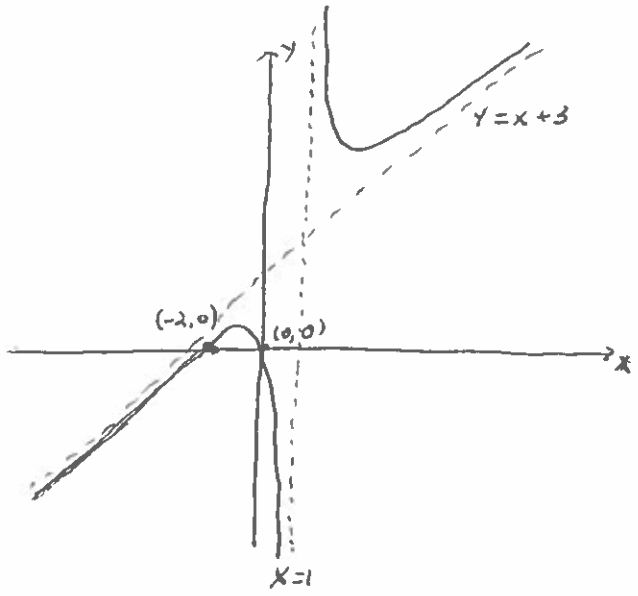
2) INTERCEPTS

Y-INT.: $x=0$ GIVES $y=0$

X-INT.: $y=0$ GIVES $x(x+2)=0$ SO $x=0$, $x=-2$

3) $-$ $+$ $-$ $+$ (−2, 0, 1, ↑) $\quad y = \dfrac{x(x+2)}{x-1}$

IF $x=2$, $y=8$




(69) $r(x) = \dfrac{x^2+5x+4}{x-3} = \dfrac{(x+4)(x+1)}{x-3} = x+8+\dfrac{28}{x-3}$

$$\begin{array}{r|l} x-3 & x+8 \\ \hline & x^2+5x+4 \\ & x^2-3x \\ \hline & 8x \\ & 8x-24 \\ \hline & 28 \end{array}$$

1) ASYMPTOTES

VERTICAL: $x=3$

SLANTED: $y=x+8$

2) INTERCEPTS

Y-INT.: $x=0$ GIVES $y=-\frac{4}{3}$

X-INT.: $y=0$ GIVES $x=-4$, $x=-1$

3) $-$ $+$ $-$ $+$ (−4, −1, 3, ↑)

IF $x=0$, $y=-\frac{4}{3}$