

Unit 3 Quiz Review

Divide.

1) $(5a^4 - 6a^3 - a^2 - 10a - 15) \div (a - 2)$

$$\begin{array}{r}
 5a^3 + 4a^2 + 7a + 4 \\
 a-2 \overline{) 5a^4 - 6a^3 - a^2 - 10a - 15} \\
 \underline{\ominus 5a^4 - 10a^3} \\
 4a^3 - a^2 \\
 \underline{\ominus 4a^3 - 8a^2} \\
 7a^2 - 10a \\
 \underline{\ominus 7a^2 - 14a} \\
 4a - 15 \\
 \underline{\ominus 4a - 8} \\
 -7
 \end{array}$$

$$5a^3 + 4a^2 + 7a + 4 - \frac{7}{a-2}$$

2) $(n^3 + n^2 - 40n + 8) \div (n + 7)$

$$\begin{array}{r}
 n^2 - 6n + 2 \\
 n+7 \overline{) n^3 + n^2 - 40n + 8} \\
 \underline{\ominus n^3 + 7n^2} \\
 -6n^2 - 40n \\
 \underline{\ominus -6n^2 - 42n} \\
 2n + 8 \\
 \underline{\ominus 2n + 14} \\
 -6
 \end{array}$$

$$n^2 - 6n + 2 - \frac{6}{n+7}$$

3) $(5n^4 + 30n^3 - 4n - 31) \div (n + 6)$

$$\begin{array}{r}
 5n^3 - 4 \\
 n+6 \overline{) 5n^4 + 30n^3 - 4n - 31} \\
 \underline{\ominus 5n^4 + 30n^3} \\
 -4n - 31 \\
 \underline{\ominus -4n - 24} \\
 -7
 \end{array}$$

$$5n^3 - 4 - \frac{7}{n+6}$$

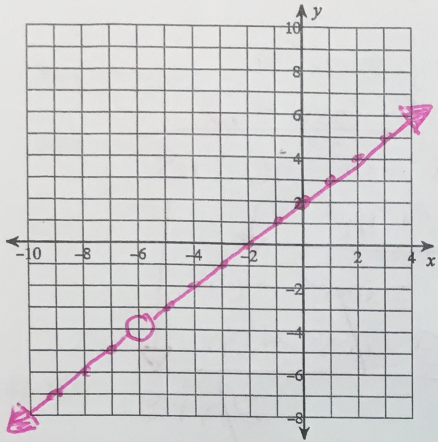
4) $(x^5 + 5x^3 + 9x^2 - 3x - 3) \div (x + 1)$

$$\begin{array}{r}
 x^4 - x^3 + 6x^2 + 3x - 6 \\
 x+1 \overline{) x^5 + 5x^3 + 9x^2 - 3x - 3} \\
 \underline{\ominus x^5 + x^4} \\
 -x^4 + 5x^3 \\
 \underline{\ominus -x^4 - x^3} \\
 6x^3 + 9x^2 \\
 \underline{\ominus 6x^3 + 6x^2} \\
 3x^2 - 3x \\
 \underline{\ominus 3x^2 + 3x} \\
 -6x - 3 \\
 \underline{\ominus -6x - 6} \\
 3
 \end{array}$$

$$x^4 - x^3 + 6x^2 + 3x - 6 + \frac{3}{x+1}$$

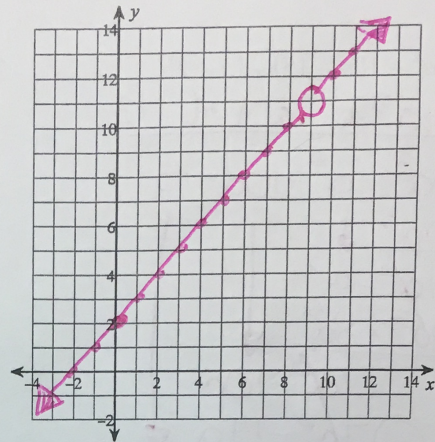
Simplify and state the excluded values for each function. Then graph.

$$5) y = \frac{x^2 + 8x + 12}{x + 6} \rightarrow x \neq -6$$



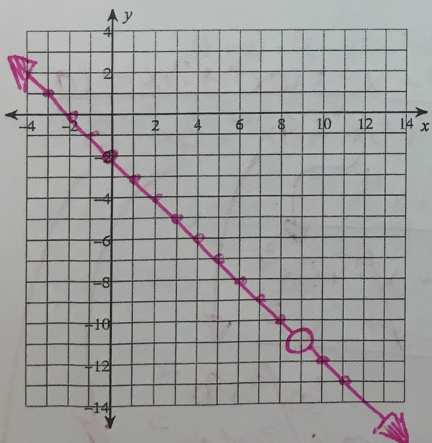
$$y = \frac{x^2 + 8x + 12}{x + 6} = \frac{(x+6)(x+2)}{x+6} = \boxed{x+2}$$

$$6) y = \frac{x^2 - 7x - 18}{x - 9} \rightarrow x \neq 9$$



$$y = \frac{x^2 - 7x - 18}{x - 9} = \frac{(x+2)(x-9)}{x-9} = \boxed{x+2}$$

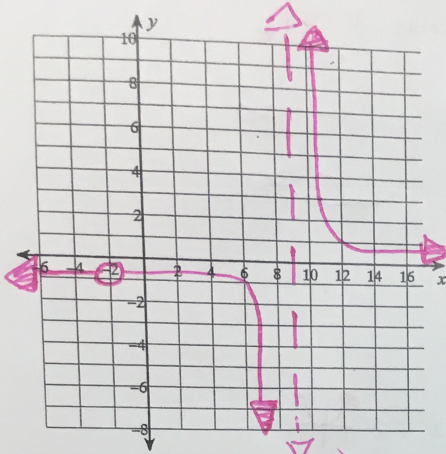
$$7) y = \frac{x^2 - 7x - 18}{-x + 9} \rightarrow x \neq 9$$



$$y = \frac{x^2 - 7x - 18}{-x + 9} = \frac{(x-9)(x+2)}{-x+9} = \frac{(x-9)(x+2)}{-1(x-9)}$$

$$= \frac{x+2}{-1} = \boxed{-x-2}$$

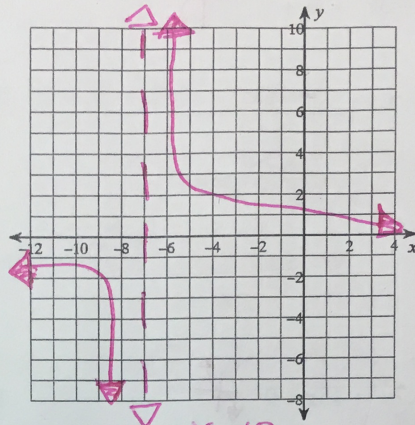
$$8) y = \frac{x+2}{x^2-7x-18}$$



$$y = \frac{x+2}{x^2-7x-18} = \frac{\cancel{x+2}}{(x-9)\cancel{(x+2)}} = \boxed{\frac{1}{x-9}}$$

$x \neq 9$ $x \neq -2$

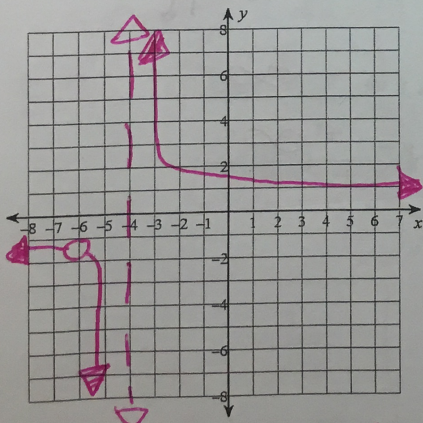
$$9) y = \frac{x-10}{x^2-3x-70}$$



$$y = \frac{x-10}{x^2-3x-70} = \frac{\cancel{x-10}}{(x+7)\cancel{(x-10)}} = \boxed{\frac{1}{x+7}}$$

$x \neq -7, x \neq 10$

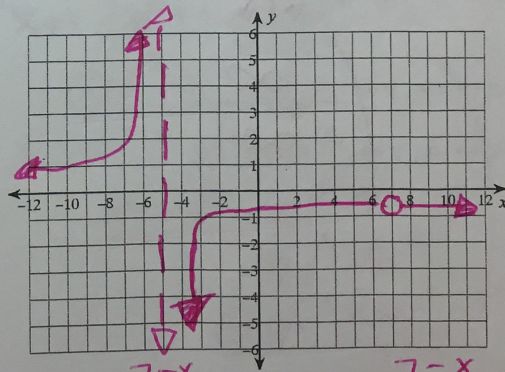
$$10) y = \frac{x+6}{x^2+10x+24}$$



$$y = \frac{x+6}{x^2+10x+24} = \frac{\cancel{x+6}}{\cancel{(x+6)}(x+4)} = \boxed{\frac{1}{x+4}}$$

$x \neq -6, x \neq -4$

$$11) y = \frac{7-x}{x^2-2x-35}$$




$$y = \frac{7-x}{x^2-2x-35} = \frac{7-x}{(x+5)(x-7)}$$

$$= \frac{-1(-7+x)}{(x+5)\cancel{(x-7)}} = \boxed{\frac{-1}{x+5}}$$


$x \neq -5, x \neq 7$

Describe the end behavior for each function. (Hint: you may want to draw a quick sketch of each graph first.)

12) $f(x) = -x^5 + 3x^3 - 3x + 1$ 


As $x \rightarrow +\infty$, $y \rightarrow -\infty$

As $x \rightarrow -\infty$, $y \rightarrow +\infty$

13) $f(x) = -x^2 + 4x - 5$ 


As $x \rightarrow +\infty$, $y \rightarrow -\infty$

As $x \rightarrow -\infty$, $y \rightarrow -\infty$

14) $f(x) = x^3 + 7x^2 + 15x + 9$ 


As $x \rightarrow +\infty$, $y \rightarrow +\infty$

As $x \rightarrow -\infty$, $y \rightarrow -\infty$

15) $f(x) = x^4 - x^2 + 4$ 


As $x \rightarrow +\infty$, $y \rightarrow +\infty$

As $x \rightarrow -\infty$, $y \rightarrow +\infty$

16) $f(x) = -x^4 + 9x^2 + 7$ 

As $x \rightarrow +\infty$, $y \rightarrow -\infty$

As $x \rightarrow -\infty$, $y \rightarrow -\infty$

17) $f(x) = -x^7 - 8x^2 + 15x - 12$ 

As $x \rightarrow +\infty$, $y \rightarrow -\infty$

As $x \rightarrow -\infty$, $y \rightarrow +\infty$