

PreCalculus
WS: Chapter 2/7 Review

Name KEY
Date 9/26/17 Block

Solve each system.

$$x + y = 4$$

1.) $2x - 3z = 14$

$$2y + z = 2$$

$$x = 1$$

$$y = 3$$

$$z = -4$$

$$x = 4z + 4$$

$$x - 4z = 4$$

2.) $y = -5x - 4z - 5$

$$5x + y + 4z = -5$$

$$-2y + 5z = -3$$

$$-2y + 5z = -3$$

$$x = 0$$

$$y = -1$$

$$z = -1$$

Divide using synthetic division or long division.

3.) $(x^3 - 10x^2 + 20x + 26) \div (x - 5)$

$$\begin{array}{r|rrrr} 5 & 1 & -10 & 20 & 26 \\ & \downarrow & 5 & -25 & -25 \\ \hline & 1 & -5 & -5 & 1 \end{array}$$

$$x^2 - 5x - 5 + \frac{1}{x-5}$$

4.) $(6x^3 + x^2 - 4x - 5) \div (3x - 1)$

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

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

Factor completely.

5.) $8x^2 - 32$

$$8(x^2 - 4)$$

$$8(x+2)(x-2)$$

6.) $x^2 - x - 56$

$$(x-8)(x+7)$$

7.) $(28x^3 + 16x^2 - 21x - 12)$

$$4x^2(7x+4) - 3(7x+4)$$

$$(4x^2 - 3)(7x+4)$$

8.) $5x^2 + 19x + 12$

$$5x^2 + 15x + 4x + 12$$

$$5x(x+3) + 4(x+3)$$

$$(5x+4)(x+3)$$

$\begin{matrix} 60x^2 \\ 15x \quad 4x \end{matrix}$

9.) $49x^2 - 25y^2$

$$(7x-5y)(7x+5y)$$

10.) $3x^2 - 8x + 4$

$$3x^2 - 6x - 2x + 4$$

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

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

$\begin{matrix} 12x^2 \\ -6x - 2x \end{matrix}$

11.) $(63x^3 + 54x^2 - 105x - 90)$ Factor gcf first!

$$9x^2(7x+6) - 15(7x+6)$$

$$(9x^2 - 15)(7x+6) = 3(3x^2 - 5)(7x+6)$$

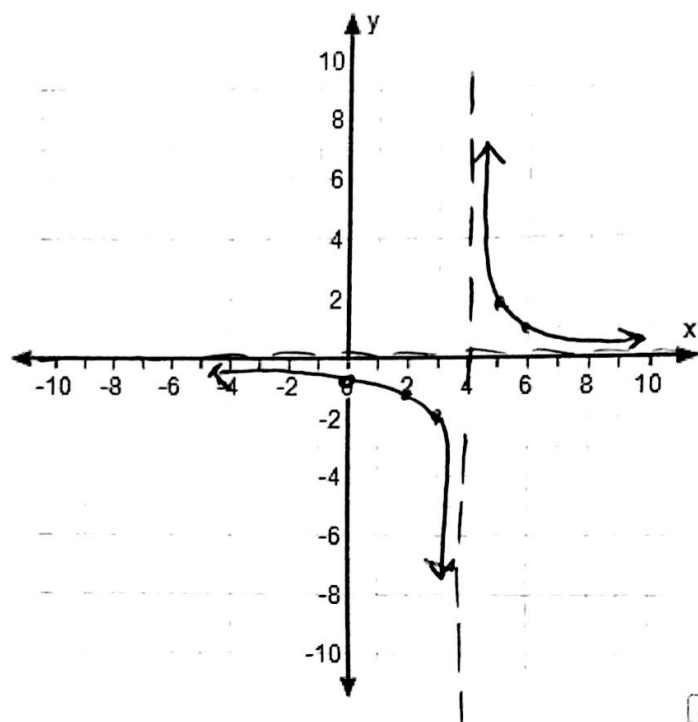
12.) $x^2 - 7x - 18$

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

Find the indicated information for each function. Note in each example if $N > D$, $N = D$ or $N < D$. Then graph each function.

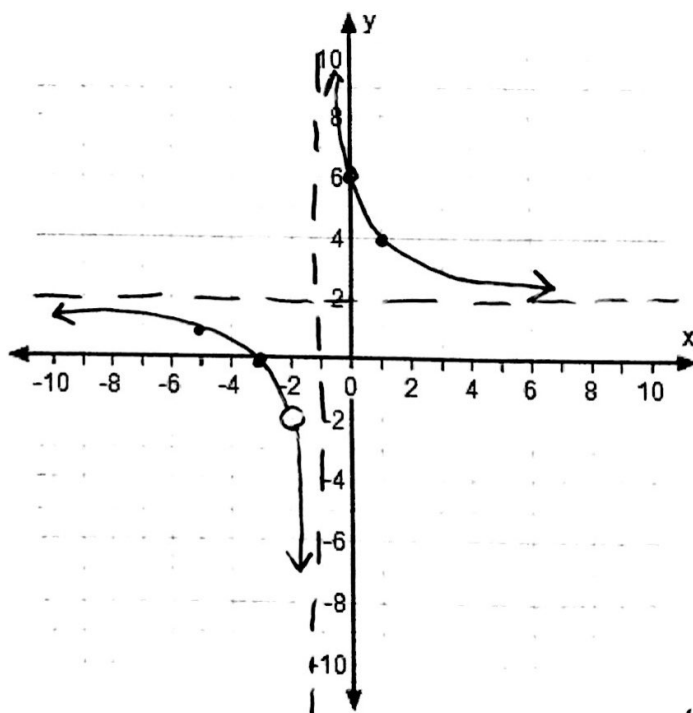
13.) $f(x) = \frac{2}{x-4}$

Higher Degree N/D?	$N < D$; $y = 0$
Asymptotes:	$x = 4$ $y = 0$
x-int (s):	DNE
y-int:	$(0, -1/2)$
hole(s):	None
Test Points:	$(2, -1)$ $(3, -2)$ $(5, 2)$ $(6, 1)$



14.) $f(x) = \frac{x^2 + 5x + 6}{x^2 + 3x + 2} = \frac{2(x+2)(x+3)}{(x+2)(x+1)} = \frac{2(x+3)}{x+1}$

Higher Degree N/D?	$N = D$; ratio
Asymptotes:	$y = 2$ $x = -1$
x-int (s):	$(-3, 0)$
y-int:	$(0, 6)$
hole(s):	@ $x = -2$ $(-2, -2)$
Test Points:	$(1, 4)$ $(-5, 1)$



$$15.) f(x) = \frac{x^2 - x - 6}{x + 1}$$

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

$$x+1 \overline{) x^2 - x - 6}$$

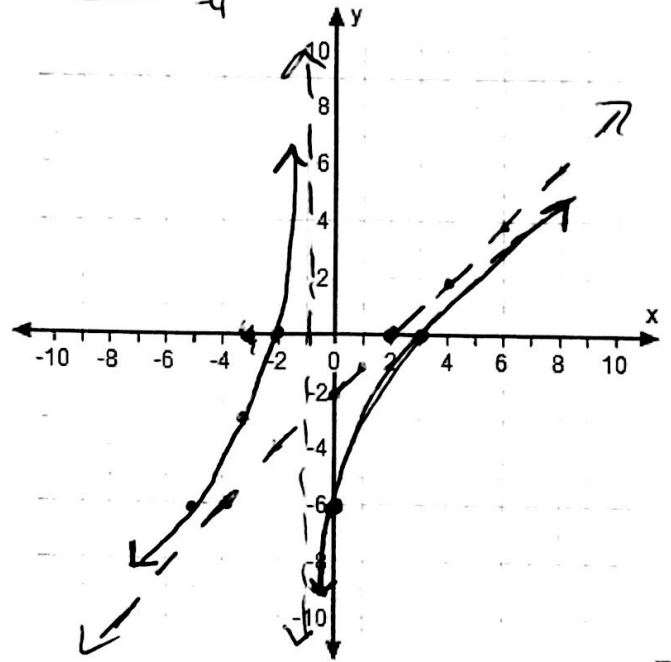
$$\underline{-(x^2 + x)}$$

$$-2x - 6$$

$$\underline{-(-2x - 2)}$$

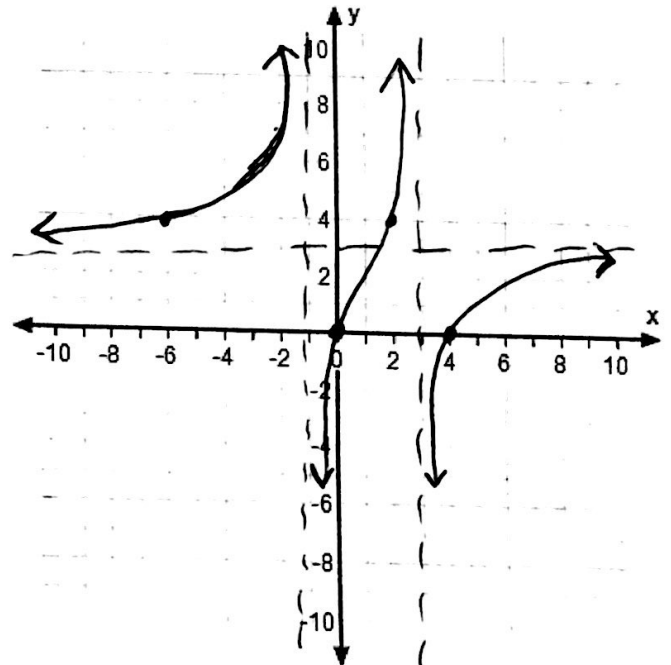
$$-4$$

Higher Degree N/D?	$N > D$; slant
Asymptotes:	$y = x - 2$ $x = -1$
x-int (s):	(-3, 0) (2, 0) $(3, 0)$ $(-2, 0)$
y-int:	$(0, -6)$
hole(s):	None
Test Points:	$(-3, -3)$ $(-5, -6)$



$$5.) f(x) = \frac{3x^2 - 12x}{x^2 - 2x - 3} = \frac{3x(x-4)}{(x-3)(x+1)}$$

Higher Degree N/D?	$N = D$; ratio
Asymptotes:	$y = 3$ $x = 3$ $x = -1$
x-int (s):	$(0, 0)$ $(4, 0)$
y-int:	$(0, 0)$
hole(s):	None
Test Points:	$(-6, 4)$ $(2, 4)$



Find the partial fraction decomposition of each.

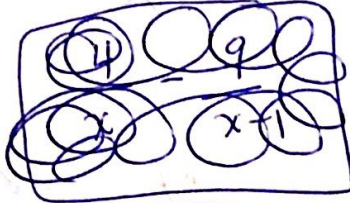
$$17.) \frac{-5x+4}{x^2-x} = \frac{-5x+4}{x(x-1)}$$

$$\frac{A}{x} + \frac{B}{x-1}$$

$$Ax - A + Bx$$

$$A+B = -5$$

$$-A = 4$$



$$A = -4$$

$$B = -1$$

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

$$19.) \frac{4x^3+16x+7}{(x^2+4)^2}$$

$$\frac{Ax+B}{x^2+4} + \frac{Cx+D}{(x^2+4)^2}$$

$$(Ax+B)(x^2+4) + Cx+D$$

$$Ax^3 + Bx^2 + 4Ax + 4B + Cx + D$$

$$A = 4$$

$$B = 0$$

$$4A + C = 16$$

$$4B + D = 7$$

$$D = 7$$

$$C = 0$$

$$\frac{4x}{x^2+4} + \frac{7}{(x^2+4)^2}$$

$$18.) \frac{-7x-15}{x^2+6x+9} = \frac{-7x-15}{(x+3)^2}$$

$$\frac{A}{x+3} + \frac{B}{(x+3)^2}$$

$$A(x+3) + B$$

$$Ax + 3A + B$$

$$A = -7$$

$$3A + B = -15$$

$$-21 + B = -15$$

$$B = 6$$

$$\frac{-7}{x+3} + \frac{6}{(x+3)^2}$$

$$20.) \frac{7x^2-17x+38}{(x+6)(x-1)^2}$$

$$\frac{A}{x+6} + \frac{B}{x-1} + \frac{C}{(x-1)^2}$$

$$A(x-1)^2 + B(x+6)(x-1) + C(x+6)$$

$$A(x^2-2x+1) + B(x^2+5x-6) + C(x+6)$$

$$Ax^2 - 2Ax + A + Bx^2 + 5Bx - 6B + Cx + 6C$$

$$A + B = 7$$

$$-2A + 5B + C = -17$$

$$A - 6B + 6C = 38$$

$$A = 8$$

$$B = -1$$

$$C = 4$$

$$\frac{8}{x+6} - \frac{1}{x-1} + \frac{4}{(x-1)^2}$$