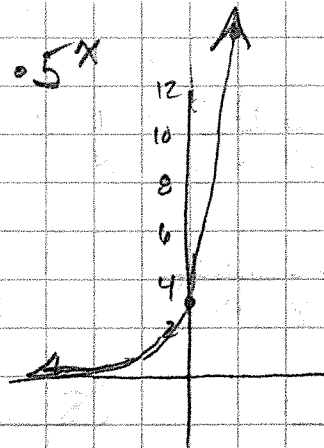
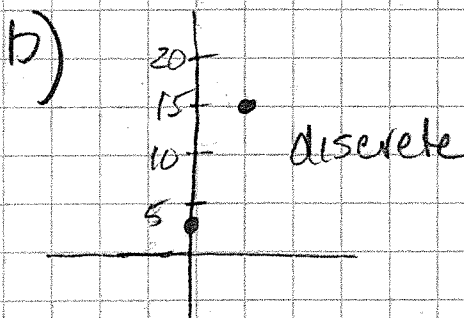


3-84) $f(x) = 3 \cdot 5^x$

x	y
0	3
1	15
2	75
-1	$3/5 = .6$



a) Domain: All real numbers



c) $f(x)$ is a continuous function with range $y > 0$ while $t(n)$ is a discrete series with positive integer inputs

Tue/Wed 12/9 and 12/10 (3.2.3 } 3.2.4 3-102-109)

3-102) a) Because if $x=4$ then the denominator is zero. Since dividing by zero makes the expression undefined $x \neq 4$

b)

$$\frac{x}{3x+1} + \frac{2x^2-2}{(x-5)(3x+1)}$$

$x \neq -1/3$
 $x \neq 5$

$$\frac{9-3x}{(x+3)(x-3)} + \frac{2x}{(x+3)}$$

$x \neq 3$
 $x \neq -3$

c)

$$\frac{1}{(x+6)(3x-1)}$$

$$3-103) a) \frac{4x}{x^2-2x-8} + \frac{4}{x-4} = \frac{4x}{(x-4)(x+2)} + \frac{4}{(x-4)} \cdot \frac{(x+2)}{(x+2)}$$

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

$$b) \frac{16x-12}{4x^2+5x-6} = \frac{4(4x-3)}{(x+2)(4x-3)} = \frac{4}{(x+2)}$$

$$21. -6 = -24$$

$$\frac{(4x^2+8x) - (3x-6)}{4x(x+2) - 3(x+2)}$$

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

$$3-104) a) |5x+9| \geq -4$$

all real numbers
absolute values always pos.

$$b) x^2 + x - 20 < 0$$

$$(x+5)(x-4) < 0$$

$$x+5 < 0$$

$$x < -5$$

$$x-4 < 0$$

$$x < 4$$

$$c) 2x^2 - 6x + 5 = 0$$

$$1 \cdot \emptyset$$

$$\sqrt{b^2 - 4ac}$$

$$\sqrt{36 - 4(2)(5)}$$

$$\sqrt{36 - 40} = \sqrt{-4}$$

$$d) \frac{5 \cdot 9}{9} = \frac{x \cdot 9^3}{9} = \frac{4 \cdot 9}{9}$$

$$5 - 3x = 4$$

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

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

$$3-105) a) \frac{(x-4)^3 (2x-1)}{(2x-1)(x-4)^2} = x-4$$

$$b) \frac{7m^2 - 22m + 3}{3m^2 - 7m - 6}$$

$$7 \cdot 3 = 21$$

$$\begin{array}{r} 21 \\ -21 \\ \hline -1 \end{array}$$

$$3 \cdot -6 = -18$$

$$\begin{array}{r} -18 \\ -9 \\ \hline -9 \end{array}$$

$$\frac{(7m^2 - 21m) - (1m + 3)}{(3m^2 - 9m) + 2m - 6}$$

$$\frac{7m(m-3) - 1(m-3)}{3m(m-3) + 2(m-3)} = \frac{(7m-1)(m-3)}{(3m+2)(m-3)} = \frac{7m-1}{3m+2}$$

$$c) \frac{(z+2)^9 (4z-1)^7}{(z+2)^{10} (4z-1)^5} = \frac{(4z-1)^2}{z+2}$$

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

$$3-106) a) S = 1500(1.047)^n$$

$$S = 1500(1.047)^3 = 1722$$

$$b) S = 1500(1.047)^{-2} = 1368$$

$$c) S = 1500(1.047)^{n+3}$$

$$3-107) a) \frac{(3x-1)(x+7)}{2 \cancel{4} (2x-5)} \cdot \frac{5 \cancel{10} (2x-5)}{(4x+1)(x+7)} = \frac{5(3x-1)}{2(4x+1)}$$

$$b) \frac{(m-3)(m+11)}{(2m+5)(m-3)} \cdot \frac{(4m-3)(2m+5)}{(4m-3)(m+11)} = 1$$

$$c) \frac{2p^2+5p-12}{2p^2-5p+3} \cdot \frac{(p+9)(p-1)}{3p^2+10p-8}$$

$$2 \cdot -12 = -24$$

$$8 \cdot -3 = -24$$

$$2 \cdot 3 = 6$$

$$3 \cdot -2 = -6$$

$$3 \cdot -8 = -24$$

$$12 \cdot -2 = -24$$

$$\frac{(2p^2+8p)-3p-12}{(2p^2-2p)-3p+3} \cdot \frac{(p+9)(p-1)}{(3p^2+12p)-(2p-8)}$$

$$\frac{2p(p+4)-3(p+4)}{2p(p-1)-3(p-1)} \cdot \frac{(p+9)(p-1)}{3p(p+4)-2(p+4)}$$

$$\frac{\cancel{2p} \cdot \cancel{3} \cdot \cancel{(p+4)}}{\cancel{2p} \cdot \cancel{3} \cdot \cancel{(p-1)}} \cdot \frac{\cancel{(p+9)} \cdot \cancel{(p-1)}}{\cancel{3p} \cdot \cancel{2} \cdot \cancel{(p+4)}} = \frac{p+9}{3p-2}$$

$$d) \frac{4(x-3)}{(x+5)(x-2)} \cdot \frac{2x^2+3x-35}{2x^2-13x+21}$$

$$2 \cdot -35 = -70$$

$$10 \cdot -7 = -70$$

$$\frac{4(x-3)}{(x+5)(x-2)} \cdot \frac{(2x^2+10x-7x-35)}{(2x^2-6x-7x+21)}$$

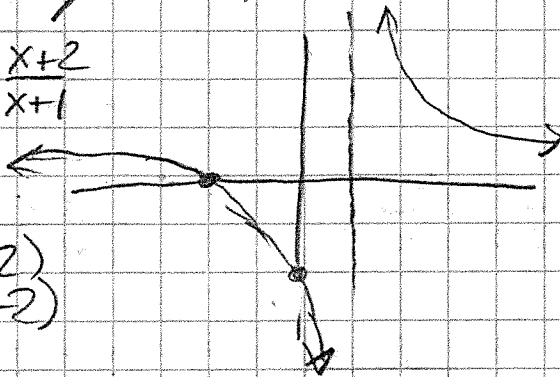
$$2 \cdot 21 = 42$$

$$-6 \cdot -7 = 42$$

$$\frac{4(x-3)}{(x+5)(x-2)} \cdot \frac{2x(x+5)-7(x+5)}{2x(x-3)-7(x-3)}$$

$$\frac{\cancel{4} \cdot \cancel{(x-3)}}{\cancel{(x+5)} \cdot \cancel{(x-2)}} \cdot \frac{\cancel{(2x-7)} \cdot \cancel{(x+5)}}{\cancel{(2x-7)} \cdot \cancel{(x-3)}} = \frac{4}{x-2}$$

$$3-109) \quad g(x) = \frac{x+2}{x+1}$$



$$x\text{-int } (-2, 0)$$

$$y\text{-int } (0, 2)$$

@ $x=1$ there is a break in the graph; no value for $f(1)$

Thursday 12/11 3.2.5 (3-113, 114, 116, 117, 118, 120, 126)

3-113) a) $\frac{2x}{3x^2+16x+5} + \frac{10}{3x^2+16x+5} = \frac{2x+10}{3x^2+16x+5} = \frac{2(x+5)}{3x(x+5)+1(x+5)}$
 $3 \cdot 5 = 15$
 $\frac{2(x+5)}{(3x+1)(x+5)} = \frac{2}{3x+1}$

b) $\frac{(x-4)(x+3)}{(3x^2-12x+1)(x-4)} \cdot \frac{(3x^2-21x+1)(x-7)}{(x-3)(x+3)}$
 $3 \cdot -4 = -12$
 $3 \cdot -7 = -21$
 $\frac{(x-4)(x+3)}{3x(x-4)+1(x-4)} \cdot \frac{3x(x-7)+1(x-7)}{(x-3)(x+3)}$
 $\frac{(x-4)(x+3)}{(3x+1)(x-4)} \cdot \frac{(3x+1)(x-7)}{(x+3)(x-3)} = \frac{x-7}{x-3}$

c) $\frac{2(x^2+4x-5)}{2x^2+15x+25} \cdot \frac{2x^2+x-10}{4(x^2+5x-6)} = \frac{2(x+5)(x-1)}{2x^2+10x+5x+25} \cdot \frac{2x^2-4x+5x-10}{4(x+6)(x-1)}$
 $2 \cdot 25 = 50$
 $2 \cdot -10 = -20$
 $\frac{2(x+5)(x-1)}{2x(x+5)+5(x+5)} \cdot \frac{2x(x-7)+5(x-2)}{4(x+6)(x-1)} = \frac{2(x+5)(x-1)}{(2x+5)(x+5)} \cdot \frac{(2x+5)(x-2)}{4(x+6)(x-1)}$

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

d) $\frac{7}{x+5} - \frac{4-6x}{(x+5)(x+5)} = \frac{(x+5) \cdot 7}{(x+5)(x+5)} - \frac{(4-6x)}{(x+5)(x+5)}$

$\frac{7x+35-4+6x}{(x+5)(x+5)} = \frac{13x+31}{(x+5)^2}$

$$3-114) a) f(3) = |3-3| + 1 = 1$$

$$b) f(0) = |0-3| + 1 = 3 + 1 = 4$$

$$c) f(4) = |4-3| + 1 = 1 + 1 = 2$$

$$d) f(-1) = |-1-3| + 1 = 4 + 1 = 5$$

$$3-116) g(x) = 2(x+3)^2$$

D: all real #s

R: $y \geq 0$

$$g(-5) = 2(-5+3)^2 = 2(-2)^2 = 2(4) = 8$$

$$g(a+1) = 2(a+1+3)^2 = 2(a+4)^2 = 2(a^2+8a+16) \\ = 2a^2 + 16a + 32$$

$$\frac{32}{2} = \frac{2(x+3)^2}{2}$$

$$\sqrt{16} = \sqrt{(x+3)^2}$$

$$x+3 = \pm 4$$

$$x = 1$$

$$x = -7$$

3-117)

$$x^2 + 14x + 33 = 0 \\ (x+11)(x+3) = 0$$

$$x = -11 \quad x = -3$$

$$x^2 + 14x + 33 = 0$$

$$x^2 + 14x + 49 + 33 = 49$$

$$(x+7)(x+7) - 16 = 0$$

$$\sqrt{(x+7)^2} = \sqrt{16}$$

$$x+7 = \pm 4$$

$$x = -11$$

$$x = -3$$

3-118) 1) D: all real #s

2) D: $x \leq 3$

3) D: $x > -2$

$$3-120) \quad a) \frac{\cancel{x-2} \cdot 1}{(x-2)(x+2)} + \frac{3}{(x-2)(x+2)} = \frac{x-2}{(x-2)(x+2)} + \frac{3}{(x-2)(x+2)}$$

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

$$b) \frac{3 \cdot (x+2)}{2(x+2)(x+2)} \cdot \frac{x}{(x+2)(x+2)} \cdot \frac{2}{2} = \frac{3x-6+2x}{2(x+2)(x+2)}$$

$$\frac{5x-6}{2(x+2)(x+2)}$$

$$c) \frac{(x+3)\cancel{(x+2)}}{\cancel{(x-3)}(x+3)} \cdot \frac{\cancel{(x-3)}}{x\cancel{(x+2)}} = \frac{1}{x}$$

$$d) \frac{4}{x-2} \cdot \frac{2-x}{8} = \frac{4}{x-2} \cdot \frac{-1\cancel{(x-2)}}{8} = \boxed{\frac{-1}{2}}$$

$$3-126) \quad a) 25x^2 - 1 = (5x-1)(5x+1)$$

$$b) 5x(x^2 - 25) = 5x(x-5)(x+5)$$

$$c) x^2 + x - 72 = (x-8)(x+9)$$

$$d) x(x^2 - 3x - 18) = x(x-6)(x+3)$$

What did the lightning say to the rain?



Simplify. Leave answers in factored form. Some answers appear more than once. ANSWER KEY

G. $\frac{x^2+3x+2}{x-2} \cdot \frac{x^2-4}{x+1}$ $(x+2)^2$	E. $\frac{1}{x^2-4} \div \frac{x^2+6x+9}{x^2+x-6}$ $\frac{1}{(x+2)(x+3)}$	O. $\frac{x^2+7x+12}{x^2+3x} \div \frac{x^2-16}{x^2}$ $\frac{x}{x-4}$
W. $\frac{x^2-5x-14}{x^2-3x+2} \cdot \frac{x^2-4}{x^2-14x+49}$ $\frac{(x+2)^2}{(x-1)(x-7)}$	U. $\frac{x^2-x}{x} \cdot \frac{x}{x^2-1}$ $\frac{x}{x+1}$	T. $\frac{x^2-8x+12}{x^2-16} \div \frac{x^2-4x+4}{4x+16}$ $\frac{4(x-6)}{(x-4)(x-2)}$
Y. $\frac{x^2+5x+6}{x-3} \cdot \frac{x^2-2x-3}{x^2+3x+2}$ $x+3$	L. $\frac{2x^2-8}{3x+4} \cdot \frac{3x^2-17x-28}{4x^2+12x+8}$ $\frac{(x-2)(x-7)}{2(x+1)}$	P. $\frac{x^2+4x-12}{x^3-4x} \div \frac{3x-6}{x^2+x-2}$ $\frac{(x+6)(x-1)}{3x(x-2)}$
H. $(x^2-1) \cdot \frac{6}{2x^2+4x+2}$ $\frac{3(x-1)}{x+1}$	I. $\frac{x^2-6x-16}{x^2-16x+64} \div \frac{x^2+5x+6}{x-8}$ $\frac{1}{x+3}$	N. $\frac{x^2-3x}{2x^2-13x+6} \div \frac{x^3+4x}{x^2-12x+36}$ $\frac{(x-3)(x-6)}{(2x-1)(x^2+4)}$

L	I	G	H	T	E	N		
$\frac{(x-2)(x-7)}{2(x+1)}$	$\frac{1}{x+3}$	$(x+2)^2$	$\frac{3(x-1)}{x+1}$	$\frac{4(x-6)}{(x-4)(x-2)}$	$\frac{1}{(x+2)(x+3)}$	$\frac{(x-3)(x-6)}{(2x-1)(x^2+4)}$		
U	P	W	I	L	L	Y	O	U
$\frac{x}{x+1}$	$\frac{(x+6)(x-1)}{3x(x-2)}$	$\frac{(x+2)^2}{(x-1)(x-7)}$	$\frac{1}{x+3}$	$\frac{(x-2)(x-7)}{2(x+1)}$	$\frac{(x-2)(x-7)}{2(x+1)}$	$x+3$	$\frac{x}{x-4}$	$\frac{x}{x+1}$