Use the solutions to check your HW

then

let me know if you have questions

then

The next test is

Tuesday, November 7th

Then do the Warm Up.

WARM UP

No calculator

① $\frac{\cancel{3}^{1}}{5} \cdot \frac{7}{\cancel{6}_{2}} = \frac{7}{10}$

② $\frac{3}{5} \div \frac{27}{20} = \frac{\cancel{3}^{1}}{\cancel{5}_{1}} \cdot \frac{\cancel{20}^{4}}{\cancel{27}_{9}} = \frac{4}{9}$

③ Simplify $\frac{3x^3 - 27x}{2x+6} = \frac{3x(x^2-9)}{2(x+3)}$

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

$\rightarrow \frac{-9n^3}{26n} = -\frac{3n^2}{2}$ $\quad -\frac{3}{2}n^2$

$\rightarrow \frac{n^4+n}{n} = \frac{n(n^3+1)}{n} = n^3+1$

$\frac{4x-10}{6} = \frac{2(2x-5)}{6_3}$

$\frac{n^4 \cdot n}{n}$ $\quad \frac{(n^4)n}{n}$

$\frac{n^4}{n}$

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

What is special about the number 1?

What can you do with 1 that you can't do with any other number?

1 will help us simplify Rational expressions

like .....

On the back of the Warm Up write.....

$\frac{6}{6} = 1$ $\frac{x^2}{x^2} = 1, \; x \neq 0$

Everyone take your graphing calculator and calculate:

$\frac{52}{0} =$ undefined

$$\frac{16x}{16x} = 1, \quad x \neq 0$$

as long as ....

does this equal 1 ?

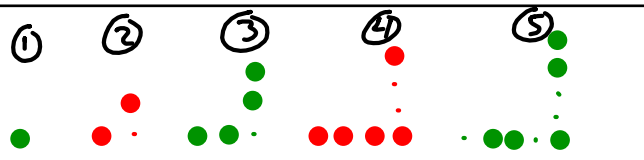
$$\frac{x-3}{x-3} = 1, \quad x \neq 3$$

0

$$\frac{(2x}{(2x}$$

HW Questions

63



$t(n) = 1 + 2(n-1)$ ← n^{th} term

$t(46) = 1 + 2(46-1) = 91$ ← 46^{th} term

64 First piece of metal $T_1 = 20 + 2x$
Second piece of metal $T_2 = 240 - 3x$
x = # minutes

Equal Values method

$20 + 2x = 240 - 3x$

65 starting value \$10.25 $+3\%$

think $y = ab^x$

(a) $100\% + 3\% = 103\%$ → 1.03

$y = 10.25(1.03)^x$

(b) function $f(n) = 10.25(1.03)^n$

(c) $f(10) = 10.25(1.03)^{10} =$

67 a $\sqrt[5]{x}$

b $\frac{1}{x^3}$

c $x^{2/3}$

d $\frac{1}{\sqrt{x}} = \frac{1}{x^{\frac{1}{2}}}$

e. $x^{-1}y^{-8}$

f. $(m^2)^{-3/2}$

g. $(x^3y^6)^{\frac{1}{2}} = \sqrt{x^3y^6}$

h. $(9x^3y^6)^{-2}$

Yesterday you took two functions

$g(x) = 4x-6$ $f(x) = 2x+3$

and combined them in various ways

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

and combined them in various ways

and some of those combinations created **Rational Functions**

$\frac{2x+3}{4x-3}$

Notes →

Today's AIM

simplify and Analyze the Graphs of

Rational FUNCTIONS

$f(x) = \frac{1}{x}$ parent

$g(x) = \frac{2x}{3x-7}$

$h(x) = \frac{2x^2+3x-7}{2x+5}$

$f(x) = \frac{\text{polynomial}}{\text{polynomial}}$

must be at least degree 1 (NO CONSTANTS)

x^2 x^5 $25x^{11}$

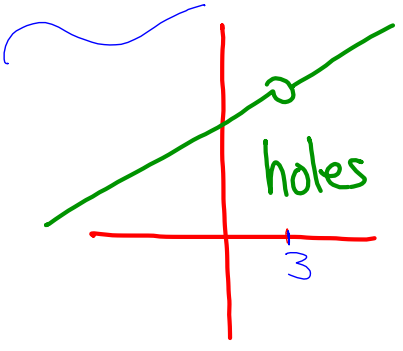
$4x^7$

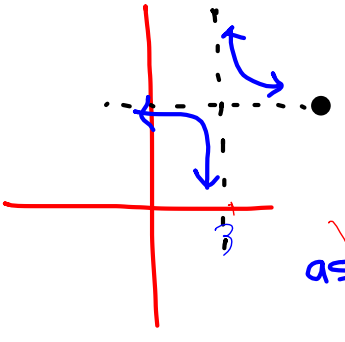
x^1

$5x^0$ ± 5

Rational functions create graphs that have

2 types of vertical discontinuities





vertical asymptotes

In your notes, do as many of the problems as you can from problem 3-74 in the next 5 minutes

- be sure you write down a problem before you work on it.

a. $\frac{x^2}{x^2} = 1$ $x \neq 0$

b. $\frac{x}{x} \cdot \frac{x}{x} \cdot \frac{x}{3} = \frac{x}{3}$ $x \neq 0$

c. $\frac{x-2}{x-2} \cdot \frac{x+5}{x-1} = \frac{x+5}{x-1}$ $x \neq 1$, $x \neq 2$

d. $\frac{9}{x} \cdot \frac{x}{9} = 1$ $x \neq 0$ $x \neq$

e. $\frac{h \cdot h \cdot k}{h} = \frac{h^2 k}{h} = hk$ $h \neq 0$

f. $\frac{(2m-5)(m+6)}{(m+6)(3m+1)} = \frac{2m-5}{3m+1}$ $m \neq -\frac{1}{3}$ $m \neq -6$

$3m+1=0$

g. $\frac{2 \cdot 3 (n-2)^2}{3(n-2)} = 2(n-2)$ $6(n-2)(n-2)$ $x \neq 2$

h. $\frac{3-2x}{(4x-1)(3-2x)} = \frac{1}{4x-1}$ $x \neq \frac{1}{4}$

$x = 1.5$

$3-2x=0$

$3=2x$

$x=\frac{3}{2}$

$4x-1=6$

$\frac{4x}{x} \rightarrow 4$?

$\frac{4+x}{x} \rightarrow 5$?

No because $\frac{4+x}{x}$ is same as $(4+x) \div x$

NOTES examples of

Simplifying Rational expressions

ex A $\dfrac{x^2+6x+9}{x^2-9}$ $\rightarrow$ $\dfrac{(x+3)(x+3)}{(x-3)(x+3)}$

$\boxed{\dfrac{x+3}{x-3}}$

ex B $\dfrac{x^2+4x}{2x+8} = \dfrac{x(x+4)}{2(x+4)} = \boxed{\dfrac{x}{2}}$

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

Ex C

$$\frac{2x^2 - x - 10}{3x^2 + 7x + 2}$$

C. $$\frac{28x^2 - x - 15}{28x^2 - x - 15}$$

B.B.

Analyzing the Graphs

of

Rational Functions

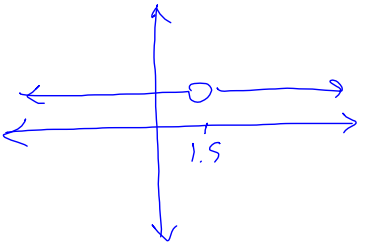
You'll need your GDC

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

No GDC's yet

$2x-3=0$

$2x=3$



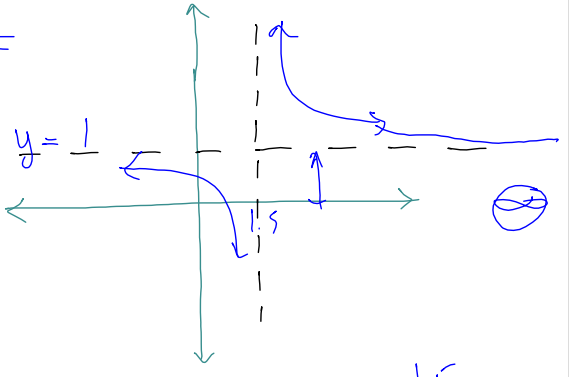
discontinuities: hole at $x=1.5$

domain: $-\infty < x < \infty,\ x \neq 1.5$ range: $y=1$

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

$\frac{2B}{2B} =$

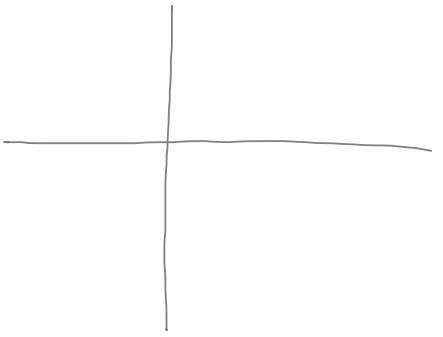
What's different?



discontinuities: Vertical asymptote at $x=1.5$

domain: $-\infty < x < \infty,\ x \neq 1.5$ range: $-\infty < y < \infty,\ y \neq 1$

$$j(x) = \frac{6x+10}{2x-8}$$



discontinuities:

domain:

range:

Assignment

3 - 78 to 84

Keep up your hard work.

Next TEST

Tues, Nov 7th