PC 12 Session 25

Tuesday, April 19, 2022 12:17 PM

Pre-Calculus 12 Session 25
Thursday, April 21, 2022

1. Last Day's Homework:
   - Textbook Practice: The Chapter 7 Review on pages 366 and 367. The Chapter 7 Practice Test on pages 368 and 369. Section 8.1: pages 380-381, Practise 1, 2, 3, 4, 6, 8, 9, 11, 12, 13, 14, 19.
   - Readings: Nothing new.
   - Hand-in Assignments and other things: The Chapter 8 Hand-in Assignment may be due in on Tuesday, April 26 (depending on how far we get today). **The Chapter 8 Test will be on Thursday, April 28. It may not cover all of Chapter 8.**
2. Return of, and a few comments on, the Chapter 7 Hand-in Assignment
3. Return of, and comments on, the Chapter 6 Test
4. More about Section 8.2: Transformations of Logarithmic Functions
5. Section 8.3: Laws of Logarithms
6. Section 8.4: Logarithmic and Exponential Equations
7. The Chapter 7 Test

Homework: This depends on how far we get today.

Readings: Nothing new.

Practice from the Textbook to try:

Section 8.2: pages 389-391, Practise 1 to 10 inclusive, 13 and 16.
Section 8.3: pages 400-402, Practice 1a), c), 2a), c), 3a), c), 7a), c), e), 8a), c), 9a), c), 10, 11a), c), 13, 14, 16, 20b), d).
Section 8.4: pages 412-414, Practise 1, 2, 3, 4a), c), 5, 6, 7a), c), 8a), c), e), 9, 13, 16 (if we got that far.)

"Chapter 7 test"

10. Solve for x.

a) $3^{\frac{x}{2}} = 81\sqrt{3}$ **b)** $\left(\frac{9}{16}\right)^{-x+2} = \left(\frac{64}{27}\right)^{x}$

$81 = 3^4$
$\sqrt{3} = 3^{\frac{1}{2}}$

a) $3^{\frac{x}{2}} = 3^4 \times 3^{\frac{1}{2}}$

$3^{x/2} = 3^{4\frac{1}{2}}$

$2 \times \frac{x}{2} = 4\frac{1}{2} \times 2$

$x = 9$

$9 = 3^2$
$16 = 4^2$
$64 = 4^3$
$27 = 3^3$

b) $\left(\frac{9}{16}\right)^{-x+2} = \left(\frac{64}{27}\right)^{x}$

$\left(\left(\frac{3}{4}\right)^2\right)^{-x+2} = \left(\left(\frac{4}{3}\right)^3\right)^{x}$

$\left(\frac{3^2}{4^2}\right)^{-x+2} = \left(\frac{3^{-3}}{4^{-3}}\right)^{x}$

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

$\left(\frac{3}{4}\right)^{-2x+4} = \left(\frac{3}{4}\right)^{-3x}$

$-2x+4 = -3x$
$+2x \quad +2x$

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

More about section 8.2: Transformations of log functions.

$y = 3\log_2(2(x-4)) + 1$

VE by 3
HC by $\frac{1}{2}$
4 units right
1 units up

Mapping Notation:

$(x, y) \to \left(\frac{1}{2}x + 4, 3y + 1\right)$

$y = \log_2 x$

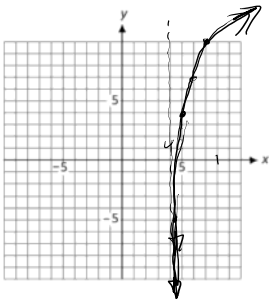
x	y	
$\frac{1}{4}$	-2	$2^{-2} = ?$
$\frac{1}{2}$	-1	$2^{-1} = \frac{1}{2}$
1	0	$2^0 = 1$
2	1	$2^1 = 2$
4	2	$2^2 = 4$
8	3	$2^3 = 8$

$y = 3\log_2(2(x-4)) + 1$

x	y
$\frac{1}{2}(\frac{1}{4}) + 4$	$3(-2) + 1$
$\frac{1}{2}(\frac{1}{2}) + 4$	$3(-1) + 1$
$\frac{1}{2}(1) + 4$	$3(0) + 1$
$\frac{1}{2}(2) + 4$	$3(1) + 1$
$\frac{1}{2}(4) + 4$	$3(2) + 1$
$\frac{1}{2}(8) + 4$	$3(3) + 1$

$\frac{1}{2} \times \frac{1}{4} + 4$
$\frac{1}{8} + 4$
$\frac{1}{2} \times \frac{1}{2} + 4$
$\frac{1}{4} + 4$

x	y
$4\frac{1}{8}$	-5
$4\frac{1}{4}$	-2
$4\frac{1}{2}$	1
5	4
6	7
8	10



asymptote: $x = 4$

x-int: ($y = 0$)

$0 = 3\log_2(x-4) + 1$
$-1 \quad -1$

$\frac{-1}{3} = \frac{3}{3}\log_2(x-4)$

$-\frac{1}{3} = \log_2(x-4)$

$2^{-\frac{1}{3}} = 2^{\log_2(x-4)}$

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

$x = 4\frac{1}{8}$

y-int: $x = 0$

$y = 3\log_2(0-4) + 1$

$y = 3(\log_2(-4)) + 1$

no y-intercept
$\log_2(-4)$ doesn't exist.

Section 8.3 Laws of Logarithms

Express each of the following in terms of the common logarithm:

$\log_7 100$ $\log_5 30$

Express each of the following in terms of the natural logarithm:

$\log_8 63$ $\log_3 e^2$

Change of Base Properties

Change of Base Properties

$$\log_b x = \frac{\log_q x}{\log_q b}$$

b = a base that we want to change

q = the base we want to change to (often, this will be base 10 or base e).

$\log_7 100$ change to base 10

$$\log_7 100 = \frac{\log_{10} 100}{\log_{10} 7} = \frac{\log 100}{\log 7} = \frac{2}{0.8750...} = 2.366589... = n$$

$7^n = 100$

Check: $7^{2.366589...} = 100$

$$\log_5 30 = \frac{\log 30}{\log 5} = 2.11328...$$

$5^{2.11328...} \stackrel{?}{=} 30$

$$\log_8 63 = \frac{\log 63}{\log 8} = 1.9924$$

$\log_3 e^2$ (e^2 = argument, 3 = base)

$$\log_3 e^2 = \frac{\ln_e(e^2)}{\ln 3} = \frac{2}{\ln 3} = 1.820478...$$