Practice Test logs.doc

Pre-Calculus 12A

Practice

I. Multiple Choice: ***Place the letter corresponding to the correct solution on the scantron sheet provided.***

1. Express the following in exponential notation: $\log_b M = C$

[A] $b^M = C$ [B] $M^b = C$ [C] $M^C = b$ [D] $b^C = M$

2. The value of $\log_2 56 - \log_2 7 + \log_2 2$ is ....

[A] $\log_2 51$ [B] 1 [C] 2 [D] 4

3. If $\log x^2 - \log 2x = 2$, then x equals…

[A] 4 [B] 50 [C] 100 [D] 200

4. Find all real solutions for the following equation: $\log_2 x + \log_2(x-2) = 3$

[A] $x = 3, -1$ [B] $x = 4$ [C] $x = 4, -2$ [D] $\frac{5}{2}$

5. Evaluate: $10^{(\log 5 + \log 2 - \log 100)}$

[A] -1 [B] 10^{-1} [C] 1 [D] 10

~~[C] $f(x) = 3\left(\frac{1}{2}\right)^x$ [D] $f(x) = 3(2)^x - 2$~~

6. The logarithmic expression $\log\left(\frac{a^3}{\sqrt{bc}}\right)$ equals …

[A] $\frac{1}{3}\log a - 2\log b + \log c$ [B] $\frac{1}{3}\log a - 2\log b - \log c$

[C] $3\log a - \frac{1}{2}(\log b - \log c)$ [D] $3\log a - \frac{1}{2}\log b - \frac{1}{2}\log c$

7. Jason has been collecting die-cast cars for several years and realizes that the value of each car increases exponentially with time. One car in his collection was purchased for $1.80 in 1970 and its value has doubled every 6 years since then. Which of the following equations could be used to model the value of the car (V) in terms of the number of years (t) since it was purchased?

[A] $V = 1.80(2)^{6t}$ [B] $V = 1.80(2)^{\frac{t}{6}}$ [C] $V = 2(1.80)^{6t}$ [D] $V = 2(1.80)^{\frac{t}{6}}$

8. Determine the value of x: $\log_x 16 = -\frac{2}{3}$

A] -64 [B] $\frac{1}{64}$ [C] 64 [D] $-\frac{1}{64}$

9. Solve for x: $3(4)^{-2x+1} - 1 = 23$

[A] $-\frac{1}{2}$ [B] $-\frac{1}{4}$ [C] $-\frac{7}{2}$ [D] $\frac{1}{2}$

10. Cesium-137 is an exceptionally dangerous radioactive isotope with a half-life of 30 years. How long would it take for a sample of 800 mg of Cesium-137 to decay to 100 mg ?

[A] 3 years [B] 120 years [C] 90 years [D] 60 years

11. If $5[\log_2(\log 10)] = x$, then x is equal to ....

[A] 0 [B] 1 [C] 5 [D] 2

2. (a) $M = 100(0.58)^{t/3}$

(b) $M = 100(0.58)^{8/3}$

$= 23.40 \text{ mg}$

(c) $10 = 100(0.58)^{t/3}$

$\frac{10}{100} = 0.58^{t/3}$

$0.1 = 0.58^{t/3}$

$\log_{0.58} 0.1 = t/3$

$\frac{\log 0.1}{\log 0.58} = t/3$

$4.2270 = t/3$

$12.7 \text{ hrs} = t$

3(a) $\log_6(x-1) + \log_6(x+4) = 2$

$\log_6(x-1)(x+4) = 2$

$(x-1)(x+4) = 6^2$

$x^2 + 3x - 4 = 36$

$x^2 + 3x - 40 = 0$

$(x+8)(x-5) = 0$

$x = -8, +5$

-8 inadmissible

(b) $\log_3(6x-3) - \log_3(x-2) = 2$

$\log_3 \frac{6x-3}{x-2} = 2$

$\frac{6x-3}{x-2} = 9$

$6x - 3 = 9(x-2)$

$6x - 3 = 9x - 18$

$6x - 9x = -18 + 3$

$-3x = -15$

$x = +5$

3. (c) $\log_9 x = -\frac{3}{2}$

$x = 9^{-\frac{3}{2}}$

$x = \frac{1}{9^{\frac{3}{2}}}$

$x = \frac{1}{27}$

(d) $\log_{2x} 256 = 4$

$256 = (2x)^4$

$256 = 16x^4$

$\frac{256}{16} = x^4$

$16 = x^4$

$2 = x$

4. (a) $\log_2 32^{20}$

$20 \log_2 32$

$20(5)$

$= 100$

(b) $\log_6 15 + \log_6 18 - \log_6 10 + 2\log_6 4 - \log_6 2$

$\log_6 \left[\frac{15(18)(4^2)}{10(2)}\right]$

$\log_6 216$

$= 3$

5. (a) $\log_r \frac{x^{\frac{3}{2}}}{r\sqrt[5]{y}}$

$= \log_r x^3 + \log_r 2^2 - \log_r r - \log_r y^{1/5}$

$3\log_r x + 2\log_r 2 - \log_r r - \frac{1}{5}\log_r y$

$3(-2) + 2(4) - 1 - \frac{1}{5}(5)$

$-6 + 8 - 1 - 1$

$= 0$

6. (a) $5\log_2 x - \frac{3}{4}[4\log_2 x^3 - 12\log_2 x^2]$

$5\log_2 x - 3\log_2 x^3 - 9\log_2 x^2$

$\log_2 x^5 - \log_2 x^9 - \log_2 x^{18}$

$\log_2\left[\frac{x^5}{x^9 x^{18}}\right] \Rightarrow \log_2 \frac{x^5}{x^{27}} \Rightarrow \log_2 \frac{1}{x^{22}}$

6. (b) $3\log_b x + \frac{3}{2}\left[6\log_b x + 2\log_b x - 8\log_b x - \frac{1}{3}\log_b x^4\right]$

$3\log_b x + 9\log_b x + 3\log_b x - 12\log_b x - \frac{1}{2}\log_b x^4$

$\log_b\left[\frac{x^3 \cdot x^9 \cdot x^3}{x^{12} \cdot x^2}\right]$

$\log_b \frac{x^{15}}{x^{14}}$

$\log_b x$

7. $P = 25(3)^{t/5}$

$2588 = 25(3)^{t/5}$

$103.52 = 3^{t/5}$

$\log_3 103.52 = t/5$

$4.223296 = t/5$

$21.1 \text{ yrs} = t$

Attachments

Practice with exp taken out Practice test logs and exponents.doc