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1. 060409b, P.I. A2.A.19  
 If  $\log_b x = y$ , then  $x$  equals  
 [A]  $\frac{y}{b}$  [B]  $y \cdot b$  [C]  $b^y$  [D]  $y^b$
2. 080607b, P.I. A2.A.19  
 The function  $y = 2^x$  is equivalent to  
 [A]  $x = \log_2 y$  [B]  $y = \log_2 x$   
 [C]  $x = y \log 2$  [D]  $y = x \log 2$
3. 060301b, P.I. A2.A.39  
 For which value of  $x$  is  $y = \log x$  undefined?  
 [A]  $\frac{1}{10}$  [B] 1.483 [C] 0 [D]  $\pi$
4. fall9904b, P.I. A2.A.39  
 The expression  $\log_2(x - 4)$  is undefined for all values of  $x$  such that  
 [A]  $x > 0$  [B]  $x \leq 0$   
 [C]  $x > 1$  [D]  $x \leq 4$
5. 010412b, P.I. A2.A.39  
 The expression  $\log_3(8 - x)$  is defined for all values of  $x$  such that  
 [A]  $x \geq 8$  [B]  $x > 8$   
 [C]  $x < 8$  [D]  $x \leq 8$
6. 080110b, P.I. A2.A.19  
 If  $\log 5 = a$ , then  $\log 250$  can be expressed as  
 [A]  $2a + 1$  [B]  $50a$   
 [C]  $10 + 2a$  [D]  $25a$
7. 010208b, P.I. A2.A.19  
 Which expression is *not* equivalent to  $\log_b 36$ ?  
 [A]  $2 \log_b 6$  [B]  $6 \log_b 2$   
 [C]  $\log_b 72 - \log_b 2$  [D]  $\log_b 9 + \log_b 4$
8. 060316b, P.I. A2.A.19  
 If  $\log a = 2$  and  $\log b = 3$ , what is the numerical value of  $\log \frac{\sqrt{a}}{b^3}$ ?  
 [A] -25 [B] 8 [C] 25 [D] -8
9. 010409b, P.I. A2.A.19  
 If  $\log x = a$ ,  $\log y = b$ , and  $\log z = c$ , then  $\log \frac{x^2 y}{\sqrt{z}}$  is equivalent to  
 [A]  $2a + b - \frac{1}{2}c$  [B]  $2ab - \frac{1}{2}c$   
 [C]  $a^2 + b - \frac{1}{2}c$  [D]  $42a + b + \frac{1}{2}c$
10. 080809b, P.I. A2.A.19  
 The expression  $\frac{1}{2} \log m - 3 \log n$  is equivalent to  
 [A]  $\log \frac{\sqrt{m}}{n^3}$  [B]  $\log \frac{1}{2} m - 3 \log n$   
 [C]  $\log \sqrt{m} + \log n^3$  [D]  $\log \frac{m^2}{3\sqrt{n}}$
11. 010316b, P.I. A2.A.19  
 The expression  $\log 10^{x+2} - \log 10^x$  is equivalent to  
 [A] -2 [B] 2 [C] 100 [D]  $\frac{1}{100}$
12. 060510b, P.I. A2.A.19  
 If  $\log a = x$  and  $\log b = y$ , what is  $\log a\sqrt{b}$ ?  
 [A]  $\frac{x+y}{2}$  [B]  $x+2y$   
 [C]  $x+\frac{y}{2}$  [D]  $2x+2y$

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13. 010611b, P.I. A2.A.19

The speed of sound,  $v$ , at temperature  $T$ , in degrees Kelvin, is represented by the equation

$v = 1087\sqrt{\frac{T}{273}}$ . Which expression is equivalent to  $\log v$ ?

- [A]  $1087 + \frac{1}{2}\log T - \log 273$   
 [B]  $\log 1087 + \frac{1}{2}\log T - \frac{1}{2}\log 273$   
 [C]  $1087(\frac{1}{2}\log T - \frac{1}{2}\log 273)$   
 [D]  $\log 1087 + 2\log(T + 273)$

14. 080709b, P.I. A2.A.19

The equation used to determine the time it takes a swinging pendulum to return to its

starting point is  $T = 2\pi\sqrt{\frac{\ell}{g}}$ , where  $T$

represents time, in seconds,  $\ell$  represents the length of the pendulum, in feet, and  $g$  equals  $32 \text{ ft/sec}^2$ . How is this equation expressed in logarithmic form?

- [A]  $\log T = 2 + \log \pi + \frac{1}{2}\log \ell - 16$   
 [B]  $\log T = \log 2 + \log \pi + \frac{1}{2}\log \ell - \frac{1}{2}\log 32$   
 [C]  $\log T = \log 2 + \log \pi + \frac{1}{2}\log \ell - \log 16$   
 [D]  $\log T = \log 2 + \log \pi + \log \sqrt{\ell - 32}$

15. 010717b, P.I. A2.A.19

A black hole is a region in space where objects seem to disappear. A formula used in the study of black holes is the Schwarzschild

formula,  $R = \frac{2GM}{c^2}$ . Based on the laws of logarithms,  $\log R$  can be represented by

- [A]  $\log 2G + \log M - \log 2c$   
 [B]  $2\log G + \log M - \log 2c$   
 [C]  $2\log GM - 2\log c$   
 [D]  $\log 2 + \log G + \log M - 2\log c$

16. 080911b, P.I. A2.A.19

Banks use the formula  $A = P(1+r)^x$  when they compound interest annually. If  $P$  represents the amount of money invested and  $r$  represents the rate of interest, which expression represents  $\log A$ , where  $A$  represents the amount of money in the account after  $x$  years?

- [A]  $\log P + \log x + \log(1+r)$   
 [B]  $\log P + x \log 1+r$   
 [C]  $\log P + x \log(1+r)$   
 [D]  $x \log P + \log(1+r)$

- [1]   C
- [2]   A
- [3]   C
- [4]   D
- [5]   C
- [6]   A
- [7]   B
- [8]   D
- [9]   A
- [10]  A
- [11]  B
- [12]  C
- [13]  B
- [14]  B
- [15]  D
- [16]  C