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A2.A.19: Apply the properties of logarithms to rewrite logarithmic expressions in equivalent forms

1. 060409b, P.I. A2.A.19
If $\log_b x = y$, then x equals

[A] $\frac{y}{b}$ [B] b^y [C] y^b [D] $y \cdot b$

2. 080607b, P.I. A2.A.19
The function $y = 2^x$ is equivalent to

[A] $y = \log_2 x$ [B] $x = y\log 2$
[C] $y = x\log 2$ [D] $x = \log_2 y$

3. 080110b, P.I. A2.A.19
If log 5 = a, then log 250 can be expressed as

[A] $2a + 1$ [B] $50a$
[C] $25a$ [D] $10 + 2a$

4. 010208b, P.I. A2.A.19
Which expression is *not* equivalent to $\log_b 36$?

[A] $\log_b 72 - \log_b 2$ [B] $6\log_b 2$
[C] $2\log_b 6$ [D] $\log_b 9 + \log_b 4$

5. 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

6. 010409b, P.I. A2.A.19
If log x = a, log y = b, and log z = c, then $\log\frac{x^2y}{\sqrt{z}}$ is equivalent to

[A] $2a + b - \frac{1}{2}c$ [B] $2ab - \frac{1}{2}c$
[C] $42a + b + \frac{1}{2}c$ [D] $a^2 + b - \frac{1}{2}c$

7. 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] $\log\sqrt{m} + \log n^3$
[C] $\log\frac{m^2}{3\sqrt{n}}$ [D] $\log\frac{1}{2}m - 3\log n$

8. 010316b, P.I. A2.A.19
The expression $\log 10^{x+2} - \log 10^x$ is equivalent to

[A] 100 [B] -2 [C] 2 [D] $\frac{1}{100}$

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9. 060510b, P.I. A2.A.19
If $\log a = x$ and $\log b = y$, what is $\log a\sqrt{b}$?

[A] $x+\frac{y}{2}$ [B] $x+2y$

[C] $\frac{x+y}{2}$ [D] $2x+2y$

10. 080212b, P.I. A2.A.19
If $\log k = c\log v + \log p$, k equals

[A] $v^c p$ [B] $v^c + p$

[C] $(vp)^c$ [D] $cv+p$

11. 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] $1087(\frac{1}{2}\log T - \frac{1}{2}\log 273)$

[B] $1087+\frac{1}{2}\log T - \log 273$

[C] $\log 1087 + \frac{1}{2}\log T - \frac{1}{2}\log 273$

[D] $\log 1087 + 2\log(T+273)$

12. 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, ℓ represents the length of the pendulum, in feet, and g equals 32 ft/sec^2. How is this equation expressed in logarithmic form?

[A] $\log T = 2 + \log \pi + \frac{1}{2}\log \ell - 16$

[B] $\log T = \log 2 + \log \pi + \frac{1}{2}\log \ell - \log 16$

[C] $\log T = \log 2 + \log \pi + \log \sqrt{\ell - 32}$

[D] $\log T = \log 2 + \log \pi + \frac{1}{2}\log \ell - \frac{1}{2}\log 32$

13. 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] $\log 2 + \log G + \log M - 2\log c$

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[1] B

[2] D

[3] A

[4] B

[5] D

[6] A

[7] A

[8] C

[9] A

[10] A

[11] C

[12] D

[13] D