Classwork / Homework 2/4/16

1.

The area of an equilateral triangle is given by the formula $A = \frac{s^2\sqrt{3}}{4}$.

(a) Write the equation for log A in terms of log s, log 3 and log 4.

(b) Using the equation, find the exact area of an equilateral triangle whose perimeter measures 12 centemeters.

(c) If $\log_2 x = 3$ and $\log_2 y = -3$ find the exact value of $2x + y$ in decimal form.

Answer for #1:

2. [ ] If $\log x = a$, $\log y = b$, and $\log z = c$, then $\log \frac{x^2 y}{\sqrt{z}}$ is equivalent to

1. $42a + b + \frac{1}{2}c$
2. $2ab - \frac{1}{2}c$
3. $a^2 + b - \frac{1}{2}c$
4. $2a + b - \frac{1}{2}c$

3. [ ] If $\log 7 = x$ and $\log 3 = y$, then $\log \sqrt{\frac{3}{7}}$ is equal to

1. $x - y$
2. $y - x$
3. $\frac{1}{2}y - x$
4. $\frac{1}{2}(y - x)$

4. [ ] The expression $\log \sqrt{\frac{x}{y}}$ is equivalent to

1. $\frac{1}{2}(\log x - \log y)$
2. $\log \frac{1}{2}x - \log \frac{1}{2}y$
3. $\frac{1}{2}\log x - \log y$
4. $\log \frac{1}{2}x - \log y$

5. [ ] The magnitude (R) of an earthquake is related to its intensity (I) by $R = \log\left(\frac{I}{T}\right)$, where T is the threshold below which the earthquake is not noticed. If the intensity is doubled, its magnitude can be represented by

1. $2(\log I - \log T)$
2. $\log I - \log T$
3. $2 \log I - \log T$
4. $\log 2 + \log I - \log T$

6. [ ] The expression $\log \frac{\sqrt{x}}{y}$ is equivalent to

1. $\frac{1}{2}(\log x - \log y)$
2. $2 \log x - \log y$
3. $\frac{1}{2} \log x - \log y$
4. $\log \frac{1}{2}x - \log y$

7. [ ] If $\log 28 = \log 4 + \log x$, what is the value of x?

1. 7
2. 14
3. 24
4. 32

8. [ ] If $2x^3 = y$, then $\log y$ equals

1. $\log(2x) + \log 3$
2. $3 \log(2x)$
3. $3 \log 2 + 3 \log x$
4. $\log 2 + 3 \log x$

9. [ ] $\operatorname{Log} \frac{\sqrt{b}}{a^2}$ is equivalent to

1. $\frac{1}{2} \log b + 2 \log a$
2. $\frac{1}{2} \log b - 2 \log a$
3. $2 \log b - \frac{1}{2} \log a$
4. $\frac{\frac{1}{2} \log b}{2 \log a}$

10. [ ] The expression $\log 4m^2$ is equivalent to

1. $2(\log 4 + \log m)$
2. $2 \log 4 + \log m$
3. $\log 4 + 2 \log m$
4. $\log 16 + 2 \log m$

11. [ ] If $\log 3 = x$ and $\log 5 = y$, express $\log 45$ in terms of x and y.

1. $2xy$
2. $2y + x$
3. $2x - y$
4. $2x + y$

12. If $\log_b 2 = 0.6931$ and $\log_b 3 = 1.0986$, then $\log_b \sqrt{12}$ = [ ].

13. [ ] If $\log_b x = y$, then $\log_b x^2$ is

1. $y + 2$
2. $2y$
3. $y - 2$
4. y

14. [ ] The expression $\log \frac{b^3}{\sqrt{a}}$ is equivalent to

1. $3b - \frac{1}{2} a$
2. $\log 3b - \log \frac{1}{2} a$
3. $3 \log b - \frac{1}{2} \log a$
4. $3 \log b - 2 \log a$

15. [ ] If $u = \frac{x}{y^2}$, which expression is equivalent to $\log u$?

1. $\log x + 2 \log y$
2. $2(\log x - \log y)$
3. $2(\log x + \log y)$
4. $\log x - 2 \log y$

16. [ ] The expression $\log_x (ab)$ is equivalent to:

1. $\log_x (a + b)$
2. $(\log_x a)(\log_x b)$
3. $\log (a_{x+} b_x)$
4. $\log_x a + \log_x b$

17. [ ] If $\log 3 = x$ and $\log 5 = y$, express $\log\left(\frac{5}{3}\right)^{\frac{1}{4}}$ in terms of x and y.

1. $\frac{1}{4}x + \frac{1}{4}y$
2. $\frac{1}{4}x - \frac{1}{4}y$
3. $\frac{1}{4}y - \frac{1}{4}x$
4. $\frac{1}{4}y + \frac{1}{4}x$

18. [ ] If $\log 2 = a$ and $\log 3 = b$, the expression $\log \frac{9}{20}$ is equivalent to

1. $2b - a + 1$
2. $2b - a - 1$
3. $b^2 - a + 10$
4. $\frac{2b}{a+1}$

19. [ ] Which logarithmic equation is equivalent to $L^m = E$?

1. $\log_L E = m$
2. $\log_E L = m$
3. $\log_m E = L$
4. $\log_E m = L$

20. [ ] If $\log a = x$ and $\log b = y$, what is $\log a\sqrt{b}$?

1. $x + 2y$
2. $2x + 2y$
3. $\frac{x+y}{2}$
4. $x+\frac{y}{2}$

21. Using logarithms: to the *nearest hundredth*, $\sqrt[3]{0.972}$ = [ ].

22.

If $\log_b 5 = x$ and $\log_b 4 = y$, express $\log_b 100$ in terms of x and y.

Answer for #22:

23. [ ] If $\log x = \frac{1}{2}\log a - 3\log b$, then x equals

1. $\frac{\sqrt{a}}{b^3}$
2. $\sqrt{a} - b^3$
3. $\frac{\frac{1}{2}a}{3b}$
4. $\frac{1}{2}a - 3b$

24. [ ] 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

1. 2 log G + log M - log 2c
2. log 2G + log M - log 2c
3. log 2 + log G + log M - 2 log c
4. 2 log GM - 2 log c

25. [ ] If $\log_b x = 3\log_b p - \left(2\log_b t + \frac{1}{2}\log_b r\right)$, then the value of x is

1. $\frac{p^3}{\sqrt{t^2 r}}$
2. $p^3 t^2 r^{\frac{1}{2}}$
3. $\frac{p^3 t^2}{\sqrt{r}}$
4. $\frac{p^3}{t^2\sqrt{r}}$

26. [ ] 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?

1. $1087 + \frac{1}{2}\log T - \log 273$
2. $1087\left(\frac{1}{2}\log T - \frac{1}{2}\log 273\right)$
3. $\log 1087 + \frac{1}{2}\log T - \frac{1}{2}\log 273$
4. $\log 2087 + 2\log(T + 273)$

27. [ ] The inverse of a function is a logarithmic function in the form $y = \log_b x$. Which equation represents the original function?

1. $y = b^x$
2. $y = bx$
3. $x = b^y$
4. $by = x$

28. [ ] The expression $\log \frac{a}{b}$ is equivalent to

1. $\log a - b$
2. $\log (a - b)$
3. $\log a - \log b$
4. $\frac{\log a}{\log b}$

29. [ ] If $\log k = c \log v + \log p$, k equals

1. $v^c p$
2. $(vp)^c$
3. $v^c + p$
4. $cv + p$

30. [ ] The expression $\log \frac{a^3}{b}$ is equivalent to

1. $3 \log a - \log b$
2. $3(\log a - \log b)$
3. $3\left(\frac{\log a}{\log b}\right)$
4. $\frac{1}{3}(\log a - \log b)$