PRECALCULUS ACCELERATED   A.M.D.G.
Exponential & Logarithmic Functions – Multiple Choice Review

1. If n, p, and t are nonzero real numbers and
   if $n^4 p^7 t^9 = \dfrac{4n^3 p^7}{t^{-9}}$, then $n =$

   (a) $\dfrac{1}{4}$

   (b) $\dfrac{1}{2}$

   (c) 4

   (d) $4p^2 t^2$

   (e) $4p^{18} t^{18}$

2. $\left(\sqrt[3]{2}\right)\left(\sqrt[5]{4}\right)\left(\sqrt[9]{8}\right) =$

   (a) 1.9
   (b) 2.0
   (c) 2.1
   (d) 2.3
   (e) 2.5

3. If $x^a \cdot \left(x^{a+1}\right)^a \cdot \left(x^a\right)^{1-a} = x^k$, then $k =$

   (a) $2a + 1$
   (b) $a + a^2$
   (c) $3a$
   (d) $3a + 1$
   (e) $a^3 + a$

4. If $f(x,y) = 2x^2 - y^2$ and $g(x) = 2^x$, which
   one of the following is equal to 2^{2x}?

   (a) $f\left(x, g(x)\right)$

   (b) $f\left(g(x), x\right)$

   (c) $f\left(g(x), g(x)\right)$

   (d) $f\left(g(x), 0\right)$

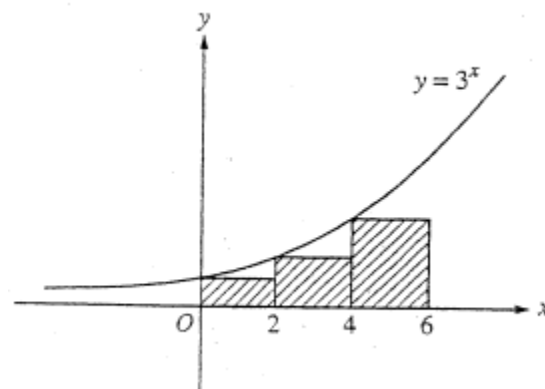   (e) $g\left(f(x,x)\right)$

5. If $f(x) = x^{\sqrt{x}}$, then $f\left(\sqrt{2}\right) =$

   (a) 1.6
   (b) 2.7
   (c) 1.5
   (d) 2.0
   (e) 1.4

6. If $(6.31)^m = (3.02)^n$, what is the value of $\dfrac{m}{n}$?

   (a) –0.32
   (b) 0.32
   (c) 0.48
   (d) 0.60
   (e) 1.67

7. The figure (Note: not drawn to scale) shows
   a portion of the graph of $y = 3^x$. What is
   the sum of the areas of the three inscribed
   rectangles shown?

   (a) 4,698
   (b) 1,638
   (c) 819
   (d) 182
   (e) 91

8. Expressed with positive exponents only,
   $\dfrac{ab^{-1}}{a^{-1} - b^{-1}}$ is equivalent to

   (a) $\dfrac{a^2}{a-b}$

   (b) $\dfrac{a^2}{a-1}$

   (c) $\dfrac{b-a}{ab}$

   (d) $\dfrac{a^2}{b-a}$

   (e) $\dfrac{1}{a-b}$

9. $\log\left(a^2 - b^2\right) =$

   (a) $\log a^2 - \log b^2$

   (b) $\log \dfrac{a^2}{b^2}$

   (c) $\log \dfrac{a+b}{a-b}$

   (d) $2 \cdot \log a - 2 \cdot \log b$

   (e) $\log\left(a+b\right) + \log\left(a-b\right)$

10. If $\log_r 3 = 7.1$, then $\log_r \sqrt{3} =$

   (a) $\sqrt[3]{7.1}$

   (b) 2.66

   (c) 3.55

   (d) $\dfrac{\sqrt{3}}{r}$

   (e) $\dfrac{7.1}{r}$

11. The value of $\log_7 \sqrt{3}$ is

   (a) 0.24

   (b) 0.26

   (c) 0.28

   (d) 0.30

   (e) 0.32

12. If $\log_b A = 0.2222$ and $\log_b B = 0.3333$,

   then the value of $\log_b\left(\sqrt{A} \cdot B^2\right) =$

   (a) 0.0741

   (b) 0.1111

   (c) 0.5555

   (d) 0.7777

   (e) 0.9999

13. If $\log_{10} m = \dfrac{1}{2}$, then $\log_{10} 10m^2 =$

   (a) 2.5

   (b) 2

   (c) 100

   (d) 10.25

   (e) 3

14. If $\log_8 3 = x \cdot \log_2 3$, then $x =$

   (a) 4

   (b) $\log_4 3$

   (c) 3

   (d) $\dfrac{1}{3}$

   (e) $\log_8 9$

15. If $\left(\log_3 x\right)\left(\log_5 3\right) = 3$, find x.

   (a) 5

   (b) 25

   (c) 125

   (d) 81

   (e) 9

16. $\log_x 2 = \log_3 x$ is satisfied by two values of
   x. Their sum is

   (a) 0

   (b) 1.73

   (c) 2.35

   (d) 2.81

   (e) 3.14

17. If $\log_b 5 = a$, $\log_b 2.5 = c$, and $5^x = 2.5$,
   then $x =$

   (a) ac

   (b) $\dfrac{c}{a}$

   (c) $a + c$

   (d) $c - a$

   (e) The value of x cannot be determined.

18. If $\log_5\left(x - 3\right) = \log_{25}\left(x - 1\right)$, which of the
   following could be a value of x?

   (a) 12

   (b) 2

   (c) 8

   (d) 5

   (e) 10

19. If $\log_2 m = \sqrt{7}$ and $\log_7 n = \sqrt{2}$, then $mn =$

   (a) 98

   (b) 2

   (c) 1

   (d) 96

   (e) 103

20. If $\log(\cos\theta) = p$, then $\log(\sec\theta) =$
   (a) $-p$
   (b) $1-p$
   (c) $\dfrac{1}{p}$
   (d) $-\dfrac{1}{p}$
   (e) p

21. If $f(x) = 2^x$, then $f\left(\log_5 2\right) =$
   (a) 5
   (b) 2.32
   (c) 0.43
   (d) 0.19
   (e) 1.35

22. If $f(x,y) = \dfrac{\log x}{\log y}$, $f(e,\pi) =$
   (a) 2.01
   (b) 0.50
   (c) −1.73
   (d) 0.87
   (e) −0.37

23. If $f(x) = \log_2 x$, then $f\left(\dfrac{2}{x}\right) + f(x) =$
   (a) $\log\left(\dfrac{2}{x}\right) + \log_2 x$
   (b) 1
   (c) $\log_2\left(\dfrac{2+x^2}{x}\right)$
   (d) $\log_2\left(\dfrac{2}{x}\right) \cdot \log_2 x$
   (e) 0

24. If $f(x) = x\log x$ and $g(x) = 10^x$, then
   $g\left(f(2)\right) =$
   (a) 24
   (b) 17
   (c) 4
   (d) 2
   (e) 0.6

25. If $f(x) = \log_2 x$ for $x > 0$, then $f^{-1}(x) =$
   (a) 2^x
   (b) x^2
   (c) $\dfrac{x}{2}$
   (d) $\dfrac{2}{x}$
   (e) $\log_x 2$

26. If $f(x) = 2^x + 1$, then $f^{-1}(7) =$
   (a) 2.8
   (b) 3
   (c) 3.6
   (d) 2.4
   (e) 2.6

27. If $16^x = 4$ and $5^{x+y} = 625$, then $y =$
   (a) 2
   (b) 5
   (c) $\dfrac{25}{2}$
   (d) $\dfrac{7}{2}$
   (e) 1

28. If $4.05^p = 5.25^q$, what is the value of $\dfrac{p}{q}$?
   (a) −0.11
   (b) 0.11
   (c) 1.30
   (d) 1.19
   (e) 1.67

29. The graphs of $y = \log_5 x$ and $y = \ln 0.5x$
   intersect at a point where x equals
   (a) 6.24
   (b) 1.14
   (c) 1.69
   (d) 1.05
   (e) 5.44

30. If $300 is invested at 3%, compounded continuously, how long (to the nearest year) will it take for the money to double? (If P is the amount invested, the formula for the amount, A, that is available after t years is

$A = Pe^{0.03t}$.

(a) 26
(b) 25
(c) 24
(d) 23
(e) 22