

Pre-Calculus: 3.3 – 3.4 Review
Exponential and Logarithmic Functions

Name: _____

Date: _____ Hour: ____

Complete the problems on a separate sheet of paper and circle the correct letter on this page.
MULTIPLE CHOICE. Choose the solution that best answers the question. (Circle ONLY one).

Evaluate the logarithm.

1. $\log_2\left(\frac{1}{2}\right)$

a. 0

b. 1

c. 2

d. -1

2. $\log_8\left(\frac{1}{512}\right)$

a. -64

b. -3

c. 3

d. 64

3. $\log_8(32)$

a. $\frac{5}{4}$ b. $\frac{4}{3}$ c. $\frac{3}{2}$ d. $\frac{5}{3}$

4. $\log_{16}(8)$

a. $\frac{3}{4}$ b. $\frac{3}{2}$ c. $\frac{4}{3}$ d. $-\frac{3}{4}$

5. $\log(1)$

a. 0

b. 3

c. -1

d. -2

6. $\ln \frac{1}{\sqrt{e^3}}$

a. $-\frac{3}{2}$

b. -6

c. -3

d. $\frac{3}{2}$

Simplify the expression.

7. $14^{\log_{14} 15}$

a. 14

b. 210

c. 15

d. 1

8. $e^{\ln 7}$

a. $\frac{1}{7}$ b. e^7

c. 7

d. $\ln 7$

Solve the equation by changing it to exponential form.

9. $\log_4 x = \frac{1}{2}$

a. $x = 8$ b. $x = 2$ c. $x = \frac{1}{16}$ d. $x = 16$

10. $\log_3 x = -4$

a. $x = -12$ b. $x = \frac{1}{81}$ c. $x = -81$ d. $x = \frac{1}{64}$

11. $\log x = 5$

a. $x = 50$ b. $x = 100,000$ c. $x = -50$ d. $x = 10,000$

12. $\ln x = 2$

a. $x = 2^e$

b. $x = 2e$

c. $x = e^2$

d. $x = \frac{2}{e}$

Solve the equation by changing it to logarithmic form.

13. $5^x = 625$

a. -2

b. 3

c. 4

d. 125

14. $81^x = 27$

a. 9

b. -3

c. $\frac{3}{4}$

d. $\frac{4}{3}$

15. $x^4 = 16$

a. 2

b. -2

c. 4

d. 5

16. $e^{3x} = 7$

a. 0.847

b. -0.847

c. $.157$

d. $.649$

Use the change of base formula to solve the logarithm. Round the answer to three decimal places.

17. $\log_{16} 3$

a. 2.773

b. 0.477

c. 2.679

d. 2.524

18. $\log_2 0.932$

a. 0.301

b. -0.031

c. -0.102

d. 0.296

19. $\log_{\sqrt{5}} 69.7$

a. 0.477

b. 1.843

c. 3.683

d. 4.150

20. $\log_5 42$

a. 2.322

b. 1.623

c. 3.262

d. 0.700

Expand: Rewrite the expression as a sum or difference or multiple of logarithms.

21. $\log_2(xy)$

22. $\log_3\left(\frac{7}{10}\right)$

23. $\log_4\left(\frac{\sqrt{5}}{16}\right)$

24. $\log_5\left(\frac{25^3 m^6}{n}\right)$

25. $\log_3(x^3 y^5)^2$

Condense: Rewrite the expression as a single logarithm.

26. $\log_2 8 - \log_2 \frac{1}{4}$

27. $4 \log_6 x - 7 \log_6 z^2$

28. $\frac{1}{3} \log_3 x^6 + \log_3 81 - 2 \log_3 x^4$

29. $\log_5 625 - \log_5 25$

30. $\log_2 8 + \log_2 16$