Precalc Review Ch. 11

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Test Tues. Ch. 11

4. **Biology** The data below give the number of bacteria found in a certain culture.

Time (hours)	0	1	2	3	4
Bacteria	6	7	12	20	32

a. Find an exponential model for the data.
b. Write the equation from part a in terms of base e.
c. Use the model to estimate the doubling time for the culture.

Extra Prac

*in terms of e

Lesson 11-7 *(Pages 740–748)*

Find the amount of time required for an amount to double at the given rate if the interest is compounded continuously.

1. 4.5%

2. 6%

3. 8.125%

$$200 = 100e^{rt}$$

$$2 = e^{0.08125t}$$

$$0.6931 = 0.08125t$$

$$8.53 = t$$

Lesson 11-1 *(Pages 695–703)*

Evaluate each expression.

1. $(-12)^{-2}$
2. -12^{-2}
3. $(4 \cdot 6)^3$
4. $\left(\frac{2}{3}\right)^4$
5. $\frac{16}{16^{\frac{1}{2}}}$
6. $27^{\frac{1}{2}} \cdot 20^{\frac{1}{2}}$
7. $\left(\sqrt[4]{625}\right)^2$
8. $\frac{1}{\sqrt[3]{(15)^6}}$

Simplify each expression.

9. $(2a^4)^2$
10. $(x^4)^3 \cdot x^5$
11. $((3f)^{-2})^3$
12. $\left(\frac{c^{-3a}}{c^{4a}}\right)^2$
13. $\left(2n^{\frac{1}{3}} \cdot 3n^{\frac{1}{3}}\right)^6$
14. $\left(\frac{h^6}{216h^{-3}}\right)^{-\frac{1}{3}}$
15. $\sqrt[3]{z^4(z^4)^{\frac{1}{2}}}$
16. $(4r^2t^5)(16r^4t^8)$

gem $4r^2t^5 \cdot 2rt^2 = 8r^3t^7$

$x^3y^{-2} = \frac{x^3}{y^2}$

$\frac{h^9}{216}$ $\left(\frac{24}{h^9}\right)^{\frac{1}{3}}$ $\sqrt[3]{\frac{24}{h^9}}$ $\frac{6}{h^3}$

Express using rational exponents.

17. $\sqrt{a^3b^5}$

18. $\sqrt[3]{64m^9n^6}$

19. $15\sqrt[3]{r^{12}t^2}$

$15(r^{12}t^2)^{\frac{1}{3}}$

$15r^4t^{\frac{2}{3}}$

20. $\sqrt[8]{256x^2y^{16}}$

Lesson 11-2 *(Pages 704–711)*

Graph each exponential function.

1. $y = 3^x$

2. $y = 3^{-x}$

3. $y = -3^{x+1}$

4. **Banking** Compare the balance after 20 years of a $5000 investment earning 5.8% compounded continuously to the same investment compounded semiannually.

$5000e^{0.058 \cdot 20}$ | $5000\left(1+\frac{.058}{2}\right)^{2 \cdot 20}$

Lesson 11-4 *(Pages 718–725)*

Write each equation in exponential form.

1. $\log_{16} 2 = \frac{1}{4}$
2. $\log_{\frac{1}{2}} 8 = -3$
3. $\log_4 \frac{1}{4} = -1$

Write each equation in logarithmic form.

4. $8^{-2} = x$
5. $x^5 = 32$
6. $\left(\frac{1}{4}\right)^{-2} = 16$

Solve each equation.

10. $\log_3 y = 4$
11. $\log_5 r = \log_5 8$
12. $\log_5 35 - \log_5 d = \log_5 5$
13. $\log_4 \sqrt{4} = x$
14. $\log_4 (2x + 3) = \log_4 15$
15. $4 \log_8 2 + \frac{1}{3}\log_8 27 = \log_8 a$

$2^4 \cdot 27^{\frac{1}{3}} = a$

Find the value of each logarithm using the change of base formula.

4. $\log_3 81$
5. $\log_6 12 = x$
6. $\log_5 29$

Solve each equation.

7. $3^x = 45$
8. $6^x = 2^{x-1}$
9. $5 \log y = \log 32$

$3^x = 81$

$3^x = 3^4$

$6^x = 12$

Convert each logarithm to a natural logarithm and evaluate.

4. $\log_{15} 10$
5. $\log_3 14$
6. $\log_8 350$

Use natural logarithms to solve each equation or inequality.

7. $5^x = 90$
8. $7^{x+2} = 5.25$
9. $4^x = 4\sqrt{3}$
10. $6e^x = 48$
11. $50.2 < e^{0.2x}$
12. $16 = 10(1 + e^x)$

$\ln 8^x = \ln 350$

$x(2.0794) = 5.8579$

$x = 2.8171$

$8^{2.8171} =$

BT
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