

Chapters 8 and 9 Review

Key



Chapter 8 – NO CALCULATOR

1. Simplify. Under what conditions is the expression undefined?

$$\frac{3x+6}{x^2+3x+2} = \frac{3(x+2)}{(x+2)(x+1)}$$

$x \neq -2, -1$

2. Simplify each expression.

a) $\frac{5x^2}{12y^2} \cdot \frac{9x^2}{2x^3} = \frac{3}{8x^3y^2}$

b) $\frac{7x^2y}{6a^3b^2} \div \frac{14xy^5}{9ab^4} = \frac{3xb^2}{4y^4a^2}$

c) $\frac{3(x+3)}{3x+9} \cdot \frac{(x+2)(x-2)}{x^2-4}$
 $\frac{3(x+2)}{(x-4)(x-1)}$

d) $\frac{x-3}{x+1} \div \frac{x^2+2x-15}{4x+4} = \frac{4}{x+5}$

3. Simplify each expression.

a) $\frac{5a^2}{6b} + \frac{9}{14a^2b^2} = \frac{35a^4b + 27}{42a^2b^2}$ (LCD = 42a²b²)

b) $\frac{(x+10)}{3x-15} \cdot \frac{3x+15}{6x-30} = \frac{2x+20-3x-15}{6(x-5)}$
 $= \frac{-x+5}{6(x-5)} = \frac{-1(x-5)}{6(x-5)} = \frac{-1}{6}$

c) $\frac{16}{x^2-16} - \frac{-2x+8}{x+4(x-4)} = \frac{-2x+24}{(x+4)(x-4)}$

4. Solve for x.

a) $\frac{(x-5)3x-1}{(x-5)x+5} + \frac{32}{x^2-25} = \frac{3x+1(x+5)}{x-5}$
 $\frac{3x^2-16x+5+32}{(x+5)(x-5)} = \frac{3x^2+16x+5}{(x+5)(x-5)}$
 $32 = 32x$
 $1 = x$

b) $\frac{(x-2)}{4x} - \frac{(x-1)}{5x} = \frac{2}{x^2-3x+2}$
 $\frac{(x-2)(x-1)}{(x-2)(x-1)} = \frac{2}{(x-2)(x-1)}$
 $4x^2-8x-5x^2+5x = 2$
 $-1x^2-3x-2 = 0$
 $x^2+3x+2 = 0$
 $(x+2)(x+1) = 0$
 $x = -2, -1$

Chapter 9 – NO CALCULATOR

Solve for x.

5. $\log_3 27 = x$

$3^x = 27$

$x = 3$

6. $\log_3 x = -1$

$3^{-1} = x$

$\frac{1}{3} = x$

7. $\log_5 \frac{1}{125} = x$

$5^x = \frac{1}{125}$

$x = -3$

8. $\log_{16} x = \frac{3}{4}$

$16^{3/4} = x$

$(2^4)^{3/4} = x$

$2^3 = x$

$x = 8$

9. $\log_x 11 = \frac{1}{2}$

$x^{1/2} = 11$

$x = 121$

10. $\log_x 216 = -3$

$(x^{-3}) = (216)^{-1/3}$

$x = (6^3)^{-1/3}$

$x = 6^{-1}$

$x = \frac{1}{6}$

11. $64^{5x-1} = 4^{7x+2}$

$(4^3)^{5x-1} = 4^{7x+2}$

$15x - 3 = 7x + 2$

$8x = 5$

$x = \frac{5}{8}$

12. $\log_7 2 + \log_7 9 = \log_7 x$

$\log_7 18 = \log_7 x$

$18 = x$

13. $\log_7 x + \log_7 (x+4) = \log_7 60$

$\log_7 x(x+4) = \log_7 60$

$x^2 + 4x - 60 = 0$

$(x+10)(x-6) = 0$

$x = -10, 6$

Rewrite in terms of a single logarithm. Let $a = \log_2 4$ and $b = \log_2 11$.

14. $\log_2 44$

$\log_2 (11 \cdot 4)$

$\log_2 11 + \log_2 4$

$b + a$

15. $\log_2 \frac{11}{4}$

$\log_2 11 - \log_2 4$

$b - a$

16. $\log_2 22$

$\log_2 11 + \log_2 2$

$b + 1$

Chapter 9 – CALCULATOR OKAY

Solve for x algebraically and using your calculator. Round all solutions to the nearest hundredth.

17. $7^{x+5} = 11$

$(x+5) \log 7 = \log 11$

$x+5 = 1.23$

$x = -3.77$

18. $4^x = 15$

$x \cdot \log 4 = \log 15$

$x = 1.95$

19. $\ln(3x-5) = 4$

$\log_e (3x-5) = 4$

$e^4 = 3x-5$

$54.60 = 3x-5$

$59.60 = 3x$

$x = 19.87$

Round all word problem answers to the nearest hundredth.

$$n=4$$

20. Jim put \$5,000 in a bank account with a rate of 2.7% compounded quarterly. How long will it take him to earn \$8,000?

$$8000 = 5000 \left(1 + \frac{.027}{4}\right)^{4t}$$

$$1.6 = (1.0068)^{4t}$$

$$\log 1.6 = 4t (\log 1.0068)$$

$$\log 1.6 = 4t$$

$$t = 17.34 \text{ years}$$

21. Pam put \$1,000 in a bank account 15 years ago. The rate was 2.2% and it was compounded monthly. How much money is currently in her account?

$$A = 1000 \left(1 + \frac{.022}{12}\right)^{12(15)}$$

$$A = \$1390.55$$

22. The house built near Hinsdale Central 5 years ago was sold for \$1 million. It has appreciated at a rate of 1.4% per year. How much is the house currently worth?

$$A = 1000000 (1 + .014)^5$$

$$A = \$1,071,987.63$$

23. Tony opened a bank account with \$50,000 that earns 4.26% annual interest. In how many years will the amount in his account be doubled?

$$100000 = 50000 (1 + .0426)^t$$

$$2 = (1.0426)^t$$

$$\log 2 = t \cdot \log 1.0426$$

$$16.62 = t$$

years