

1.2 Order of Operations and Variable Expressions

Name _____

Rewrite the following using exponential notation.	
1. $2 \cdot 2 \cdot 2 = 2^3$	2. $7 \cdot 7$
3. $\frac{3}{4} \cdot \frac{3}{4} \cdot \frac{3}{4} \cdot \frac{3}{4} \cdot \frac{3}{4} = \left(\frac{3}{4}\right)^5$	4. $\frac{2}{3} \cdot \frac{2}{3} \cdot \frac{2}{3}$
Calculate the value of the exponential expressions.	
5. $5^3 = 5 \cdot 5 \cdot 5 = 125$	6. 3^7
7. $\left(\frac{2}{3}\right)^4 = \frac{2}{3} \cdot \frac{2}{3} \cdot \frac{2}{3} \cdot \frac{2}{3} = \frac{16}{81}$	8. $\left(\frac{3}{4}\right)^3$
Calculate each square root. Round to four decimal places if necessary.	
9. $\sqrt{25} = 5$	10. $\sqrt{49}$
11. $\sqrt{0} = 0$	12. $\sqrt{1}$
13. $\sqrt{17} \approx 4.1231$	14. $\sqrt{361}$
Calculate each square root. Write your answer as a fraction.	
15. $\sqrt{\frac{1}{16}} = \sqrt{\left(\frac{1}{4}\right)^2} = \frac{1}{4}$	16. $\sqrt{\frac{25}{64}}$
Answers: 1. 2^3 ; 3. $\left(\frac{3}{4}\right)^5$; 5. 125; 7. $\frac{16}{81}$; 9. 5; 11. 0; 13. 4.1231; 15. $\frac{1}{4}$	

Simplify each expression using the order of operations.	
17. $15 - 2 \cdot 3$ $= 15 - 6$ $= 9$	18. $45 - 10 \cdot 2 + 13$
19. $4\sqrt{25} - 28 \div 7$ $= 4 \cdot 5 - 28 \div 7$ $= 20 - 4$ $= 16$	20. $(20 - \sqrt{81})^2$
21. $\frac{17 - 3^2}{5 - 1} = \frac{17 - 9}{4} = \frac{8}{4} = 2$	22. $\frac{5(7) - 2(4)}{18 - 3^2}$
23. $\frac{11}{12} - \frac{1}{2} \cdot \frac{5}{6} = \frac{11}{12} - \frac{5}{12} = \frac{6}{12} = \frac{6 \div 6}{12 \div 6} = \frac{1}{2}$	24. $\frac{3}{8} \div \frac{2}{3} \cdot \frac{5}{9}$
Use the formula to calculate the requested value. Round decimal answers to two decimal places if necessary.	
25. Fahrenheit to Celsius temperature conversion $C = \frac{5}{9}(F - 32)$ <p>a) $F = 68$</p> $C = \frac{5}{9}(68 - 32) = \frac{5}{9}(36) = \frac{5}{9^1} \cdot \frac{36^4}{1} = 20$ <p>b) $F = 212$</p> $C = \frac{5}{9}(212 - 32) = \frac{5}{9}(180) = \frac{5}{9^1} \cdot \frac{180^{20}}{1} = 100$ <p>c) $F = 95$</p> $C = \frac{5}{9}(95 - 32) = \frac{5}{9}(63) = \frac{5}{9^1} \cdot \frac{63^7}{1} = 35$	26. Simple Interest $I = Prt$ <p>a) $P = 10,000 \quad r = 0.04 \quad t = 15$</p> <p>b) $P = 25,000 \quad r = 0.025 \quad t = 10$</p>
Answers: 17. 9; 19. 16; 21. 2; 23. $\frac{1}{2}$; 25. a) 20, b) 100, c) 35	

Evaluate the expression for the given values of the variable/s. Give exact answers.	
<p>27. $5x - 2$</p> <p>a) $x = 7$ b) $x = 1.8$</p> $\begin{aligned} 5x - 2 &= 5 \cdot 7 - 2 \\ &= 35 - 2 \\ &= 33 \end{aligned}$ $\begin{aligned} 5x - 2 &= 5 \cdot 1.8 - 2 \\ &= 9 - 2 \\ &= 7 \end{aligned}$	<p>28. $x^2 + 2x$</p> <p>a) $x = 3$ b) $x = 1.8$</p>
<p>29. $\frac{x-y}{2y}$</p> <p>a) $x = 17$ $y = 5$ b) $x = 7.8$ $y = 1.5$</p> $\frac{x-y}{2y} = \frac{17-5}{2 \cdot 5} = \frac{12}{10} = \frac{12 \div 2}{10 \div 2} = \frac{6}{5}$ $\frac{x-y}{2y} = \frac{7.8-1.5}{2 \cdot 1.5} = \frac{6.3}{3} = 2.1$	<p>30. $\frac{3y^2 - 2x}{5(x-y)}$</p> <p>a) $x = 6$ $y = 5$ b) $x = 1.1$ $y = 1$</p>
Translate each to an algebraic expression, using x to represent the unknown number.	
<p>31. The sum of a number and twelve</p> $x + 12$	<p>32. The product of a number and seven</p>
<p>33. Four less than twice a number</p> $2x - 4$	<p>34. Three less than five times a number</p>
<p>35. Ten more than the square of a number</p> $x^2 + 10$	<p>36. Five more than the cube of a number</p>
<p>37. 7 times a number increased by 11</p> $7x + 11$	<p>38. The product of a number and 9, decreased by 12</p>
Answers: 27. a) 33, b) 7; 29. a) $\frac{6}{5}$, b) 2.1; 31. $x + 12$; 33. $2x - 4$; 35. $x^2 + 10$; 37. $7x + 11$	