

Basic Mathematics

Chapter 1 Review




Objective [1.1a] Convert from standard notation to expanded notation.		
Brief Procedure	Example	Practice Exercise
Determine the place value of each digit and write a sum.	Write expanded notation for 12,309. $12,309 = 1 \text{ ten thousand} + 2 \text{ thousands} + 3 \text{ hundreds} + 0 \text{ tens} + 9 \text{ ones}$, or $1 \text{ ten thousand} + 2 \text{ thousands} + 3 \text{ hundreds} + 9 \text{ ones}$	1. Write expanded notation for 2087. A. 2 thousands + 8 tens + 7 ones B. 2 thousands + 8 hundreds + 7 ones C. 2 hundreds + 8 tens + 7 ones D. 2 thousands + 8 hundreds + 7 tens
Objective [1.1b] Convert from expanded notation to standard notation.		
Brief Procedure	Example	Practice Exercise
Write standard notation using place values for each digit.	Write standard notation for 5 thousands + 6 hundreds + 1 one. This is equivalent to 5 thousands + 6 hundreds + 0 tens + 1 one, so standard notation is 5601.	2. Write standard notation for 6 ten thousands + 4 hundreds + 1 ten + 9 ones. A. 6419 B. 60,419 C. 64,019 D. 64,190
Objective [1.1c] Write a word name for a number given standard notation.		
Brief Procedure	Example	Practice Exercise
Starting with the period at the left, write the number named in each period followed by the name of the period.	Write a word name for 36,760,235. The first period denotes millions. There are thirty-six millions. The second period denotes thousands. There are seven hundred sixty thousands. The last period denotes ones. There are two hundred thirty-five ones. Thus, a word name for 36,760,235 is thirty-six million, seven hundred sixty thousand, two hundred thirty-five.	3. Write a word name for 5,487,203. A. 5 millions + 487 thousands + 2 hundreds + 3 ones B. 5 millions + 4 hundred thousands + 8 ten thousands + 7 thousands + 2 hundreds + 3 ones C. Five million, four hundred eighty-seven thousand, two hundred three D. Five million, four hundred eighty-seven thousand, twenty-three

Objective [1.1d] Write standard notation for a number given a word name.											
Brief Procedure	Example	Practice Exercise									
Starting with the period at the left, write standard notation for the number named in each period.	Write standard notation for eighty-six million, one hundred twenty-three thousand, seven hundred sixty-one. The number named in the millions period is 86, the number named in the thousands period is 123, and the number named in the ones period is 761. We write each of these numbers in order, separating them with commas. Thus standard notation is 86,123,761.	4. Write standard notation for four hundred sixty-five thousand, eight hundred thirteen. A. 465,813,000,000 B. 465,000 + 813 C. 465,000,813 D. 465,813									
Objective [1.1e] Given standard notation like 278,342, tell what 8 means, what 3 means, and so on; identify the hundreds digit, the thousands digit, and so on.											
Brief Procedure	Example	Practice Exercises									
To tell what a given digit means, find the digit and identify the place value.	What does the digit 7 mean in 4,678,952? 4,6 7 8,9 5 2 7 means 7 ten thousands.	5. What does the 2 mean in 516,204? A. 2 ones B. 2 tens C. 2 hundreds D. 2 thousands									
To determine which digit has a specific place value, locate the place and identify the digit in it.	In 816,304,259, which digit tells the number of hundreds? 8 1 6,3 0 4, 2 5 9 The digit 2 tells the number of hundreds.	6. In 124,806,357, which digit tells the number of ten thousands? A. 0 B. 1 C. 5 D. 6									
Objective [1.2a] Write an addition sentence that corresponds to a situation.											
Brief Procedure	Example	Practice Exercise									
Read carefully, looking for numbers that are being combined. Write an addition sentence showing these numbers combined and their sum.	Write an addition sentence that corresponds to this situation. Chris buys an accounting textbook costing \$45 and a solutions manual costing \$18. What was the total cost? <table style="margin-left: auto; margin-right: auto;"> <tr> <td>Cost</td> <td>Cost of</td> <td>Total</td> </tr> <tr> <td>of text</td> <td>manual</td> <td>cost</td> </tr> <tr> <td>\$45</td> <td>+ \$18</td> <td>= \$63</td> </tr> </table>	Cost	Cost of	Total	of text	manual	cost	\$45	+ \$18	= \$63	7. Write an addition sentence that corresponds to this situation. Jared ran 3 miles on Monday and 5 miles on Wednesday. How far did he run on Monday and Wednesday? A. 5 mi – 3 mi = 2 mi B. 3 mi + 3 mi = 6 mi C. 3 mi + 5 mi = 8 mi D. 5 mi + 5 mi = 10 mi
Cost	Cost of	Total									
of text	manual	cost									
\$45	+ \$18	= \$63									

Objective [1.2b] Add whole numbers.								
Brief Procedure	Example	Practice Exercise						
Add the ones digits first, then the tens, then the hundreds, and so on, carrying as necessary.	Add: $8429 + 4098$. $\begin{array}{r} & 1 & 1 & & \\ & 8 & 4 & 2 & 9 \\ + & 4 & 0 & 9 & 8 \\ \hline 1 & 2 & 5 & 2 & 7 \end{array}$	8. Add: $27,609 + 38,415$. A. 6624 B. 66,014 C. 66,024 D. 66,124						
Objective [1.3a] Write a subtraction sentence that corresponds to a situation involving "take away."								
Brief Procedure	Example	Practice Exercise						
Read carefully, looking for words that indicate an initial quantity and a quantity being taken away from it. Write a subtraction sentence showing this.	Write a subtraction sentence that corresponds to the situation. Ryan has \$568 in his checking account. He spends \$312 for books. How much is left in his account? <table style="margin-left: auto; margin-right: auto;"> <tr> <td>Beginning amount</td> <td>Amount spent</td> <td>Amount left</td> </tr> <tr> <td>\$568</td> <td>– \$312</td> <td>= \$256</td> </tr> </table>	Beginning amount	Amount spent	Amount left	\$568	– \$312	= \$256	9. Write a subtraction sentence that corresponds to the situation. You need not carry out the subtraction. Tilara buys a box of 10 computer disks and uses 4 of them. How many are left? A. $10 + 4 = \square$ B. $4 + 6 = \square$ C. $10 - 6 = \square$ D. $10 - 4 = \square$
Beginning amount	Amount spent	Amount left						
\$568	– \$312	= \$256						
Objective [1.3b] Given a subtraction sentence, write a related addition sentence; and given an addition sentence, write two related subtraction sentences.								
Brief Procedure	Example	Practice Exercises						
Given a subtraction sentence, write a related addition sentence by adding the number being taken away (the subtrahend) to the difference.	Write a related addition sentence for $13 - 8 = 5$. $13 - 8 = 5$ $\begin{array}{c} \uparrow \\ \text{This number gets added (after 5).} \\ \downarrow \\ 13 = 5 + 8 \end{array}$ We could also write $13 = 8 + 5$.	10. Write a related addition sentence for $9 - 3 = 6$. A. $9 - 6 = 3$ B. $9 = 6 + 3$ C. $9 + 3 = 12$ D. $9 + 6 = 15$						
Given an addition sentence, write two related subtraction sentences by subtracting one of the numbers being added (an addend) from the sum.	Write two related subtraction sentences for $8 + 6 = 14$. We can subtract 6 from 14 to get one related subtraction sentence: $8 = 14 - 6$ We can also subtract 8 from 14: $6 = 14 - 8$	11. Write two related subtraction sentences for $4 + 7 = 11$. A. $4 = 11 - 7$, $7 = 11 - 4$ B. $4 + 7 = 11$, $7 + 4 = 11$ C. $3 = 7 - 4$, $4 = 7 - 3$ D. $6 = 11 - 5$, $5 = 11 - 6$						

Objective [1.3c] Write a subtraction sentence that corresponds to a situation involving “how much more.”		
Brief Procedure	Example	Practice Exercise
First consider an addition sentence with a missing addend. Then write a related subtraction sentence.	Write a subtraction sentence that corresponds to the situation. You need not carry out the subtraction. Michiyo has \$196 and wants to buy a \$340 fax machine. How much more does she need? Addition sentence: $\$196 + \square = \340 Related subtraction sentence: $\square = \$340 - \196	12. Write a subtraction sentence that corresponds to the situation. You need not carry out the subtraction. The members of a service club have collected 127 cans of food for a food pantry. Their goal is to collect 500 cans. How many more cans do they need? A. $\square = 500 + 127$ B. $127 + \square = 500$ C. $\square = 500 - 127$ D. $500 = \square - 127$
Objective [1.3d] Subtract whole numbers.		
Brief Procedure	Example	Practice Exercise
Subtract ones first, then tens, then hundreds, and so on, borrowing when necessary.	Subtract: $8045 - 2897$. $\begin{array}{r} & & 13 & & & \\ & 7 & 9 & \cancel{3} & 15 & \\ & \cancel{8} & \cancel{0} & \cancel{4} & \cancel{5} & \\ - & 2 & 8 & 9 & 7 & \\ \hline & 5 & 1 & 4 & 8 & \end{array}$	13. Subtract: $6401 - 3629$ A. 2772 B. 2782 C. 2882 D. 10,030
Objective [1.4a] Round to the nearest ten, hundred, or thousand.		
Brief Procedure	Example	Practice Exercise
a) Locate the digit in the place to be rounded. b) Consider the next digit to the right. c) If the digit to the right is 5 or higher, round up; if the digit to the right is 4 or lower, round down. d) Change all digits to the right of the rounding location to zeros.	Round 8365 to the nearest hundred. $83\boxed{6}5$ \uparrow The digit 3 is in the hundreds place. Consider the next digit to the right. Since the digit, 6, is 5 or higher, round 3 hundreds up to 4 hundreds. Then change all digits to the right of the hundreds digit to zeros. The answer is 8400.	14. Round 27,459 to the nearest thousand. A. 26,000 B. 27,000 C. 27,500 D. 28,000

Objective [1.4b] Estimate sums and differences by rounding.		
Brief Procedure	Example	Practice Exercise
Round each part of the sum or difference to the specified place. Then add or subtract.	Estimate this difference by first rounding to the nearest hundred: $7546 - 3271$. $\begin{array}{r} 7500 \\ - 3300 \\ \hline 4200 \end{array} \leftarrow \text{Estimated answer}$	15. Estimate this sum by first rounding to the nearest thousand. $\begin{array}{r} 2764 \\ 9076 \\ + 4528 \\ \hline \end{array}$ A. 15,000 B. 16,000 C. 17,000 D. 18,000
Objective [1.4c] Use < or > for \square to write a true sentence in a situation like $6 \square 10$.		
Brief Procedure	Example	Practice Exercise
If the first number given lies to the left of the other on a number line, use <. If the first number lies to the right of the other, use >.	Use < or > for \square to write a true sentence: $23 \square 16$. Since 23 is to the right of 16 on a number line, $23 > 16$.	16. Use < or > for \square to write a true sentence: $33 \square 36$. A. < B. >
Objective [1.5a] Write a multiplication sentence that corresponds to a situation.		
Brief Procedure	Example	Practice Exercise
Read carefully, looking for numbers and words that indicate multiplication. Write a multiplication sentence showing this.	Write a multiplication sentence that corresponds to the situation: There are 24 hours in a day. How many hours are there in 3 days? We visualize the situation. $\boxed{24 \text{ hr}} + \boxed{24 \text{ hr}} + \boxed{24 \text{ hr}}$ $3 \cdot 24 \text{ hr} = 72 \text{ hr}$	17. Write a multiplication sentence that corresponds to the situation: A book of stamps contains 20 stamps. How many stamps are there in 6 books? A. $6 + 20 = 26$ B. $6 \cdot 6 = 36$ C. $6 \cdot 20 = 120$ D. $20 \cdot 20 = 400$
Objective [1.5b] Multiply whole numbers.		
Brief Procedure	Example	Practice Exercise
First multiply by ones, then by tens, then by hundreds, and so on, and add.	Multiply: 37×415 . $\begin{array}{r} 1 \\ 13 \\ 415 \\ \times 37 \\ \hline 2905 \leftarrow 415 \times 7 \\ 12450 \leftarrow 415 \times 30 \\ \hline 15,355 \end{array}$	18. Multiply: 238×764 . A. 9932 B. 23,432 C. 117,932 D. 181,832

Objective [1.5c] Estimate products by rounding.		
Brief Procedure	Example	Practice Exercise
Round each factor to the specified place. Then multiply.	Estimate the product by first rounding to the nearest hundred: 152×649 . $\begin{array}{r} 600 \\ \times 200 \\ \hline 120,000 \end{array} \leftarrow \text{Estimated product}$	19. Estimate the product by first rounding to the nearest ten: 59×34 . A. 1500 B. 1800 C. 2000 D. 2400
Objective [1.6a] Write a division sentence that corresponds to a situation.		
Brief Procedure	Example	Practice Exercise
Read carefully looking for words and numbers that indicate division. Write a division sentence showing this.	Write a division sentence that corresponds to this situation. There are 28 student desks in a college classroom, and there are 7 desks in each row. How many rows are there? Think of a rectangular array with 7 desks in each row. How many rows will there be? $28 \div 7 = \square$	20. Write a division sentence that corresponds to this situation. Five friends spend \$35 for lunch and split the check equally among themselves. How much is each person's portion? A. $35 \div 5 = \square$ B. $5 \times \square = 35$ C. $35 \div 7 = \square$ D. $35 \times 5 = \square$
Objective [1.6b] Given a division sentence, write a related multiplication sentence and given a multiplication sentence, write two related division sentences.		
Brief Procedure	Example	Practice Exercise
Given a division sentence, write a related multiplication sentence by using Dividend = Quotient \times Divisor.	Write a related multiplication sentence for $36 \div 4 = 9$. The 4 moves to the right. $36 \div 4 = 9$  A related multiplication sentence is $36 = 9 \cdot 4$. We could also write $36 = 4 \cdot 9$.	21. Write a related multiplication sentence for $42 \div 6 = 7$. A. $42 \div 7 = 6$ B. $42 \div 21 = 2$ C. $42 = 2 \cdot 21$ D. $42 = 6 \cdot 7$
Given a multiplication sentence, write two related division sentences by dividing the product by each of the factors.	Write two related division sentences for $4 \cdot 6 = 24$. Move a factor to the other side and then write a division. $4 \times 6 = 24$ $4 \times 6 = 24$   $4 = 24 \div 6$ $6 = 24 \div 4$	22. Write two related division sentences for $9 \cdot 8 = 72$. A. $8 \cdot 9 = 72$, $4 \cdot 18 = 72$ B. $9 = 72 \div 8$, $8 = 72 \div 9$ C. $12 = 72 \div 6$, $6 = 72 \div 12$ D. $12 \cdot 6 = 72$, $6 \cdot 12 = 72$

Objective [1.6c] Divide whole numbers.		
Brief Procedure	Example	Practice Exercise
Start with the digit of highest place value in the dividend and work down to the lowest through the remainders. At each step ask if there are multiples of the divisor in the quotient.	Divide: $8973 \div 36$. $\begin{array}{r} 249 \\ 36 \overline{)8973} \\ \underline{7200} \\ 1773 \\ \underline{1440} \\ 333 \\ \underline{324} \\ 9 \end{array}$ The answer is 249 R 9.	23. Divide: $8519 \div 27$. A. 254 B. 254 R 9 C. 315 D. 315 R 14
Objective [1.7a] Solve simple equations by trial.		
Brief Procedure	Example	Practice Exercise
Try various replacements for the variable. A replacement that yields a true equation is a solution of the equation.	Solve $x + 5 = 12$ by trial. Ask: 5 plus what number is 12? The only correct answer is 7, so the solution is 7.	24. Solve $x - 2 = 6$ by trial. A. 3 B. 4 C. 8 D. 12
Objective [1.7b] Solve equations like $t + 28 = 54$, $28 \cdot x = 168$, and $98 \div 2 = y$.		
Brief Procedure	Example	Practice Exercise
To solve $x + a = b$, subtract a on both sides.	Solve: $t + 15 = 32$. $\begin{aligned} t + 15 &= 32 \\ t + 15 - 15 &= 32 - 15 \\ t + 0 &= 17 \\ t &= 17 \end{aligned}$ The solution is 17.	25. Solve: $y + 8 = 9$ A. 1 B. 17 C. 18 D. 72
To solve $a \cdot x = b$, divide by a on both sides.	Solve: $16 \cdot n = 416$. $\begin{aligned} 16 \cdot n &= 416 \\ \frac{16 \cdot n}{16} &= \frac{416}{16} \\ n &= 26 \end{aligned}$ The solution is 26.	26. Solve: $24 \cdot y = 912$ A. 24 B. 38 C. 888 D. 21,888
To solve an equation like $98 \div 2 = y$, carry out the calculation.	Solve: $2808 \div 18 = x$. $\begin{array}{r} 156 \\ 18 \overline{)2808} \\ \underline{1800} \\ 1008 \\ \underline{900} \\ 108 \\ \underline{108} \\ 0 \end{array}$ The solution is 156.	27. Solve: $2806 \div 61 = n$ A. 46 B. 2745 C. 2867 D. 171,166

Objective [1.8a] Solve applied problems involving addition, subtraction, multiplication, or division of whole numbers.																	
Brief Procedure	Example	Practice Exercise															
<ol style="list-style-type: none"> <i>Familiarize</i> yourself with the situation. <i>Translate</i> the problem to an equation. <i>Solve</i> the equation. <i>Check</i> the answer in the original problem. <i>State</i> the answer clearly. 	<p>Margaret borrows \$8820 to buy a car. The loan is to be paid off in 36 equal monthly payments. How much is each payment (excluding interest)?</p> <ol style="list-style-type: none"> <i>Familiarize.</i> Visualize a rectangular array of dollar bills with 36 rows. How many dollars are in each row? Let p = the amount of each payment. <i>Translate.</i> We translate to an equation. <table style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td style="text-align: center;">Amount of loan</td> <td style="text-align: center;">\div</td> <td style="text-align: center;">Number of payments</td> <td style="text-align: center;">=</td> <td style="text-align: center;">Amount of each payment</td> </tr> <tr> <td style="text-align: center;">↓</td> <td></td> <td style="text-align: center;">↓</td> <td style="text-align: center;">↓</td> <td style="text-align: center;">↓</td> </tr> <tr> <td style="text-align: center;">8820</td> <td style="text-align: center;">\div</td> <td style="text-align: center;">36</td> <td style="text-align: center;">=</td> <td style="text-align: center;">p</td> </tr> </table> <ol style="list-style-type: none"> <i>Solve.</i> We carry out the division. $ \begin{array}{r} 245 \\ 36 \overline{)8820} \\ \underline{7200} \\ 1620 \\ \underline{1440} \\ 180 \\ \underline{180} \\ 0 \end{array} $ <ol style="list-style-type: none"> <i>Check.</i> We can repeat the calculation. We can also multiply the number of payments by the amount of each payment: $36 \cdot 245 = 8820$. The answer checks. <i>State.</i> Each payment is \$245. 	Amount of loan	\div	Number of payments	=	Amount of each payment	↓		↓	↓	↓	8820	\div	36	=	p	<p>28. Rex is driving from Las Vegas to Chicago, a distance of 1749 miles. He travels 1399 miles to Des Moines. How much farther must he travel?</p> <p>A. 350 mi B. 1399 mi C. 1749 mi D. 3148 mi</p>
Amount of loan	\div	Number of payments	=	Amount of each payment													
↓		↓	↓	↓													
8820	\div	36	=	p													
Objective [1.9a] Write exponential notation for products such as $4 \cdot 4 \cdot 4$.																	
Brief Procedure	Example	Practice Exercise															
<p>Count the number of identical factors. Make that number the exponent, using the repeated factor as the base.</p>	<p>Write exponential notation for $6 \cdot 6 \cdot 6 \cdot 6$.</p> $ \underbrace{6 \cdot 6 \cdot 6 \cdot 6}_{4 \text{ factors}} = 6^4 $	<p>29. Write exponential notation for $2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$.</p> <p>A. 32 B. $5 \cdot 2$ C. 5^2 D. 2^5</p>															

Objective [1.9b] Evaluate exponential notation.		
Brief Procedure	Example	Practice Exercise
Rewrite the exponential notation as a product and compute.	Evaluate: 3^4 . $3^4 = 3 \cdot 3 \cdot 3 \cdot 3 = 81$	30. Evaluate: 5^3 . A. 15 B. 125 C. 243 D. 625
Objective [1.9c] Simplify expressions using the rules for order of operations.		
Brief Procedure	Example	Practice Exercise
<ol style="list-style-type: none"> Do all calculations within parentheses, brackets, or braces before operations outside. Evaluate all exponential expressions. Do all multiplications and divisions in order from left to right. Do all additions and subtractions in order from left to right. 	Simplify: $64 \div 4^2 \cdot 3 + (12 - 7)$. $64 \div 4^2 \cdot 3 + (12 - 7)$ $= 64 \div 4^2 \cdot 3 + 5$ $= 64 \div 16 \cdot 3 + 5$ $= 4 \cdot 3 + 5$ $= 12 + 5$ $= 17$	31. Simplify: $9 + (19 - 9)^2 \div 5 \cdot 2$. A. 19 B. 49 C. 121 D. 220
Objective [1.9d] Remove parentheses within parentheses.		
Brief Procedure	Example	Practice Exercise
Do computations within the innermost parentheses first and work outward.	Simplify: $7 + \{15 - [2 \times (6 - 4)]\}$. $7 + \{15 - [2 \times (6 - 4)]\}$ $= 7 + \{15 - [2 \times 2]\}$ $= 7 + \{15 - 4\}$ $= 7 + 11$ $= 18$	32. Simplify: $25 + \{3 \times [18 - (2 + 6)]\}$. A. 55 B. 91 C. 344 D. 750