Developmental Mathematics
Chapter 3 Review

Objective [3.1a] Given decimal notation, write a word name, and write a word name for an amount of money.

Brief Procedure	Example	Practice Exercise
To write a word name given decimal notation, a) write a word name for the whole number, b) write the word "and" for the decimal point, and c) write a word name for the number named to the right of the decimal point, followed by the place value of the last digit.	Write a word name for 306.845. a) Write a word name for the whole number. $\boxed{\text{Three hundred six}}$ b) Write "and" for the decimal point. Three hundred six $\boxed{\text{and}}$ c) Write a word name for the number to the right of the decimal point, followed by the place value of the last digit. Three hundred six and $\boxed{\begin{array}{c}\text{eight hundred forty-five}\\\text{thousandths}\end{array}}$ A word name for 306.845 is three hundred six and eight hundred forty-five thousandths.	1. Write a word name for 59.07. A. Fifty-nine and seven tenths B. Fifty-nine and seven hundredths C. Fifty-nine and seventy hundredths D. Fifty-nine and seven thousandths
To write a word name for an amount of money, write the whole dollar amount, then write "and" for the decimal point, and finally write the number to the right of the decimal point over a denominator of 100.	Write a word name for $146.98. One hundred forty-six and $\dfrac{98}{100}$.	2. Write a word name for $23.79. A. Twenty three and $\dfrac{79}{100}$ B. Twenty three seventy-ninths C. Two thousand three hundred seventy-nine D. Two and $\dfrac{379}{100}$.

Objective [3.1b] Convert from decimal notation to fractional notation.

Brief Procedure	Example	Practice Exercise
a) Count the number of decimal places, b) move the decimal point that many places to the right, and c) write the answer over a denominator with a 1 followed by that number of zeros.	Write fractional notation for 3.471. $3.\underline{471}$ $\quad$ 3.471. $\quad$ $\dfrac{3471}{1\underline{000}}$ 3 places $\quad$ Move 3 places. $\quad$ 3 zeros $3.471 = \dfrac{3471}{1000}$	3. Write fractional notation for 16.09. A. $\dfrac{1609}{10}$ B. $\dfrac{1609}{100}$ C. $\dfrac{1609}{1000}$ D. $\dfrac{1609}{10,000}$

Objective [3.1c] Convert from fractional notation and mixed numerals to decimal notation.		
Brief Procedure	Example	Practice Exercise
To convert from fractional notation to decimal notation when the denominator is a power of ten such as 10, 100, 1000, and so on, a) count the number of zeros in the denominator, and b) move the decimal point that number of places to the left. Leave off the denominator. (See Objective [4.5a] for converting from fractional notation to decimal notation when the denominator is a number other than a power of ten.)	Write decimal notation for $\frac{61}{1000}$. $\frac{61}{\underline{1000}}$ $0.061.$ 3 zeros Move 3 places. $\frac{61}{1000} = 0.061$	4. Write decimal notation for $\frac{259}{100}$. A. 0.0259 B. 0.259 C. 2.59 D. 25.9
Given a mixed numeral with a fractional part having a denominator that is a power of 10, convert it to decimal notation by first writing it as a sum of a whole number and a fraction.	Write decimal notation for $5\frac{7}{10}$. $5\frac{7}{10} = 5 + \frac{7}{10} = 5 \text{ and } \frac{7}{10} = 5.7$	5. Write decimal notation for $91\frac{23}{100}$. A. 0.9123 B. 9.123 C. 91.23 D. 912.3
Objective [3.1d] Given a pair of numbers in decimal notation, tell which is larger.		
Brief Procedure	Example	Practice Exercise
Start at the left and compare corresponding digits, moving from left to right. If two digits differ, the number with the larger digit is the larger number. Extra zeros can be written to the right of the last decimal place in one number, if necessary.	Which of 0.01 and 0.009 is larger? 0.01 Starting at the left, these digits are the first to differ; 1 is larger than 0. 0.009 Thus, 0.01 is larger.	6. Which of 2.08 and 2.11 is larger? A. 2.08 B. 2.11
Objective [3.1e] Round to the nearest thousandth, hundredth, tenth, one, hundred, or thousand.		
Brief Procedure	Example	Practice Exercise
To round to a given place: a) Locate the digit in that place. b) Consider the next digit to the right. c) If the digit to the right is 5 or higher, round up; if it is 4 or lower, round, down.	Round 46.1938 to the nearest hundredth. 46.19 $\boxed{3}$ 8 Thousandths digit is 4 or lower. Round down. 46.19	7. Round 327.249 to the nearest tenth. A. 327.2 B. 327.3 C. 327.24 D. 327.25

Objective [3.2a] Add using decimal notation.		
Brief Procedure	Example	Practice Exercise
Line up the decimal points. Then add digits from right to left, carrying if necessary. If desired, extra zeros can be written to the right of the decimal point so the numbers have the same number of decimal places.	Add: $14.26 + 63.589$. $\quad\overset{1}{}$ $\quad 1\,4.2\,6\,0 \quad$ Writing an extra zero $+\ 6\,3.5\,8\,9$ $\overline{\quad 7\,7.8\,4\,9}$	8. Add: $3.08 + 25.962$ A. 5.6762 B. 26.27 C. 29.042 D. 56.762

Objective [3.2b] Subtract using decimal notation.		
Brief Procedure	Example	Practice Exercise
Line up the decimal points. Then subtract digits from right to left, borrowing if necessary. If desired, extra zeros can be written to the right of the decimal point so the numbers have the same number of decimal places.	Subtract: $67.345 - 24.28$. $\quad\ \ \overset{2}{}\ \overset{14}{}$ $\quad 6\,7.\cancel{3}\ \cancel{4}\ 5$ $-\ 2\,4.2\ 8\ 0 \quad$ Writing an extra zero $\overline{\quad 4\,3.0\ 6\ 5}$	9. Subtract: $221.04 - 13.192$ A. 89.02 B. 89.12 C. 207.848 D. 207.948

Objective [3.2c] Solve equations of the type $x + a = b$ and $a + x = b$, where a and b may be in decimal notation.		
Brief Procedure	Example	Practice Exercise
Subtract a on both sides of the equation.	Solve: $x + 54.16 = 83.042$. $$x + 54.16 = 83.042$$ $$x + 54.16 - 54.16 = 83.042 - 54.16$$ $$x = 28.882$$ The solution is 28.882.	10. Solve: $3.29 + y = 41.342$. A. 84.42 B. 79.56 C. 41.013 D. 38.052

Objective [3.3a] Multiply using decimal notation.		
Brief Procedure	Example	Practice Exercise
a) Ignore the decimal points and multiply as though both factors were whole numbers. b) Then place the decimal point in the result. The number of decimal places in the product is the sum of the numbers of places in the factors. (Count places from the right.)	Multiply: 2.8×0.03. $\quad\quad 2.\,8 \quad$ (1 decimal place) $\times\ 0.\ 0\ 3 \quad$ (2 decimal places) $\overline{\ 0.\ 0\ 8\ 4} \quad$ (3 decimal places)	11. Multiply: 4.63×2.5. A. 1.1575 B. 11.575 C. 115.75 D. 1157.5

Objective [3.3a] continued		
Brief Procedure	Example	Practice Exercise
To multiply any number by a tenth, hundredth, thousandth, and so on, a) count the number of decimal places, and b) move the decimal point that many places to the left.	Multiply: 0.001×72.4. $0.\underline{001} \times 72.4$ $0.072.4$ 3 decimal places Move 3 places to the left. $0.001 \times 72.4 = 0.0724$	12. Multiply: 14.3×0.01. A. 0.143 B. 1.43 C. 143 D. 1430
To multiply any number by a power of ten, a) count the number of zeros in the power of ten, and b) move the decimal point that many places to the right.	Multiply: 34.6×100. $34.6 \times 1\underline{00}$ $34.60.$ 2 zeros Move 2 places to the right. $34.6 \times 100 = 3460$	13. Multiply: 1000×85.043. A. 0.085043 B. 0.85043 C. 8504.3 D. 85,043

Objective [3.3b] Convert from notation like 45.7 million to standard notation, and convert from dollars to cents and cents to dollars.		
Brief Procedure	Example	Practice Exercise
To convert a large number to standard notation, multiply the numerical part of the number by standard notation for the word name part of the number.	Convert 45.7 million to standard notation. $45.7 \text{ million} = 45.7 \times 1 \text{ million}$ $= 45.7 \times 1,000,000$ $= 45,700,000$	14. Convert 6.2 billion to standard notation. A. 62,000 B. 6,200,000 C. 6,200,000,000 D. 62,000,000,000
To convert from dollars to cents, move the decimal point two places to the right and change the $ sign in front to the ¢ sign at the end.	Convert \$63.42 to cents. Move 2 places to the right. \$63.42.¢ Change from \$ sign in front to ¢ sign at end. $\$63.42 = 6342¢$	15. Convert \$125.49 to cents. A. 1.2549¢ B. 12.549¢ C. 1254.9¢ D. 12,549¢
To convert from cents to dollars, move the decimal point two places to the left and change from the ¢ sign at the end to the $ sign in front.	Convert 9168¢ to dollars. Move 2 places to the left. \$91.68.¢ Change from ¢ sign at end to \$ sign in front. $9168¢ = \$91.68$	16. Convert 245¢ to dollars. A. \$0.245 B. \$2.45 C. \$24.50 D. \$245

Objective [3.4a] Divide using decimal notation.		
Brief Procedure	Example	Practice Exercise
To divide by a whole number, a) place the decimal point directly above the decimal point in the dividend, and b) divide as though dividing whole numbers.	Divide: $36.8 \div 8$. $\begin{array}{r} 4.6 \\ 8\,\overline{)\,3\,6.8} \\ 3\,2\,0 \\ \overline{4\,8} \\ 4\,8 \\ \overline{0} \end{array}$	17. Divide: $615.6 \div 12$. A. 513 B. 51.3 C. 5.13 D. 0.513
To divide when the divisor is not a whole number, a) move the decimal point (multiply by 10, 100, and so on) to make the divisor a whole number; b) move the decimal point (multiply the same way) in the dividend the same number of places; and c) place the decimal point directly above the new decimal point in the dividend and divide as though dividing whole numbers.	Divide: $21.35 \div 6.1$. $\begin{array}{r} 3.5 \\ 6.1_{\wedge}\,\overline{)\,2\,1.3_{\wedge}5} \\ 1\,8\,3\,0 \\ \overline{3\,0\,5} \\ 3\,0\,5 \\ \overline{0} \end{array}$	18. Divide: $24.07 \div 2.9$. A. 0.083 B. 0.83 C. 8.3 D. 83
To divide by a power of ten, such as 10, 100, or 1000, and so on, a) count the number of zeros in the divisor, and b) move the decimal point that number of places to the left.	Divide: $\dfrac{16.7}{1000}$. $\dfrac{16.7}{1\underline{000}}$ $\qquad$ $0.016.7$ 3 zeros $\qquad$ Move 3 places to the left. $\dfrac{16.7}{1000} = 0.0167$	19. Divide: $\dfrac{3.9}{100}$. A. 0.039 B. 0.39 C. 39 D. 390
To divide by a tenth, hundredth, thousandth, and so on, a) count the number of decimal places in the divisor, and b) move the decimal point that number of places to the right.	Divide: $\dfrac{42.93}{0.001}$. $\dfrac{42.93}{0.\underline{001}}$ $\qquad$ $42.930.$ 3 decimal places $\qquad$ Move 3 places to the right. $\dfrac{42.93}{0.001} = 42,930$	20. Divide: $\dfrac{123.4}{0.01}$. A. 1.234 B. 12.34 C. 1234 D. 12,340

Objective [3.4b] Solve equations of the type $a \cdot x = b$, where a and b may be in decimal notation.		
Brief Procedure	Example	Practice Exercise
Divide on both sides of the equation by a.	Solve: $3.4 \cdot t = 20.978$. $$3.4 \cdot t = 20.978$$ $$\frac{3.4 \cdot t}{3.4} = \frac{20.978}{3.4}$$ $$t = 6.17$$ The solution is 6.17.	21. Solve: $5 \cdot y = 14.85$. A. 0.34 B. 2.97 C. 9.85 D. 74.25

Objective [3.4c] Simplify expressions using the rules for order of operations.		
Brief Procedure	Example	Practice Exercise
The same rules used with whole numbers and fractional notation apply when simplifying expressions containing decimal notation. 1. Do all calculations within parentheses before operations outside. 2. Evaluate all exponential expressions. 3. Do all multiplications and divisions in order from left to right. 4. Do all additions and subtractions in order from left to right.	Simplify: $(8 - 2.4) \div 2^2 + 4.9 \times 10$. $$(8 - 2.4) \div 2^2 + 4.9 \times 10$$ $$= 5.6 \div 2^2 + 4.9 \times 10$$ $$= 5.6 \div 4 + 4.9 \times 10$$ $$= 1.4 + 49$$ $$= 50.4$$	22. Simplify: $5 \div 0.5 + 2.1 \times 8 - (1 - 0.9)^3$. A. 24.999 B. 26.7979 C. 26.799 D. 29.797

Objective [3.5a] Convert from fractional notation to decimal notation.		
Brief Procedure	Example	Practice Exercise
When a denominator has no prime factors other than 2's and 5's, we can find decimal notation by multiplying by 1 to get a denominator that is a power of ten, like 10, 100, or 1000.	Find decimal notation for $\frac{13}{20}$. $$\frac{13}{20} = \frac{13}{20} \cdot \frac{5}{5} = \frac{65}{100} = 0.65$$	23. Find decimal notation for $\frac{17}{25}$. A. 0.17 B. 0.425 C. 0.68 D. 0.85

Objective [3.5a] continued		
Brief Procedure	Example	Practice Exercise
We can always divide to find decimal notation.	Find decimal notation for $\frac{1}{6}$. $$6\,\overline{\smash{\big)}\,1.000}$$ $$\begin{array}{r}0.\ 1\ 6\ 6\\ \underline{6}\\ 4\ 0\\ \underline{3\ 6}\\ 4\ 0\\ \underline{3\ 6}\\ 4\end{array}$$ Since 4 keeps reappearing as a remainder, the digit repeats and will continue to do so. Thus, $\frac{1}{6} = 0.1\overline{6}$.	24. Find decimal notation for $\frac{5}{9}$. A. $0.2\overline{5}$ B. $0.3\overline{6}$ C. $0.\overline{5}$ D. $0.\overline{6}$

Objective [3.5b] Round numbers named by repeating decimals.

Brief Procedure	Example	Practice Exercise
a) Write out the repeating decimal at least one place beyond the given rounding place. b) Locate the digit in the given place. b) Consider the next digit to the right. c) If the digit to the right is 5 or higher, round up; if it is 4 or lower, round, down.	Round $0.\overline{37}$ to the nearest thousandth. $0.\overline{37} = 0.3737\ldots$ The digit in the ten-thousandths place, 7, is 5 or higher so we round up and get 0.374.	25. Round $0.\overline{15}$ to the nearest hundredth. A. 0.15 B. 0.151 C. 0.152 D. 0.16

Objective [3.5c] Calculate using fractional and decimal notation together.

Brief Procedure	Example	Practice Exercise
There are at least three ways to calculate using fractional and decimal notation together. 1. Convert the decimal notation to fractional notation and then calculate. 2. Convert the fractional notation to decimal notation and then calculate. 3. Write the decimal notation with a denominator of 1 and calculate.	Calculate: $1.512 \times \frac{4}{3}$. We will use the third method. $1.512 \times \frac{4}{3} = \frac{1.512}{1} \times \frac{4}{3} = \frac{1.512 \times 4}{3} = \frac{6.048}{3} = 2.016$	26. Calculate: $5.32 \div \frac{4}{5}$. A. 0.150, or $\frac{3}{20}$ B. 0.35, or $\frac{7}{20}$ C. 4.256, or $\frac{532}{125}$ D. 6.65, or $\frac{133}{20}$

Objective [3.6a] Estimate sums, differences, products, and quotients.		
Brief Procedure	Example	Practice Exercise
Round the numbers so that there are one or two nonzero digits. Then do the calculation.	Estimate $4.25+6.91+1.046$ by rounding to the nearest tenth. $4.25+6.91+1.046 \approx 4.3+6.9+1.0 = 12.2$	27. Indicate which choice is an appropriate estimate for 68×4.2. A. 17 B. 280 C. 650 D. 700

Objective [3.7a] Solve applied problems involving decimals.		
Brief Procedure	Example	Practice Exercise
Use the five-step problem solving process.	Erik's odometer read 45,918.7 mi at the beginning of a trip. It read 47,304.2 mi at the end of the trip. How far did Erik drive? 1. *Familiarize.* We make a drawing. Let $m = $ the number of miles Erik drove. $$\begin{array}{\|c\|c\|}\hline 45{,}918.7 \text{ mi} & m \\\hline \multicolumn{2}{\|c\|}{47{,}304.2 \text{ mi}} \\\hline\end{array}$$ 2. *Translate.* This is a "how much more" situation. $\underbrace{\text{First reading}} + \underbrace{\begin{array}{c}\text{Additional}\\\text{number}\\\text{of miles}\end{array}} = \underbrace{\text{Final reading}}$ $45,918.7 + \quad m \quad = 47,304.2$ 3. *Solve.* We subtract 45,918.7 on both sides of the equation. $$45,918.7 + m = 47,304.2$$ $$45,918.7 + m - 45,918.7 =$$ $$47,304.2 - 45,918.7$$ $$m = 1385.5$$ 4. *Check.* We can check by adding: $45,918.7 + 1385.5 = 47,304.2$. The result checks. 5. *State.* Erik drove 1385.5 mi.	28. A car loan of \$7791.60 is to be paid off in 24 equal monthly payments. How much is each payment? A. \$216.43 B. \$324.65 C. \$401.17 D. \$649.30