RLP-ALG1B · RLP Algebra 1B — Functions, Exponential and Quadratic Models

Unit 5: Missouri Algebra I Supplement

Practice Workbook. The same problems, in the same order, as the Practice sections of the online lessons.

Name _____ Period _____

Lesson 5.1 — Units, Rates and Scale: Making Quantities Make Sense

FLUENCY

1. Convert 3.5 hours to minutes.

2. Convert 2 miles to feet.

3. Convert 45 miles per hour to feet per second.

4. Convert 12 gallons to quarts (1 gal = 4 qt).

5. A grain buyer pays 90 cents per pound. Convert this rate to dollars per ton (1 ton = 2,000 lb).

6. A tank drains at 8 gallons per minute for 15 minutes. Find the amount drained, and show how the units cancel.

APPLICATION

7. A car averages 31.25 miles per gallon on the 250-mile drive from St. Louis to Kansas City, and gas costs $3.05 per gallon (illustrative). Find the gallons used and the fuel cost in one chain of factors.

8. An 85-acre Missouri soybean field yields 52 bushels per acre, and the crop sells for $10.50 per bushel (illustrative figures). Find the value of the crop, labeling each step.

9. The Gateway Arch in St. Louis is 630 feet tall. Using 1 ft = 0.3048 m exactly, give its height in meters to the nearest meter.

10. A household's monthly electricity use runs from 410 to 560 kWh. Give one vertical scale and origin that show true proportions and one that shows month-to-month detail, and say what a reader must watch for in the second.

CHALLENGE

11. A faucet leaks 1 drop per second, and 20 drops make about 1 mL. About how many liters leak in a 365-day year?

REVIEW

12. If $f(x) = x^2 - 3x - 2$, find $f(3)$.

13. Factor: $x^2 - 2x - 63$

Lesson 5.2 — Functions by Name: Notation, Graphs, Sequence Terms and Division by a Monomial

FLUENCY

1. For $f(x) = 3x - 7$, find $f(4)$ and $f(-2)$.

2. Write the area A of a square as a function of its side length s, in function notation.

3. Is $(3, 11)$ on the graph of $f(x) = x^2 + 2$? Explain.

4. Is $(-1, 4)$ on the graph of $g(x) = 2x^2 - 3x + 1$? If not, which point of the graph has $x = -1$?

5. Write the first five terms of $a(n) = 7 - 2n$.

6. Write the first five terms of $a(1) = 3$, $a(n) = a(n - 1) + 4$.

7. For $b(1) = 2$ and $b(n) = 3 \cdot b(n - 1)$, find $b(5)$.

8. Divide: $(8x^3 + 12x^2) \div 4x$, for $x \neq 0$.

9. Divide: $(10a^4 - 15a^3 + 5a^2) \div 5a^2$, for $a \neq 0$.

APPLICATION

10. A bike share charges $C(m) = 1 + 0.15m$ dollars for an m-minute ride. Find $C(30)$ and say what it means. Then find m when $C(m) = 4$.

11. A rectangular garden has area $A(x) = 6x^2 + 15x$ square feet and width $3x$ feet. Find its length. Check with $x = 4$.

12. A theater's first row has 22 seats, and each row has 2 more than the row before. Write an explicit and a recursive formula, and find the seats in row 15.

CHALLENGE

13. The first n rows of that theater hold $S(n) = n^2 + 21n$ seats. Check S(1) and S(2), then divide by n to find the average seats per row and evaluate it for 15 rows.

REVIEW

14. Solve: $x^2 + 2x - 24 = 0$

15. Write with a positive exponent: x^{-2}

Lesson 5.3 — Two-Way Tables: Relative Frequencies and Associations

FLUENCY

1. Homework device survey (160 students): grade 9, laptop 48 and phone 32; grade 12, laptop 60 and phone 20. Find the joint relative frequency of twelfth graders who use a laptop.

2. In the homework device survey, find the marginal relative frequency of laptop users.

3. In the homework device survey, what percent of ninth graders use a phone?

4. In the homework device survey, what percent of phone users are ninth graders?

5. Complete the table: grade 9 has 30 yes and a row total of 75; grade 12 has 45 yes and 30 no. Find the missing count and every total.

6. Breakfast survey: 63 of 90 students with a sibling and 42 of 60 without one eat breakfast. Give the row percentages.

APPLICATION

7. Do the homework device data suggest an association between grade and device? Support your answer with conditional relative frequencies.

8. Do the breakfast data suggest an association between having a sibling and eating breakfast?

9. A classmate says urban students are more likely to ride the bus because 75 urban and 60 rural students ride. Of 250 urban and 150 rural students surveyed, explain the error.

10. Of 120 students, 50 play a school sport. 30 of the sport players and 20 of the other students report 8 or more hours of sleep. Build the two-way table, compare the rates and state a careful conclusion.

CHALLENGE

11. Design a two-way table for 200 students, 100 in each grade, in which 30% of all students say yes and there is no association between grade and answer. Then change two cells so that an association appears while the column totals stay the same.

REVIEW

12. For the data 8, 9, 11, 13, 17, 34, 36: find the mean, median, range and interquartile range. (Find the quartiles as the medians of the lower and upper halves, leaving out the overall median when the count is odd.)

13. An arithmetic sequence has first term −6 and common difference 4. Write an explicit formula, then find term 16 and the sum of the first 16 terms.