RLP-ALG2B · RLP Algebra 2B — Logarithms, Transformations, Trigonometry and Statistical Inference

Unit 5: Missouri Algebra II Supplement

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

Name _____ Period _____

Lesson 5.1 — Radical Expressions: Simplify, Combine, Multiply and Divide

FLUENCY

1. Simplify $\sqrt{48}$.

2. Simplify $\sqrt{18} + \sqrt{8}$.

3. Simplify $2\sqrt{75} - \sqrt{27}$.

4. Multiply $\sqrt{10} \cdot \sqrt{14}$.

5. Multiply $(3 + \sqrt{2})(3 - \sqrt{2})$.

6. Rationalize $10/\sqrt{5}$.

7. Simplify $\sqrt[3]{24} + \sqrt[3]{81}$.

APPLICATION

8. Expand $(\sqrt{7} + 3)^2$ and check with decimals.

9. Rationalize $6/(2 + \sqrt{3})$.

10. A square garden has area 50 m^2 and a second square garden has area 18 m^2. Find the exact total length of one side of each, added together.

11. Two diagonal shortcuts cross a 3-by-3 block square and a 5-by-5 block square on a street grid. Find their exact total length in blocks.

CHALLENGE

12. Show that $(\sqrt{6} + \sqrt{2})/4$ squared equals $(2 + \sqrt{3})/4$.

REVIEW

13. Evaluate exactly: $64^{2/3}$

14. A right triangle has legs 2 and 2. Find the hypotenuse exactly.

Lesson 5.2 — The Least Common Multiple of Polynomials

FLUENCY

1. Find LCM(15, 25).

2. Find the LCM of $6x^3$ and $9x$.

3. Find the LCM of $10a^2b$ and $4ab^4$.

4. Find the LCM of $x^2 - 25$ and $x + 5$.

5. Find the LCM of $x^2 + 7x + 10$ and $x^2 + 3x - 10$.

6. Find the LCM of $x^2 - 6x + 9$ and $x^2 - 9$.

APPLICATION

7. Add $2/(x^2 - 1) + 1/(x^2 + x)$ using the LCM of the denominators.

8. Three park sprinklers start together and cycle every 8, 12 and 20 minutes (illustrative). After how many minutes do all three start together again?

9. Verify GCF × LCM = product for $x^2 - 4x + 4$ and $x^2 - 4$.

CHALLENGE

10. Find the LCM of $x^3 - 8$ and $x^2 - 4$.

REVIEW

11. Factor: $x^2 - 6x - 16$

12. Solve: $1 / (x + 4) = 8 / (x - 3)$

Lesson 5.3 — Why Logarithmic Scales? Earthquakes, Sound and Acidity

FLUENCY

1. Earthquake A is magnitude 6.2 and earthquake B is 4.2. How many times the amplitude does A have?

2. One earthquake has 1,000 times the amplitude of another. How many magnitude units larger is it?

3. A sound has intensity 10^{-5} W/m^2. Find its level in decibels.

4. Find the pH of a solution with $[H^+] = 10^{-3}$ mol/L.

5. How many times more acidic (in hydrogen-ion concentration) is pH 5 than pH 6.5?

6. A sound level rises from 70 dB to 76 dB. By what factor does the intensity grow?

APPLICATION

7. Using the USGS magnitudes 7.5 (February 1812, New Madrid) and 5.8 (1895, Charleston, Missouri), find the energy ratio, using about $10^{1.5}$ times the energy per magnitude unit.

8. A friend says a magnitude 6 earthquake is “only 20% bigger” than a magnitude 5 because 6 is 20% more than 5. Write a two-sentence correction.

9. Four identical speakers each produce 75 dB alone. What level do all four produce together (intensities add)?

CHALLENGE

10. Explain why the energy ratio for a 2-unit magnitude difference is 1,000 when each unit is about 32 times the energy.

REVIEW

11. Evaluate: $\log_2 (1/2)$

12. Solve for x: $5^x = 1000$. Give an exact answer using logarithms and a decimal to the nearest thousandth.

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