SOLUTION

Expressions and the Number System STUDY GUIDE:

Exponents, Roots, Irrational and Rational Numbers.

Complete the following problems in your Spiral Notebooks:
Show Work, easier to study from!!

1. Simplify:
$6^3 \cdot 6^7$. $= 6\cdot6\cdot6\cdot6\cdot6\cdot6\cdot6\cdot6\cdot6\cdot6 = 6^{10}$

2. Simplify:
$(-2)^{-3} \times (-2)^4$. $= \frac{(-2)(-2)(-2)(-2)}{(-2)(-2)(-2)} = (-2)^1$ or (-2)

3. Simplify using exponents:
$9^5 \cdot 9^4 \cdot 9^8$. $9\cdot9\cdot9\cdot9\cdot9\cdot9\cdot9\cdot9\cdot9\cdot9\cdot9\cdot9\cdot9\cdot9\cdot9\cdot9\cdot9 = 9^{17}$

4. Simplify the expression:
$\frac{v^2}{v^6}$. $= \frac{v\cdot v}{v\cdot v\cdot v\cdot v\cdot v\cdot v} = \frac{1}{v^4}$

5. What is equivalent to 2^{-3}? $= 2^3 = 8$ so $2^{-3} = \frac{1}{8}$

6. Simplify:
64^0. $= 1$

7. Simplify:
$\left(\frac{1}{25}\right)^0 = 1$

8. Evaluate $2w^{-2}z^0$ for $w = 10$ and $z = 2$. $\Rightarrow 2(10^{-2})(2^0) = \frac{2}{1}\left(\frac{1}{100}\right)\left(\frac{1}{1}\right) = \frac{2}{100} = \frac{1}{50}$

9. A student has 4 cubes and each cube measures 4 units on each side. Write an expression using exponents that represents the combined surface area of all 4 cubes. $4[6(4^2)] = 24(4^2)$

10. Find:
$\sqrt{144}$. $= 12$

11. Simplify:
$\sqrt{25} + \sqrt{36}$. $= 5 + 6 = 11$

12. Simplify:
$2\sqrt{16} + 40$. $= 2(4) + 40 = 8 + 40 = 48$

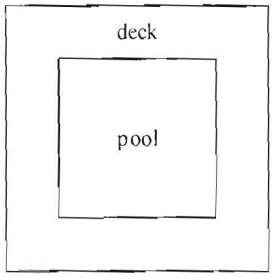
13. Find all square roots of the number 225. 15 AND -15

14. Evaluate:
$\sqrt{81} - \sqrt{25}$. $= 9 - 5 = 4$

15. What is equivalent to:
$9\sqrt{36+64}$?

$9\sqrt{36+64} = 9\sqrt{100} = 9(10) = 90$

16. Randal's dad is installing a new pool in their backyard. The pool is a square and has an area of 121 ft^2. Randal's dad will then build a 7 ft wide deck to surround the pool. **What is the outside perimeter of the deck?**



$A_{pool} = 121 = 11^2$

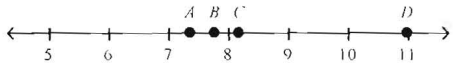
- SIDES OF POOL = 11ft
- DECK WIDTH = 7ft
- So, SIDES OF DECK = 7+7+11 = 25

$P = 4s$
$P = 4(25)$
$P = 100ft$

17. Which point best represents π? Explain your answer.

B

18. Which point best represents $\sqrt{55}$? Explain your answer.



A

19. Which of these expressions is true? $\sqrt{36} < 5$ or $5^3 < 12^2$

$\sqrt{36} < 5$
$6 < 5$ NO

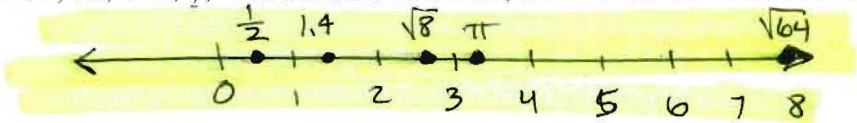
$5^3 < 12^2$
$125 < 144$ YES

20. Between what two integers does $\sqrt{156}$ lie? $\sqrt{144} < \sqrt{156} < \sqrt{169}$, so between 12 & 13

21. Estimate $-\sqrt{21}$ to the nearest tenth. $= -4.6$

22. Which whole number is the best approximation for $\sqrt{(\sqrt{3})^2 + 5}$? Explain. $\sqrt{3+5} = \sqrt{8} \approx 3$

23. Graph the numbers $\sqrt{8}$, 1.4, $\sqrt{64}$, $\frac{1}{2}$, π on a number line. Then, order the numbers from least to greatest.



Numeric Response

1. Find the value of $\sqrt{5^2 + 12^2}$. $= \sqrt{25+144}$
$= \sqrt{169}$
$= 13$

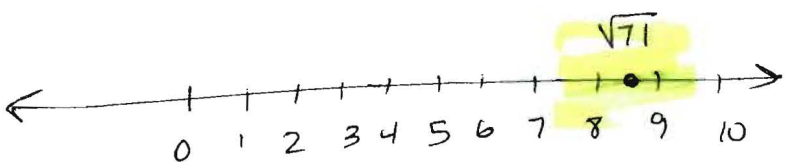
Essay

1. Explain why the exponents in each of the following expressions cannot be added.

$3^a + 3^b$ ← CAN NOT ADD EXPONENTS WHEN ADDING BASE NUMBERS.

$2^x \cdot 5^y$ ← CAN NOT ADD EXPONENTS WHEN MULTIPLYING DIFFERENT BASE NUMBERS.

2. Plot $\sqrt{71}$ on a number line. Explain how you know the location is correct.



- BECAUSE, $\sqrt{64} = 8$
$\sqrt{81} = 9$
- SO $\sqrt{71}$ IS BETWEEN THOSE TWO PERFECT SQUARES.