Practice Exam 2: Math 2-to-3B Place-Up Pathway Exam

Instructions

The Math 2-to-3B PUP-E has 23 questions and lasts 45 minutes. You must get 16 or more correct to pass. The exam is closed notes, no cheat sheets, and no calculator. **Time yourself** and take this practice exam under these conditions. Expect a range of difficulty levels, including both calculations and word problems. Do not work this exam until you have fully completed your review. Answers follow below. Detailed solutions are intentionally not provided; this will force you to discover the source of your errors.

Problems

1. Find the prime factorization of 1200.

2. Convert 9.8% to a decimal and to a fraction in simplest terms.

3. Solve $2 - 3(y + 1) \geq 8$ and give your answer using inequality and interval notation.

4. Find $3^{-2} + 2^{-3}$

5. Solve $\sqrt{5x - 1} = \sqrt{3x + 7}$

6. Find the GCF of these monomials: $50a^2b^3, 40a^3b^2$

7. Find $\left(\dfrac{5 + 7 + 9}{2^5 - 5^2}\right)^3$.

8. Convert $\dfrac{234}{100}$ to a decimal.

9. A piece of bendable wire is currently shaped like an equilateral triangle. After the wire is straightened and reshaped to form a square, the square has side length 12. Find the side length of the triangle.

10. Find $(h^{5/6})^2 \cdot h^{0.25}$.

11. Find $\dfrac{\sqrt{80}}{\sqrt{245}}$

12. Expand and simplify: $(\sqrt{12}x + \sqrt{3})(\sqrt{12}x - \sqrt{3})$

13. At the college level, high-performing students will often study 8 hours for an exam. You decide to try this approach, but you know you can only focus for $\dfrac{4}{5}$ of an hour in one sitting. How many sittings will be needed to meet the study goal?

14. For those who have gone hiking, you'll know that the temperature gets colder as you get higher up. This is why you often see snow-capped mountains while standing in pleasant weather at the base of a mountain. There is a general rule that says for each 1000 feet of altitude you gain, the temperature will drop by 3.5°F. Suppose the temperature is 72°F at the start of your hike and 51°F at the top of the mountain you are climbing. How many feet of elevation did you gain?

15. You are a materials engineer who designs razor blades for shaving companies. Your current employer wants to make a trapezoidal-shaped blade with height $\dfrac{2}{3}$ inch and where one base is twice as long as the other. Due to weight constraints, you need to keep the area of the blade under $\dfrac{5}{4}$ inches^2. What are the possible lengths for the longer base? Give your answer in inequality and interval notation.

16. Find $\sqrt{192} - \sqrt{75}$

17. Find the coefficient on x after $-4x + (3x - 4)(2x + 1)$ is fully simplified.

18. What number must go in the box: $\dfrac{37}{60} = \dfrac{1}{3} + \dfrac{1}{5} + \dfrac{1}{\square}$?

19. You're exploring two options for watching content on Amazon Prime. Option A involves buying a Fire Stick 4K for \$82, which gives you 3 months of Prime for free, and then you'd pay a monthly rate (for Fire Stick owners) of \$9/month. Option B involves using the built-in Amazon app on your smart TV at a higher rate of \$14/month (with no free months). At what month is the cost of these options the same?

20. Simplify $\dfrac{3z^2 + 6z}{z^2 + 4z + 4}$

21. Students who live on campus often have to learn to do their laundry for the first time. Most dorm-based laundry centers charge a fee for every load of laundry you wash and dry. Suppose the cost to wash one load of laundry is \$2.25, and the cost to dry it is \$2. If you only have \$272 to spend on laundry in a school year, how many loads can you clean? Write your answer as an inequality.

22. How many positive integers below 110 have a square root that is not an integer?

23. You're painting the six faces of a rectangular prism with length 20 feet and height 10 feet. If you use a total of 880 ft^2 of paint, what is the width of the prism?

Answers

1. $2^4 \cdot 3 \cdot 5^2$
2. $0.098 = \dfrac{49}{500}$
3. $y \leq -3,\ (-\infty, -3]$
4. $\dfrac{17}{72}$
5. $x = 4$
6. $10a^2b^2$
7. 27
8. 2.34
9. 16
10. $h^{23/12}$
11. $\dfrac{4}{7}$
12. $12x^2 - 3$
13. 10
14. 6000
15. $0 < \text{long base} < \dfrac{5}{2}$ inches, $\left(0, \dfrac{5}{2}\right)$
16. $3\sqrt{3}$
17. -9
18. 12
19. 11

20. $\dfrac{3z}{z+2}$

21. $0 \leq x \leq 64$, where x (an integer) is the number of loads of laundry you do

22. 99

23. 8 feet