Practice Exam 4: 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 $\frac{21}{5} \cdot \frac{5}{9} \cdot \frac{10}{3}$

2. Solve $2[3z - 3(z - 1)] = 6$

3. Solve $3(w + 5) < 3w + 7$, giving your answer in inequality notation.

4. Find $\frac{5}{18}\sqrt{2} + \frac{7}{24}\sqrt{2}$

5. Find $(\sqrt{3}c^3) \cdot (\sqrt{12}c^{-4})$. Do not use negative exponents in your answer.

6. Find $\frac{7}{12} + \frac{23}{18}$

7. Suppose your bathroom is shaped like a rectangle with length 6 feet and width 8 feet. During a remodel, the bathroom's length is increased by 10% and the width is decreased by 15%. By how much has the area changed?

8. You're a farmer and want to build an enclosure shaped like an isosceles triangle where the sides are three times as long as the base. If you own 600 feet of fencing, what are the possible lengths for the base? You need not use all the fencing and decimal lengths are OK for the sides.

9. Find $\left(\sqrt[3]{125}\right)^{\sqrt[3]{-8}} - 64^{1/3}$

10. Find $\left(\frac{1}{2} - \frac{2}{3}a^4\right) - \left(\frac{3}{8}a^4 - \frac{3}{5}\right)$

11. Factor $y^2 - 23y + 120$

12. Find the least common multiple of 24, 36, and 20.

13. The sum of four consecutive integers is 274. Find the smallest of the four numbers.

14. Solve $\sqrt{\sqrt{x+1}+2} = 3$

15. You're planning to invest some money in an account that pays simple interest at a rate of 4% per month. In your state, the government doesn't tax interest earned as long as your total interest earned is less than \$1200 in a year. What amounts could you use as the principal if the goal is to avoid taxation on your interest accumulated during a year?

16. If $2^x = 3$, what is 8^x?

17. You've decided to add some stone decorations to your front yard. Each decoration will consist of a cylinder-shaped pedestal of radius r and height h topped with a sphere of radius r. If you want six such decorations, find an expression for the total volume of stone needed and then factor your expression.

18. A parcel of farmable land is shaped like a square with side length 8 miles. Inside this parcel, the government plans to build an airport that will also be square-shaped and have perimeter 10 miles. How much farmable land remains after the airport is built?

19. Suppose you run a small business that sells homemade jellies. In a recent harvest, you were able to process enough grapes to make 30 pounds of grape jelly. You'll split this into smaller jars that hold 1/4 pound of jelly, which you can sell for \$4.25 each. How much money will you make from this grape harvest if you sell all the jars?

20. A painter wants 12 gallons of purple paint that costs \$18 per gallon, so they mix red paint (\$20/gal) and blue paint (\$14/gal). How many gallons of red paint should be used?

21. Suppose the side length of a square is 2^{500}. Find the perimeter and area of the square. List each answer in the form $2^{\text{some power}}$.

22. The particles in a certain laser beam travel a distance of $\sqrt{54} \cdot 10^4$ meters in $\sqrt{9} \cdot 10^{-3}$ seconds. How fast are the particles traveling in meters per second?

23. Suppose a trapezoid with shorter base x has a height that is one less than the shorter base and a longer base that is two more than the height. If you were to increase the height, shorter

base, and longer base all by 2, you would get a larger trapezoid. Find an expression for how much additional area the larger trapezoid has using the variable x.

Answers

1. $\frac{70}{9}$

2. All real numbers

3. No solution

4. $\frac{41\sqrt{2}}{72}$

5. $\frac{6}{c}$

6. $\frac{67}{36}$

7. decreases by 3.12 ft^2

8. $0 < x \leq \frac{600}{7}$

9. $\frac{-99}{25}$

10. $\frac{11}{10} - \frac{25}{24}a^4$

11. $(y - 15)(y - 8)$

12. 360

13. 67

14. 48

15. $0 < P < \$2500$

16. 27

17. $2\pi r^2(3h + 4r)$

18. $\frac{231}{4}$ mi^2

19. \$510

20. 8 gallons

21. perimeter: 2^{502}, area: 2^{1000}

22. $\sqrt{6} \cdot 10^7$ m/s

23. $4x + 3$