



MB3 Intermediate Diagnostic Test

1. If the point (2, 3) is reflected about the origin, what is the new coordinate?
2. When a group of students are seated 3 to a bench in the auditorium, 18 are left standing. If they were seated 4 to a bench, 3 benches would be empty. Find the number of benches and students.
3. What is the 768th term in the sequence 103, 97, 91, ...
4. In preparation for Tracy's wedding, Lisa decides to throw Tracy a bridal shower. Lisa is planning to make the invitations herself. Each invitation requires 6 inches of ribbon to make a tiny bow on the front. If Lisa needs enough ribbon for 28 invitations, but must buy the ribbon by the half-yard, how many yards of ribbon must Lisa buy? Express your answer as a decimal to the nearest tenth. (Adapted from MATHCOUNTS Problem of the Week July 20, 2020)
5. Next on Stephen's task list was spreading mulch in his mother's new garden. The garden is in the shape of an isosceles trapezoid. The large base is 10 feet long and the short base is 6 feet long. In the center of the garden is a tree with a diameter of 2 feet. If Stephen spreads mulch 2 inches thick, he would spread $8 - \pi/6$ cubic feet. What is the altitude, in feet, of the trapezoid?
6. John is a contractor who has been tasked to paint houses. If John hires 15 workers, they can paint 2 houses in 40 hours. Suddenly, John finds out that he needs to paint three houses but can only hire ten workers. How long will it take the workers to finish the entire job now?
7. Let p be a perfect square such that $p = n^2$ where n is a natural number. For $0 < n \leq 100$, what is the probability that p is odd? Express your answer as a common fraction.
8. John and his parents are planning to go back-to-school shopping. He wants to go to a particular store in another city, so it takes him and his parents 50 minutes to drive to the store. When he gets to the store, it takes him 60 minutes to shop and obtain everything. After that, it takes them 10 minutes to walk to their car and pack everything. After a long day at the store, John and his parents decide to go back, but it takes 70 minutes for them to get back due to a car accident that was blocking the road. Assuming that John was in the car when they were driving, what percent of the time was John in the car. Express your answer as a decimal to the nearest tenth.
9. In a certain school, students are preparing for their final exams. Sarah is preparing for her Calculus final. If she got an 82, 94, 96, and a 88 on her unit tests which combined are worth 60% of her final grade and has a homework average of 100 which counts for 10% of her final grade, what score does Sarah need on her final to get at least a 90 in the class? Round your answer to the nearest whole number.



10. Jason wants to buy gasoline for his car. His car requires 16 gallons of gasoline, but the store only sells gasoline in cans of quarts. How many cans of gasoline does Jason need to replenish the gasoline in his car? (1 gallon = 4 quarts).



MB3 Intermediate Diagnostic Test Answer Key

1. (-2, -3)
2. 30 benches and 108 students
3. -4,499
4. 5 yards
5. 6 feet
6. 90 hours
7. $\frac{1}{2}$
8. 66.7 %
9. 87
10. 64 quarts