

ANSWERS

1. **11/2000.** $1/100 = 100/10000$ and $1/1000 = 10/10000$. The difference between these fractions is $90/10000$, half of which is $45/10000$. Add this to the $10/10000$ making the midpoint at $55/10000$ or $11/2000$.
2. **Yes.** Anyone who is more than $31\frac{3}{4}$ years old. One year has 31,536,000 seconds. Dividing that number into 1 billion gives the answer.
3. **$2\frac{7}{9}$.** If you know what $\frac{3}{5}$ of a number is, then you can find $\frac{1}{5}$ of the same number by taking a third of this. Then $\frac{1}{3}$ of $\frac{5}{3}$ is $\frac{5}{9}$, which represents one of the five parts. $5 \times \frac{5}{9}$ gives the secret number.
4. **d.** There is no such number as zillion.
5. $\frac{2}{3}$, $1\frac{2}{3}$, $2\frac{2}{3}$.
6. **14 coins. She could have 1 quarter, 9 dimes, and 4 pennies**
7. **108.** The cardboard box is 27 cubic feet. It takes 4 shoeboxes to make one cubic foot, so $4 \times 27 = 108$. OR 18 shoeboxes can be packed on the bottom layer, which is 6 inches deep. Then, you will have 6 layers for a total of 108.
8. **6:20 p.m.** It cools $\frac{1}{4}$ degree every 10 minutes (90 minutes divided by $\frac{9}{4}$ degrees). To cool $9\frac{1}{2}$ degrees will take 380 minutes ($9\frac{1}{2}$ divided by $\frac{1}{4}$ multiplied by 10).
9. **36. You can make a chart to find the 36 possible combinations.**

| Number of | | | |
|-----------|---------|-------|-------|
| Pennies | Nickels | Dimes | = 50¢ |
| 50 | 0 | 0 | 50¢ |
10. **500,500.** Pairing up the numbers makes 499 pairs, each totaling a thousand, for 499,000. Add the one 1000 that is unpaired. That's 500 thousands plus the 500, which was unpaired.
11. **18 years old.**
12. **0.36 seconds.** An hour has 3600 seconds, so 1% is 36 seconds. $\frac{1}{100}$ of that is $\frac{36}{100}$ or 0.36.
13. **0.028 meters.** To quadruple something, the additional portion must represent 3 parts so when added to the original, you have 4 parts. .021 divided in thirds is .007. Multiply it by the 4 parts to find .028 meters.
14. **He was $10\frac{1}{2}$, and she was $3\frac{1}{2}$.** The key word is *was*. Guess-and-check then begins at 24 and goes downward from there. (This problem can also be solved by algebra, where $D = M + 7$ and $M = \frac{D}{3}$.)
15. **d.** There are two ways to solve this. Find the areas of the circles using the radius squared and multiplying by pi. For the 10-inch, the area is 25 pi while the 14-inch is 49 pi. Close to double. Another way to think about it: suppose the pizza came in 10-inch and 14-inch square boxes. The total area would be 10 x 10 (100) and 14 by 14 (196). Again, almost double the area.
16. **120.** For every set of 4 four-legged stools and 3 three-legged stools, he needs 25 legs. Thus, he can make 40 sets for a total of 120 three-legged stools and 160 four-legged stools.
17. **12.** The difference between $\frac{1}{3}$ and $\frac{1}{2}$ is $\frac{1}{6}$. Since 6 problems represents $\frac{1}{6}$ of the total problems, there must be 36 problems in all.
18. **$\frac{1}{3}$.** To find the number, multiply 4% by 25, which gives 100% ($3 \times 25 = 75$, and $\frac{25}{75} = \frac{1}{3}$).
19. **38.** Totaling the age differences from the youngest to oldest is $2 + 4 + 6 + 8 + 10$ or 30 years. $198 - 30 = 168$. Divide by 6 to find the youngest age of 28.

91. **\$62.** Working backwards, she ends with 0; so before ride five, she must have had \$2. Before ride four, she had 6. Before ride three, she had 14. Before ride two, she had 30. Before the first ride, she had 62.
92. **13,501.** $0 + 999, 1 + 998 \dots 499 + 500$. The sum of the digits in all of these pairs is 27. So, $50 \text{ pairs} \times 27 = 13,500$. Adding the digits in 1000 completes the problem.
93. **Dom pays \$10 and Craig pays \$6.** The friend paid \$1 for each of the 8 dishes he shared. All 8 dishes cost \$24 total.
94. **11lb. 1oz.** Suppose he pays \$1 per pound for the seed. He wants to sell a 10-pound bag for \$17.00, but he actually sells the ten pounds for \$16.00. $170/160 = 1 \frac{1}{16}$. In other words, every time he thinks he sold 16 pounds, he actually sold 17 for the price of 16.
95. **72.** There are 12 (4×3) routes from Jonesville to Clarksville. There are 12 routes from Clarksville to Jonesville, but he can't repeat a route on the return trip. Since there are 3 routes from Clarksville to Thomasville and 4 routes from Thomasville to Jonesville, multiply $12 \times (3 + 4)$, which is $12 \times 7 = 84$. Then also subtract the 12 repeated routes ($84 - 12 = 72$).
96. **c.** From scale 2, we know $OO = \Delta \square$. Going to scale 1 and substituting, we find $\square\square = \Delta\square O$. Subtract \square and you find $\square = \Delta O$. Substitute ΔO for each \square in scale 1 and you find $\Delta\Delta = O$. Substitute this in scale 3 to find OOO is the same as $\square\square$, as shown in scale 1.
97. **5.** Write the bottom two numbers as a fraction. The top number represents the percent.
98. **7 inches.** One way to do it is to find the diagonal length of the whole cube, from corner to opposite corner, then divide this in half. The cube measures 8 by 8 by 8. So, the diagonal of the bottom face can be found using the Pythagorean formula (square root of the sum of 8 squared plus 8 squared. [square root of 128]). Now, use this line to make one side of a new right triangle, whose other side is the full height of 8 inches. The hypotenuse of this triangle is the diagonal of the cube. The square root of 194 is close to the square root of 196, which is 14. Cut this in half, since its midpoint is the cubes' center.
99. **\$17.** The \$28 represents 140%, so divide 2800 by 140 and get \$20, the cost before the 40%. 85% of \$20 is \$17.
100. **Movie B.** It had an average attendance of 393 per show; Movie A averaged 381.
101. **75π or a little over 235 miles.** With the 5-foot diameter, it travels 5π each revolution. Multiply this by 1320 for distance per minute. Multiply by 60 for the hourly speed. Divide by the distance in a mile. Note that 1320 is $1/4$ of 5280.
102. **$67 \frac{1}{2}\%$.** The women started with 40%, then together bought $12 \frac{1}{2}\%$ and 15%.
103. **120.** 75% of 88 is 66. $66 \div .55$ (55%) = 120.
104. **5 cubed or 125 cubes.** The smaller cube has faces of 25 square centimeters, making it a 5-by-5-by-5 cube. The larger cube is 25-by-25-by-25. Thus you can fit 5 smaller cubes across the length, width, and height of the larger cube.
105. **67.** A repeating pattern emerges of odd, odd, even. Thus, $2/3$ of the numbers will be odd (from 1 to 99), plus the last number will be odd because it is next in the pattern.