

Texas A&M Mathematics Department Mini Fair Math Contest

Grades 5-7

April 16, 2011

Please write your answers on the provided solutions page.

1. Find the value of  $27 \times 53$ .
2. Find the value of  $41 \div 5$ .
3. A single pad of paper is .5 inches thick and weighs 3 ounces. What would be the weight of a stack of such pads that is 12 feet high?
4. At the end of the year, my salary was three times its size at the beginning of the year. What was the percent increase of my salary from the beginning to the end of the year?
5. Find the value of

$$\frac{\frac{1}{2} + \frac{1}{3}}{\frac{1}{4} + \frac{2}{5}}$$

Your answer should be a single fraction in reduced form.

6. Determine which shape in the figure below has the largest area.

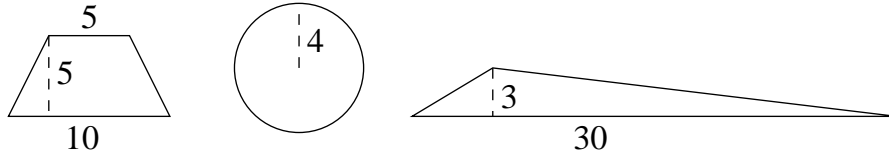


FIGURE 1. Figure for Problem 6

7. Which statement is ALWAYS true?
  - a. The diagonals of a parallelogram are perpendicular.
  - b. The diagonals of a parallelogram bisect each other.
  - c. The diagonals of a parallelogram are congruent.
  - d. Adjacent sides of a parallelogram are congruent.
  - e. Adjacent angles of a parallelogram are congruent.
8. Luke made  $\frac{2}{3}$  of a gallon of hot chocolate. If cups are  $\frac{1}{10}$  of a gallon, how many cups can he fill, and how much will be left over? Your answer should be a number of cups and an amount left over in gallons.

9. What is the 25th digit to the right of the decimal in the decimal representation of  $1/13$ ?
- a. 7
  - b. 9
  - c. 2
  - d. 3
  - e. 0

10. Determine the next two numbers in the pattern

$$31, 62, 93, 25, 56, 87, \dots$$

11. There are three tribes on an island. Members of the Liar Tribe always lie. Members of the Truthful Tribe always tell the truth. Members of the Alternator Tribe always alternate their statements: they tell one lie, then one true statement, then one lie, and so on. Which situation is impossible?

- a. A Liar says, I am a Liar.
- b. A Truthful says, I am a Truthful.
- c. An Alternator says, I am a Liar.
- d. A Liar says, I am a Truthful.
- e. An Alternator says, I am an Alternator.

12. Find the smallest integer  $n$  so that

$$1 + 2 + 3 + \dots + n > 100.$$

13. A large cube is made up of identical unit cubes. After the unit cubes are glued together to form the large cube, it is dipped in paint. For example, 27 unit cubes could be assembled into a  $3 \times 3 \times 3$  cube. After it was dipped in paint, 8 of the unit cubes would have three painted faces, 12 would have two painted faces, 6 would have one painted face, and 1 would have no painted faces. If 1,728 unit cubes were assembled into an  $12 \times 12 \times 12$  cube and then dipped into paint, how many of the unit cubes would then have three painted faces?

14. What is the sum of the first 100 even numbers.

15. A farmer has several black and several white horses. If one of the black horses were white, the number of black horses would be equal to the number of white ones. If one of the white horses were black, the number of black horses would be twice as large as the number of white ones. How many black horses and how many white horses does the farmer have?

16. Which of the following is impossible?
- A rectangle with area 25 square meters and perimeter 29 meters
  - A rectangle with area 25 square meters and perimeter 20 meters
  - A rectangle with area 16 square meters and perimeter 16 meters
  - A rectangle with area 16 square meters and perimeter 20 meters
  - A rectangle with area 9 square meters and perimeter 9 meters
17. In a group of five friends, the sums of the ages of each group of four of them are 124, 128, 130, 136, and 142. What is the age of the youngest of the friends?
18. It is 1:00 a.m. How much money would you make in the next 48 hours if you made 8 dollars every time the hands of a clock formed a 90 degree angle?
19. Which of the following is the smallest number divisible by 9 different prime numbers?
- 111,500,000
  - 203,693,490,000
  - 223,092,870
  - 3,011
  - 3,234
20. Evaluate  $\sqrt[8]{\left(7\left(\frac{\sqrt{4.41}}{7}\right)\right)^8}$ . (Round to the nearest hundredth.)
21. Allan and Bill are walking in the same direction beside a railroad track, and Allan is far behind Bill. Both walk at constant speeds, and Allan walks faster than Bill. A long train traveling at a constant speed in the same direction will take 10 seconds to pass Allan (from the front to the end) and will take 9 seconds to pass Bill. If it will take twenty minutes for the front of the train to travel from Allan to Bill, how many minutes will it take for Allan to catch up to Bill?
22. Which statement is true about  $\left(\frac{10}{11}\right)^{111} \cdot \left(\frac{11}{10}\right)^{211}$ ?
- The product is greater than 1,000.
  - The product is greater than 700 but less than 1000.
  - The product is greater than 3 but less than 700.
  - The product is greater than 1 but less than 3.
  - The product is less than 1 but greater than 0.