1. John saw an ad for tomato soup at 24¢ per can. At the price advertised, what is the greatest number of whole cans of soup John could buy for $1.00?

1. _____ cans

2. Yvonne purchased a jacket at Right Price, and the lowest price on the tag was $4. This was the sale price, which was calculated by taking 75% off of the original price. What was the original price of Yvonne's jacket?

2. $ _____

3. What is the greatest number of interior right angles a convex octagon can have?

3. _____ right angles

4. Tamara knows that the arithmetic mean of her five quiz scores is 95%. However, she has misplaced one of these quizzes. The ones she can find have scores of 100%, 100%, 99% and 98%. What is her score on the misplaced quiz?

4. _____ %

5. How many integers between 100 and 300 have both 11 and 8 as factors?

5. _____ integers

6. One-half of a road construction project was completed by 6 workers in 12 days. Working at the same rate, what is the smallest number of workers needed to finish the rest of the project in exactly four days?

6. _____ workers

7. The trisectors of angles B and C of scalene triangle ABC meet at points P and Q, as shown. Angle A measures 39 degrees and angle QBP measures 14 degrees. What is the measure of angle BPC?

A

Q

P

B   C
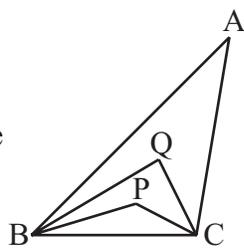
7. _____ degrees

8. What non-zero, real value of x satisfies $(5x)^4 = (10x)^3$? Express your answer as a common fraction.

8. _____

9. A clock loses 5 seconds every 12 minutes. At this rate, how many minutes will the clock lose in a 24-hour period?

9. _____ minutes

10. Elliott Farms has a silo for storage. The silo is a right circular cylinder topped by a right circular cone, both having the same radius. The height of the cone is half the height of the cylinder. The diameter of the base of the silo is 10 meters and the height of the entire silo is 27 meters. What is the volume, in cubic meters, of the silo? Express your answer in terms of π.
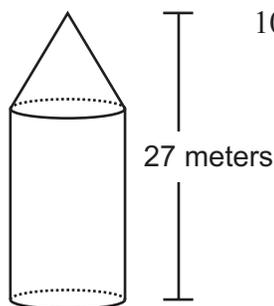
27 meters

10. _____ cu meters

11. For how many non-negative real values of x is $\sqrt{144 - \sqrt[3]{x}}$ an integer?

11. _____ values

12. Jim's stride measures $2\frac{1}{2}$ feet, and Jeffrey's stride measures $2\frac{2}{3}$ feet. There are 5280 feet in a mile. If Jim and Jeffrey each walk one mile, what is the ratio of the number of strides Jim takes to the number of strides Jeffrey takes? Express your answer as a common fraction.

12. _____

13. Kelly drove north for 12 miles and then east for 9 miles at an average rate of 42 miles per hour to arrive at the town of Prime. Brenda left from the same location, at the same time, and drove along a straight road to Prime at an average rate of 45 miles per hour. How many minutes earlier than Kelly did Brenda arrive?

13. _____ minutes

14. A bag contains 21 marbles; there are only red marbles and blue marbles in the bag. There are twice as many red marbles as there are blue marbles. If exactly two marbles were to be selected at random, without replacement, what is the probability that one would be red and one would be blue? Express your answer as a common fraction.

14. _____

15. The integers from 1 through 15 are written in numerical order in pencil going clockwise around a circle. A student begins moving clockwise around the circle erasing every third integer that has not yet been erased until only the integer 11 remains. Which integer did the student erase first?

15. _____

16. Two sides of a square are divided into fourths and another side of the square is trisected, as shown. A triangle is formed by connecting three of these points, as shown. What is the ratio of the area of the shaded triangle to the area of the square? Express your answer as a fraction.
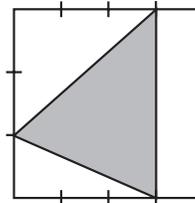
16. _____

17. Lauren solved the equation $|x - 5| = 2$. Meanwhile Jane solved an equation of the form $x^2 + bx + c = 0$ that had the same two solutions for x as Lauren's equation. What is the ordered pair (b, c)?

17. (_____ , _____)

18. In triangle ABC, AB is congruent to AC, the measure of angle ABC is 72° and segment BD bisects angle ABC with point D on side AC. If point E is on side BC such that segment DE is parallel to side AB, and point F is on side AC such that segment EF is parallel to segment BD, how many isosceles triangles are in the figure shown?
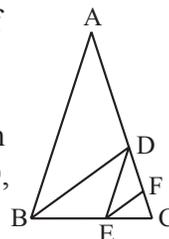
18. _____ isosceles triangles

19. Positive integers x and y have a product of 56 and $x < y$. Seven times the reciprocal of the smaller integer plus 14 times the reciprocal of the larger integer equals 4. What is the value of x?

19. _____

20. When a positive integer is divided by 7, the remainder is 4. When the same integer is divided by 9, the remainder is 3. What is the smallest possible value of this integer?

20. _____

21. A circle with a radius of 2 units has its center at $(0, 0)$. A circle with a radius of 7 units has its center at $(15, 0)$. A line tangent to both circles intersects the x-axis at $(x, 0)$ to the right of the origin. What is the value of x? Express your answer as a common fraction.

21. _____

22. The first term of an arithmetic sequence is 1, another term of the sequence is 91 and all of the terms of the sequence are integers. How many distinct arithmetic sequences meet these three conditions?

22. _____ sequences

23. A circular cylindrical post with a circumference of 4 feet has a string wrapped around it, spiraling from the bottom of the post to the top of the post. The string evenly loops around the post exactly four full times, starting at the bottom edge and finishing at the top edge. The height of the post is 12 feet. What is the length, in feet, of the string?

23. _____ feet

24. The areas of two squares differ by 100 square units, and the perimeters of the two squares differ by 10 units. What is the perimeter, in units, of the smaller square?

24. _____ units

25. How many integers between 1 and 200 are multiples of both 3 and 5 but not of either 4 or 7?

25. _____ integers

26. Kevin will start with the integers 1, 2, 3 and 4 each used exactly once and written in a row in any order. Then he will find the sum of the adjacent pairs of integers in each row to make a new row, until one integer is left. For example, if he starts with 3, 2, 1, 4, and then takes sums to get 5, 3, 5, followed by 8, 8, he ends with the final sum 16. Including all of Kevin's possible starting arrangements of the integers 1, 2, 3 and 4, how many possible final sums are there?

26. _____ sums

27. A rectangular band formation is a formation with *m* band members in each of *r* rows, where *m* and *r* are integers. A particular band has less than 100 band members. The director arranges them in a rectangular formation and finds that he has two members left over. If he increases the number of members in each row by 1 and reduces the number of rows by 2, there are exactly enough places in the new formation for each band member. What is the largest number of members the band could have?

27. _____ members

28. A right cylinder with a base radius of 3 units is inscribed in a sphere of radius 5 units. What is the total volume, in cubic units, of the space inside the sphere and outside the cylinder? Express your answer as a common fraction in terms of π.

28. _____ cu units

29. Given that $x^2 - 5x + 8 = 1$, what is the positive value of $x^4 - 10x^3 + 25x^2 - 9$?

29. _____

30. An o-Pod MP3 player stores and plays entire songs. Celeste has 10 songs stored on her o-Pod. The time length of each song is different. When the songs are ordered by length, the shortest song is only 30 seconds long and each subsequent song is 30 seconds longer than the previous song. Her favorite song is 3 minutes, 30 seconds long. The o-Pod will play all the songs in random order before repeating any song. What is the probability that she hears the first 4 minutes, 30 seconds of music - there are no pauses between songs - without hearing every second of her favorite song? Express your answer as a common fraction.

30. _____