1. Six different high schools form a chess league. Each school must play each of the other five schools twice (home and away). How many chess matches will be played during this double round robin league season?

a) 15 b) 20 c) 25 d) 30 e) None of these

2. Bo has \$2.73 in pennies, nickels, dimes, quarters, and half-dollars. There are an equal number of coins of each kind. Find the total number of coins.

a) 15 b) 20 c) 25 d) 30 e) None of these

3. How many ounces of alcohol should be added to 125 oz of a 45% solution of sugar in alcohol in order to produce a mixture that is a 5% solution of sugar in alcohol?

a) 700 b) 800 c) 900 d) 1000 e) None of these

4. Find $a + b$ where $\sqrt{\frac{3}{2}\cdot\frac{4}{3}\cdot\frac{5}{4}\cdot\frac{6}{5}\cdot\cdots\cdot\frac{a}{b}} = 3$.

a) 18 b) 35 c) 56 d) 60 e) None of these

5. If 2^{27} is written as an integer the last or units digit will be

a) 0 b) 2 c) 6 d) 8 e) None of these

6. In a 4.0 scale with A = 4, B = 3, etc, Bo has a 3.2 GPA after taking 10 courses. Find his cumulative GPA for all 16 courses if his next 6 courses are 3 A's and 3 B's. Assume that all courses carry the same weight and credit in the GPA calculation.

a) 3.3125 b) 3.3130 b) 3.3135 d) 3.3140 e) None of these

7. Find x where $10^x = (10^{12} + 25)^2 - (10^{12} - 25)^2$.

a) 13 b) 15 c) 17 d) 19 e) None of these

8. Square ABCD has lower left corner A at the origin and lower right corner B on the positive x-axis. The circumradius of square ABCD is $\sqrt{18}$. The top of this square (segment CD) is the base of equilateral triangle CDE. Point E is in the 1st quadrant above segment CD. Segment CD is tangent to the circle with point E as center. Find the area inside circle E but not inside triangle CDE. Round the answer to the nearest 0.001 square unit.

a) 70.684 b) 70.685 c) 70.686 d) 70.687 e) None of these

9. Find the set of all real numbers, which are solutions of the equation $10^{-1}\left(4 - \left|2x + 6\right|\right) = 11.\overline{9}$.

a) {55, 61} b) {-55, 65} c) {-61, -55} d) {-55, 61} e) None of these

10. Fifty people are in a large room and each person shakes hands with each of the other 49 people exactly once. How many handshakes are needed?

a) 1215 b) 1220 c) 1225 d) 1230 e) None of these

11. If (a, b) is the vertex of the parabola $y + x^2 = 8 - 6x$, find $a + b$.

a) 14 b) 15 c) 16 d) 17 e) None of these

12. Find the area of a triangle whose 3 sides are 46 feet, 54 feet, and 100 feet.

a) 300 sq. ft. b) 298 sq. ft. c) 296 sq. ft. d) 294 sq. ft. e) None of these

13. A, B, C, D, E, and F go for a ride in F's car with F driving. How many different ways can they sit in the car (3 in the front seat and 3 in the back seat) if A and B must sit together?

a) 35 b) 36 c) 37 d) 38 e) None of these

14. Write as a sum and difference of logarithms: $\log\left[\dfrac{x^5\sqrt{x^2-1}}{(x+1)^4}\right]$

a) $5\log x+\log(x^2-1)-4\log(x+1)$ b) $5\log x+.5\log(x+1)+\log(x-1)-4\log(x+1)$

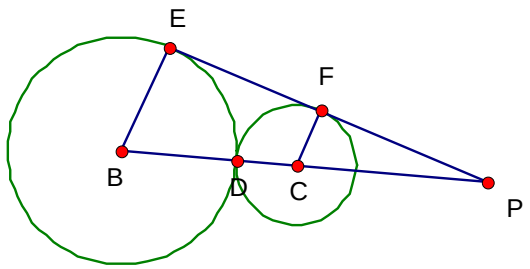
c) $5\log x-3.5\log(x+1)+.5\log(x-1)$ d) $5\log x-3.5\log(x+1)+\log(x-1)$

e) None of these

15. Find the length of the median drawn to the longest side of a triangle with sides 6, 8, and 12. Round the answer to the nearest 0.001 unit.

a) 3.746 b) 3.744 c) 3.742 d) 3.740 e) None of these

16. Circles centered at B and C are tangent externally at D. The line BC and the line EF (where E and F are the endpoints of the common tangent segment) meet at point P. The radius BE of circle B is 6 inches. Angle EPB is 30°. Find the area inside triangle BPE and outside these two circles. Round your answer to the nearest 0.001 square unit.



a) 6.042 b) 6.044 c) 6.046

d) 6.048 e) None of these

17. Find the number of solutions, in positive integers, of $2x+3y=763$.

a) 255 b) 254 d) 128 d) 127 e) None of these

18. An arch of bridge is a semi-ellipse with major axis horizontal at road level. The base of the arch is 30 feet across and the highest point of the arch is 10 feet above the road. Find the height of the arch 6 feet from the center of the base. Round the answer to the nearest 0.001 feet.

a) 9.159 b) 9.161 c) 9.163 d) 9.165 e) None of these

19. You randomly draw 13 cards (without replacement) from a standard deck of 52. Find the probability of getting at least 2 hearts. Round your answer to the nearest 0.001.
a) 0.906 b) 0.907 c) 0.908 d) 0.909 e) None of these

20. The radius of a circle is increasing at the rate of 2 inches per second. When the radius is 10 inches, the area is increasing at x square inches per second. Find x.
a) 4π b) 20π c) 40π d) 50π e) None of these

21. Find the number of distinct positive integers that are exact divisors of 14,400.
a) 64 b) 63 c) 62 d) 61 e) None of these

22. Points A, B, and C are collinear with B between A and C. If A is (2, -3), B is (4, 2), and C is (a, b), the ratio of length BC to length AC is 4:5. Find $a + b$.
a) 34 b) 36 c) 38 d) 40 e) None of these

23. If a number is selected at random from {-6, -2, -1, 1, 2, 6}, what is the probability that it is a solution of $x^2 = |5x + 6|$.
a) $\frac{1}{3}$ b) $\frac{1}{6}$ c) $\frac{1}{2}$ d) $\frac{2}{3}$ e) None of these

24. Find the radius of the base of the largest right circular cone that can be inscribed in a sphere with radius 12. Round your answer to the nearest 0.001 unit.
a) 11.316 b) 11.314 c) 11.312 d) 11.310 e) None of these

Solutions:

1. D
2. A
3. D
4. B
5. D
6. A
7. E
8. C
9. E
10. C
11. A
12. E
13. B
14. C
15. C
16. B
17. D
18. D
19. B
20. C
21. B
22. A
23. C
24. B