

1. If $3x + 4 = 6x + 8$ then $x =$
a) $3/4$ b) $-4/3$ c) $4/3$ d) $-3/4$ e) none of these

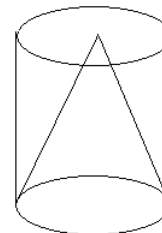
2. The sum $1/2 + 2/3 + 1/6 =$
a) 1 b) $5/6$ c) $7/6$ d) $4/3$ e) none of these

3. Joe has 4 more dollars than Sally. When they combine their money they have \$18.50. How many dollars did Joe have before combining?
a) 14 b) $6\frac{1}{2}$ c) $11\frac{1}{4}$ d) $6\frac{1}{4}$ e) none of these

4. If the perimeter of a right isosceles triangle is numerically equal to the square of its hypotenuse, then the area of the triangle is
a) $\frac{1 + \sqrt{2}}{2}$ b) $\frac{3 + 2\sqrt{2}}{4}$ c) $\frac{2 + 3\sqrt{2}}{4}$ d) $\frac{1 + 2\sqrt{2}}{2}$ e) none of these

5. A wheel has diameter d feet. How many revolutions will it make if it travels x feet?
a) $\frac{x}{d}$ b) $\frac{2x}{\pi d}$ c) $\frac{\pi x}{d}$ d) $\frac{x}{2\pi d}$ e) none of these

6. The volume of a right circular cylinder is 9 cubic feet. A right circular cone is inscribed in the cylinder such that the base of the cone is the lower base of the cylinder and the vertex of the cone is on the upper base of the cylinder. The volume, in cubic feet, of the region inside the cylinder and outside the cone is



- a) 3 b) $4\frac{1}{2}$ c) 5 d) 6 e) none of these

7. The sum of all positive integers that are less than 30 is

- a) 406 b) 435 c) 421 d) 462 e) none of these

8. An urn contains 8 blue marbles and 10 red marbles. Two of the marbles are drawn at random without replacement from the urn. What is the probability that they will both be red?

- a) $\frac{5}{17}$ b) $\frac{6}{17}$ c) $\frac{5}{18}$ d) $\frac{7}{18}$ e) none of these

9. Bob's grade depends on 4 quizzes and 2 tests, with a possible top score of 100 on each of the 6. Each test is weighted the same as 2 quizzes. If his average on the four quizzes was 75 and his first test score was 86, then what must he score on the second test if he is to get 82 for his course average?

- a) 89 b) 93 c) 91 d) 92 e) none of these

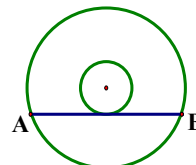
10. Joan sets out on a 220 mile auto trip and averages 55 miles per hour for the first 110 miles. What must her average speed be for the remainder of the trip if her average speed for the entire trip is to be 60 miles per hour?

- a) 63 mph b) 65 mph c) 67 mph d) 69 mph e) none of these

11. Billy has 100 dimes, 100 nickels and 100 pennies. He must use exactly 90 of these coins to buy a \$4.00 toy. The number of different ways that this can be done is

- a) 8 b) 9 c) 11 d) 10 e) none of these

12. A circle of radius 3 is concentric to a larger circle whose area is 4 times that of the smaller circle. The figure is not to scale. If a tangent line to the smaller circle cuts the larger circle at points A and B , then the length of segment AB is



- a) $\frac{9\sqrt{3}}{2}$ b) $5\sqrt{3}$ c) $\frac{7\sqrt{3}}{2}$ d) 9 e) none of these

13. The fractional part of a positive number x is denoted by $\{x\}$. For example $\{2\frac{1}{3}\} = \frac{1}{3}$ and $\{3.17\} = 0.17$. If R is the region in the (x,y) -plane above the x -axis, below $y = \{x\}$, and between $x = 1\frac{1}{3}$ and $x = 4\frac{1}{2}$, then the area of R is

- a) $57/36$ b) $111/72$ c) $113/72$ d) $55/36$ e) none of these

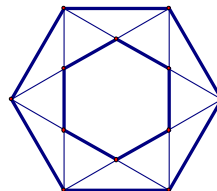
14. Suppose that 25% of all the wise people are nice and half of all the nice people are wise. If 25% of the people are neither nice nor wise, then what percent of the people are both nice and wise?

- a) 10 b) 20 c) 15 d) 25 e) none of these

15. If a circle is inscribed in a triangle with vertex angles 30° , 60° , and 90° , then the area of the triangle divided by the area of the circle is

- a) $(3+2\sqrt{3})/\pi$ b) $(3+3\sqrt{3})/\pi$ c) $(2+3\sqrt{3})/\pi$
 d) $(1+2\sqrt{3})/\pi$ e) none of these

16. The small regular hexagon GHIJKL is constructed from the large regular hexagon ABCDEF as shown in the figure. If the length of each of the sides of ABCDEF is one unit, then the area of the smaller hexagon is



- a) $\sqrt{3}/2$ b) $\sqrt{3}/3$ c) $\sqrt{2}/2$
 d) $2\sqrt{2}/3$ e) none of these

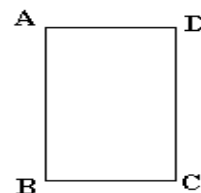
17. Let C be the units digit, B the tens digit and A the hundreds digit. For example if $A = 4$, $B = 2$ and $C = 3$, then ABC represents the integer four hundred twenty three and BC represents the integer twenty three. Note that leading digits cannot be 0. For the only triple (A, B, C) such that $(BC)^2 = ABC$, the sum of the digits, $A + B + C$, is

- a) 12 b) 13 c) 14 d) 15 e) none of these

18. The wealthy mother died leaving an estate of G gold coins, where G is an integer greater than 30. She has D daughters and they inherit the coins as follows. The eldest receives 1 coin plus $1/k$ of those remaining, where k is an integer. The second eldest receives 2 coins plus $1/k$ of those remaining. The third eldest receives 3 coins plus $1/k$ of those remaining. This pattern continues for the rest of the daughters, except that the youngest receives all the coins that were not inherited by her sisters. If each of the daughters received the same number of coins, then $D + G$ is

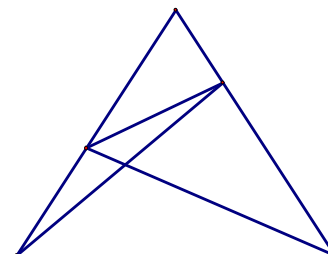
- a) $6k$ b) $k^2 + k$ c) $k^2 + 1$ d) $(k+1)^2$ e) none of these

19. Given the rectangle $ABCD$ with $AB = 6$ inches and $AD = 3$ inches. The rectangle is folded so that vertices A and C coincide. What is the length of the crease?



- a) $\frac{3}{2}\sqrt{6}$ b) $\frac{2}{3}\sqrt{5}$ c) $\frac{2}{3}\sqrt{6}$ d) $\frac{3}{2}\sqrt{5}$ e) none of these.

20. Triangle ABC is isosceles ($AB = AC$). Point D is on side AC , such that $\angle DBC = 60^\circ$. Point E is on side AB , such that $\angle ECB = 50^\circ$. The triangle is shown in the figure but not to scale. If $\angle BAC = 20^\circ$ then $\angle AED$, in degrees, is



- a) 60 b) 45 c) 50 d) 40 e) none of these