LEVEL 3 (GEOMETRY) BLITZ 2014

1) The sum of the measures of the interior angles of a regular pentagon is

a) 180° b) 360° c) 540° d) 720° e) none of these

2) The surface area of a sphere is 4π units^2. The volume of this sphere is

a) 4π units^3 b) $4\pi^3$ units^3 c) $\frac{4}{3}\pi^2$ units^3 d) $\frac{4}{3}\pi$ units^3 e) none of these

3) The area of triangle with side lengths of 4 units, 7 units, and 9 units is

a) $3\sqrt{2}$ units^2 b) $12\sqrt{5}$ units^2 c) $6\sqrt{7}$ units^2 d) 126 units^2 e) none of these

4) The length of one leg of a right triangle is decreased by 50%. By what percentage must the other leg be increased by if the area is to remain the same?

a) 25% b) 50% c) 100% d) 200% e) none of these

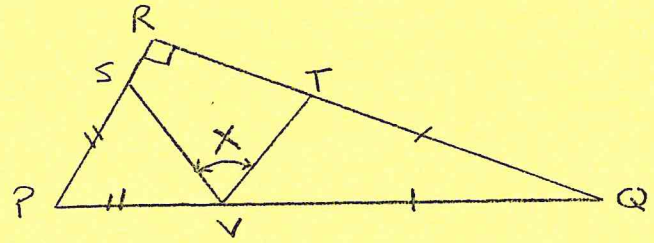
5) The perimeter of a rectangle is 26 units and the area is 40 units^2. The width (smaller dimension) of the rectangle is

a) 2 units b) 4 units c) 5 units d) 8 units e) none of these

6) The sum of the measures of the complement and the supplement of an angle is 160 degrees. What is the first digit in the measure of the angle?

a) 2 b) 3 c) 4 d) 5 e) none of these

7) For the triangle in the sketch, $TQ = VQ$, $PV = PS$, and $\angle SRT$ is a right angle. The measure of angle X is



a) 40° b) 45° c) 50° d) 55° e) none of these

8) A triangle with angle measures of 30°, 60°, 90° has a hypotenuse length of 20 units. The area of the triangle is

a) $50\sqrt{3}$ b) $50\sqrt{2}$ c) $100\sqrt{3}$ d) $100\sqrt{2}$ e) none of these

9) The area of a circle is $\frac{50}{\pi}$ square units. The diameter of the circle is

a) 10 b) 5 c) $\frac{5\sqrt{2}}{\pi}$ d) $\frac{10\sqrt{2}}{\pi}$ e) none of these

10) A square has side lengths of 8. The length of a segment from any vertex to the point at which the diagonals intersect is

a) $8\sqrt{2}$ b) $8\sqrt{3}$ c) $4\sqrt{2}$ d) $4\sqrt{3}$ e) none of these

11) The side lengths of a rectangle is increased by 20%. The area of the rectangle is increased by

a) 80% b) 40% c) 32% d) 16% e) none of these

12) The volume of a pyramid with a square base (side length of 6 units) and a height of 4 units is

a) 48 units^3 b) 60 units^3 c) 72 units^3 d) 84 units^3 e) none of these

13) A circle is inscribed in a square and the square is inscribed in a larger circle. The ratio of the area of the larger circle to the area of the smaller circle is

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

14) Two angles are supplementary. The second angle measure is 13° more than the first angle measure. The measure of the second angle is

a) 87° b) 96.5° c) 43.5° d) 87.5° e) none of these

15) Which of the following is *not* an abbreviation for a condition that guarantees triangle congruence

a) ASA b) SSS c) SAS d) AAS e) none of these

16) The slope of a line that is perpendicular to the line described by $2x - 4y = 3$ is

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

17) The number of sides of a regular polygon with 9 diagonals is

a) 5 b) 6 c) 7 d) 8 e) none of these

18) The diagonal of a square is $4\sqrt{2}\,ft$. The area of the square is

a) $16\sqrt{2}\,ft^2$ b) $16\,ft^2$ c) $4\sqrt{2}\,ft^2$ d) $4\,ft^2$ e) none of these

19) All three sides of a triangle are congruent. The triangle is not called

a) equiateral b) isosceles c) acute d) obtuse e) none of these

20) In a right triangle, the square of the length of the hypotenuse is equal to twice the product of the lengths of the other two sides. The measure of one of the acute angle of the triangle is

a) 60° b) 45° c) 30° d) 15° e) none of these

21) When two parallel lines are cut by a transversal, the alternate interior angles are

a) obtuse b) acute c) congruent d) complementary e) none of these

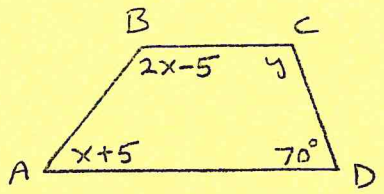
22) The distance between (2, -3) and (4, -1) is

a) $2\sqrt{2}$ b) $2\sqrt{5}$ c) $4\sqrt{2}$ d) 4 e) none of these

23) A circle has a diameter of 20 inches. The length of the arc subtended by a 72° angle is

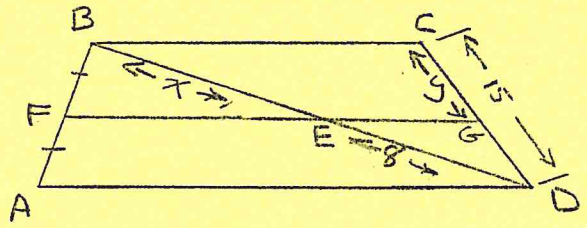
a) 2π inches b) 4π inches c) 8π inches d) 16π inches e) none of these

24) In the sketch, $ABCD$ is a trapezoid and $\overline{AD} \parallel \overline{BC}$. The sum of x and y is



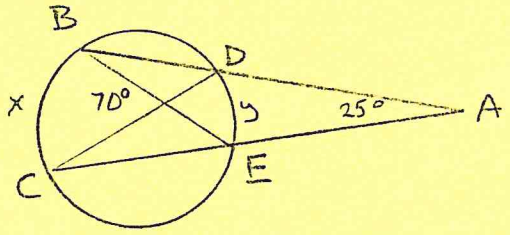
a) 110° b) 170° c) 180° d) 210° e) none of these

25) In the trapezoid $ABCD$, the horizontal segments are parallel and $AF = FB$. The sum of x and y is



a) 23 b) 19 c) 15.5 d) 11.5 e) none of these

26) In the following sketch, the sum of x and y is

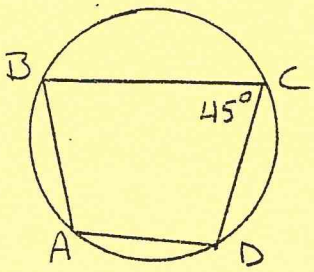


a) 95° b) 175° c) 190° d) 210° e) none of these

27) The diameter of the circle having its center at (-6, 1) and the end of a radius at (0, 9) is

a) 10 b) 14 c) 20 d) 100 e) none of these

28) In the sketch, the measure of angle BAD is

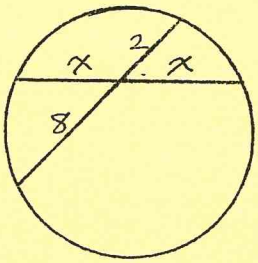


a) 45° b) 90° c) 135° d) 225° e) none of these

29) The measures of the three angles of a triangle are in the ratio 4:3:2. The sum of the smallest and largest angle measures is

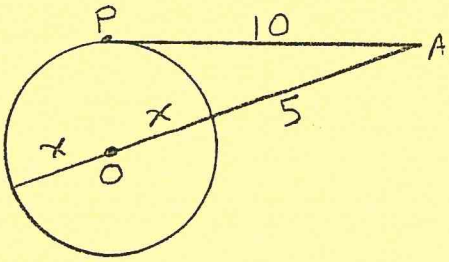
a) 100° b) 120° c) 140° d) 160° e) none of these

30) In the following sketch, the value of x is



a) 2 b) 4 c) 6 d) 8 e) none of these

31) In the following sketch where line AP is tangent to the circle with center O, the value of x is

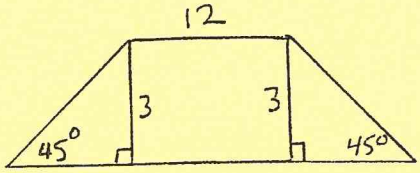


a)2.5 b) 5 c) 7 d) 7.5 e) none of these

32) The diagonals of a rhombus have measures of 30 units and 40 units. The side lengths are

a) 25 b) 30 c) 35.5 d) $\sqrt{70}$ e) none of these

33) The product of the four sides of of the trapezoid in the picture is

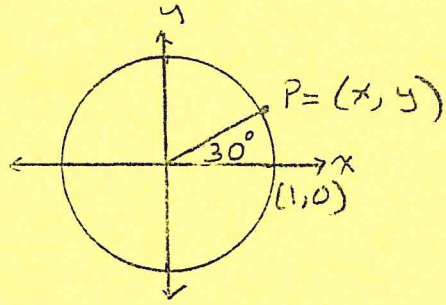


a) 1944 b) 3888 c) 10368 d) 46656 e) none of these

34) The product of x and y where x and y satisfy the proportions $7 : 5x - 2 = 14 : 3y$ and $7 : 18 = 14 : 3y$ is

a) 12 b) 24 c) 32 d) 48 e) none of these

35) The circle in the picture has a radius of one unit and the center is at the origin. The y coordinate of point P is

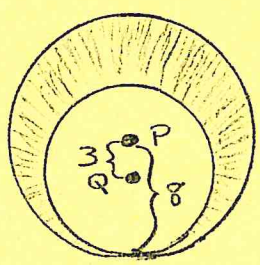


a) $\frac{1}{4}$ b) $\frac{1}{2}$ c) $\frac{3}{8}$ d) $\sqrt{3}$ e) none of these

36) A central angle of a circle of radius 12 units is 60°. The area of the sector subtended by this central angle is

a) 12π units^2 b) 24π units^2 c) 36π units^2 d) 48π units^2 e) none of these

37) In the picture, points P and Q represent the centers of the indicated circles. The area of the shaded region is



a) 5π units^2 b) 28π units^2 c) 39π units^2 d) 55π units^2 e) none of these

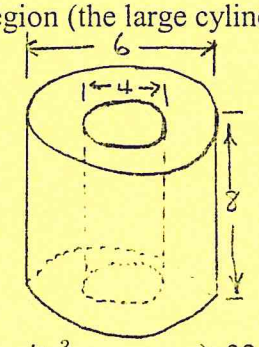
38) Which of the following sets contain the lengths of the sides of a triangle.

a) 3, 4, 8 b) 5, 7, 12 c) 2, 3, 6 d) 50, 50, 5 e) none of these

39) The converse of the statement "Vertical angles are equal angles" is

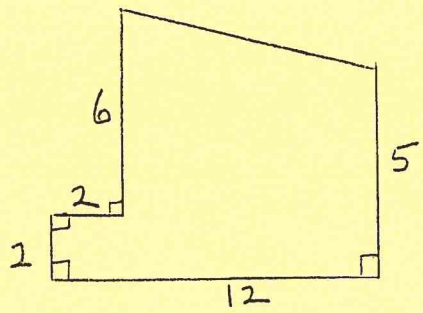
a) Equal angles are vertical angles
b) Unequal angles are not vertical angles
c) Non-vertical angles are equal angles
d) Vertical angles are not equal
e) none of these

40) The volume of the indicated region (the large cylinder, excluding the hole) in the picture is



a) 1760π units^3 b) 40π units^3 c) 32π units^3 d) 8π units^3 e) none of these

41) The area of the picture is



a) 54 units^2 b) 60 units^2 c) 84 units^2 d) 69 units^2 e) none of these

42) A cylinder has a radius of 3 units and a height of 5 units. The surface area is

a) 15 π unit^2 b) 30 π units^2 c) 45 π units^2 d) 75 π units^2 e) none of these

43) Square tiles 6 inches on a side are used to cover a rectangular floor 4 yards by 3 yards. The number of tiles required is

a) 54 b) 27 c) 216 d) 448 e) none of these

44) In triangle ABC, base $AB = AC = 17$ and $BC = 30$. The length of the altitude drawn from A is

a) $3\sqrt{6}$ b) $4\sqrt{5}$ c) 8 d) 10 e) none of these

45) The earth has a circumference of approximately 24000 miles. Assume for a moment the earth is spherical and smooth (no mountains, oceans, etc.). Also, assume a rope is stretched around the equator. How many miles longer would the rope need to be if it were to be raised one mile uniformly above the equator. (one foot above at all points).

a) 24001 b) 24002 c) $\frac{24000}{\pi} + 2$ d) $24000 + \pi$ e) none of these