

Geometry Individual Test

8. An isosceles right triangle and a second triangle with angles 30, 60 and 90 degrees have the same length hypotenuses. Find the positive difference of their perimeters, to the nearest tenth place, if the length of each hypotenuse is 12.

A. 0.4 B. 0.5
C. 0.6 D. 0.7 E. NOTA

9. In triangle ABC , \overline{BD} bisects $\angle ABC$ with point D on side \overline{AC} . \overline{BE} is the median to side \overline{AC} with E on side \overline{AC} . If $AB=6$, $BC=9$ and $AC=10$ then give the positive distance DE to the nearest tenth.

A. 1.0 B. 0.8
C. 0.7 D. 0.3 E. NOTA

10. Square $ABCD$ has as midpoints of its sides E , F , G and H . Square $EFGH$ is the result. On square $EFGH$, each side has midpoints I , J , K , and L , and a third square $IJKL$ is drawn. If $AB=12$ then find the area of square $IJKL$.

A. 72 B. 36
C. 18 D. $18\sqrt{2}$ E. NOTA

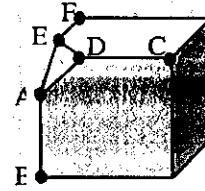
11. Lines m and n are parallel, and line t , not necessarily in the same plane, intersects line m . Which cannot be true?

A. t intersects n
B. t is perpendicular to n
C. t and n are skew
D. t is parallel to n
E. NOTA

12. A triangle has sides of length 5, 6 and x . If the triangle is NOT a right triangle, then which can be the length of x ?

A. 11 B. $\sqrt{61}$
C. $\sqrt{11}$ D. 10 E. NOTA

13.



- A cube with edges of 6 cm each is truncated as shown, so that the new face created is an equilateral triangle of side length 2 cm, and $AB=EF=DC$. Find the area of one pentagonal face, in square cm.

A. $36 - 2\sqrt{2}$ B. $36 - \sqrt{2}$
C. 35 D. 32
E. NOTA

14. In a semicircle with diameter \overline{AB} , $\triangle ABC$ is inscribed. If $AB = 2(BC)$ and $AC = 12$ then find the area of the semicircle.

A. 96π B. 72π
C. 36π D. 24π E. NOTA

15. A square of side length 32 is circumscribed about a circle. If the circle has radius $k\sqrt{2}$ then give the value of k .

A. 8 B. $8\sqrt{2}$
C. 16 D. $16\sqrt{2}$ E. NOTA

16. A trapezoid has height 12, and legs 13 and 15. The shorter base has length 10. What is the length of the longer base?

A. 20 B. 22
C. 24 D. 26 E. NOTA

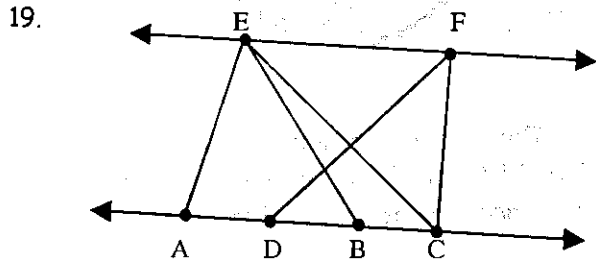
17. Right triangle ABC has the right angle at vertex C . If $AC=6$ and $AB=10$ then what is the distance from point C to the hypotenuse?

A. 6 B. $4\sqrt{3}$
C. 4.8 D. 7.2 E. NOTA

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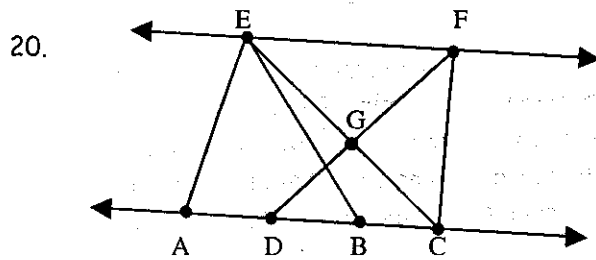
18. Consider the intersection of the solutions to the following inequalities: $y \leq x + 4$, $y \geq 4$ and $x \leq 5$. What is the length of the longest side of the triangular region formed by this intersection?

- A. $9\sqrt{3}$ B. $9\sqrt{2}$
 C. $5\sqrt{3}$ D. $5\sqrt{2}$ E. NOTA



Lines \overline{EF} and \overline{AB} (the latter contains points D and C) are parallel. If $AD = DB = BC$ then give the ratio of the area of $\triangle AEC$ to the area of $\triangle DFC$.

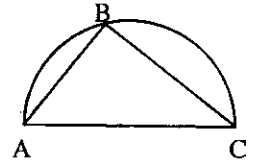
- A. 9:1 B. 3:1
 C. 9:4 D. 3:2 E. NOTA



Lines \overline{EF} and \overline{AB} (the latter contains points D and C) are parallel. If $AD = DB = BC = 5$ and point G, the intersection of \overline{DF} and \overline{EC} , is a distance of 4 from line \overline{AB} and a distance of 3 from \overline{EF} , then give the ratio of the area of $\triangle DGB$ to the area of $\triangle DFC$.

- A. 4:7 B. 3:7
 C. 2:7 D. 1:14 E. NOTA

21. Semicircle ABC is shown, with the length of segment \overline{AC} 12. Point B may lie on any point of the semicircle, (except on point A or C).

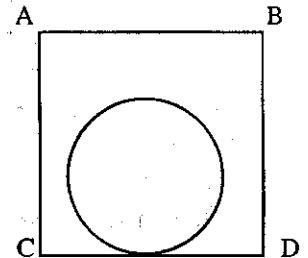


Let $\triangle ABC$ have the largest possible area, with vertices described. What is that area?

- A. 24 B. 36
 C. 48 D. 72 E. NOTA

22. A circle has interior which is always totally inside square ABCD's interior as shown. The circle rolls along the sides of the square, always keeping at least one side of the square tangent to the circle. The circle's diameter is 0.75 the length of one side of the square. What is the percent of the area of the square NOT covered by the circle's interior, as it rolls, to the nearest tenth of a percent?

- A. 19.2%
 B. 12.1%
 C. 21.5%
 D. 23.3%
 E. NOTA



23. Circles A and B (centers at A and B respectively) have a common external tangent. The tangent line meets circle A at point P and meets circle B at point Q. Circle A has radius 5 and circle B has radius 8. If $PQ = 20$ then what is the distance AB?

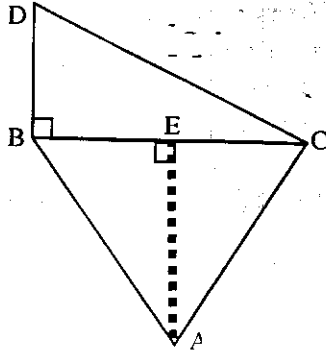
- A. 13 B. $\sqrt{409}$
 C. $\sqrt{391}$ D. $\sqrt{391} - 13$ E. NOTA

24. An isosceles right triangle has one side on the x-axis, and one vertex on point $P(1, 0)$. Another side of the triangle could NOT lie on the line with which equation?

- A. $x = 1$ B. $y = x - 1$
 C. $y = 1 - x$ D. $y = \sqrt{2}x + 1$ E. NOTA

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25.



Triangle DBC and equilateral triangle ABC share a side as shown. If altitude \overline{AE} has length 12, and $DB=5$ then give the perimeter of quadrilateral DBAC, to the nearest tenth.

- A. 47.4 B. 73.4
C. 87.3 D. 90.0 E. NOTA

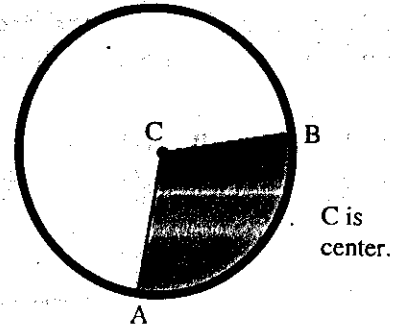
26. A circle's radius is shrinking so that its circumference at the end of minute 2 is 75% of its circumference at the end of minute 1. The circumference at the end of minute 3 is 75% of its circumference at the end of minute 2. If the circle has radius 200 at the end of minute 3 then give the radius at the end of minute 1.

- A. 225 B. 112.5
C. $\frac{3200}{3}$ D. $\frac{3200}{9}$ E. NOTA

27. Triangle ABC has sides of lengths 5, 12 and k . If the triangle is obtuse, then the possible lengths for k are $\{x \mid a < k < b \text{ or } c < k < d\}$ for $a < b < c < d$. Give the sum $a + b + c + d$ to the nearest tenth place.

- A. 47.9 B. 37.0
C. 13.0 D. 24.1 E. NOTA

28.



The distance around the shaded region is $42 + 14\pi$ cm. Give the measure of the minor arc that helps bound the shaded region.

- A. 30° B. 60°
C. 100° D. 120° E. NOTA

29. A convex polyhedron has 12 edges and 8 faces. What is the number of vertices that the polyhedron has?

- A. 6 B. 8
C. 10 D. 14 E. NOTA

30. A triangle of side lengths 40, 42 and 58 is inscribed in a circle. The circle is inscribed in a regular hexagon. The regular hexagon has the same area as the area of an equilateral triangle ABC. Find the altitude of triangle ABC.

- A. $\frac{29\sqrt{3}}{3}$ B. $\frac{58\sqrt{3}}{3}$
C. $58\sqrt{3}$ D. $29\sqrt{6}$
E. NOTA