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RATIO

- 2003B 17. An ice cream cone consists of a sphere of vanilla ice cream and a right circular cone that has the same diameter as the sphere. If the ice cream melts, it will exactly fill the cone. Assume that the melted ice cream occupies 75% of the volume of the frozen ice cream. What is the ratio of the cone's height to its radius? (Note: A cone with radius r and height h has volume $\pi r^2 h/3$, and a sphere with radius r has volume $4\pi r^3/3$.)
- (A) 2 : 1 (B) 3 : 1 (C) 4 : 1 (D) 16 : 3 (E) 6 : 1
- 2017A 17. Distinct points P , Q , R , and S lie on the circle $x^2 + y^2 = 25$ and have integer coordinates. The distances PQ and RS are irrational numbers. What is the greatest possible value of the ratio $\frac{PQ}{RS}$?
- (A) 3 (B) 5 (C) $3\sqrt{5}$ (D) 7 (E) $5\sqrt{2}$
- 2000 19. Through a point on the hypotenuse of a right triangle, lines are drawn parallel to the legs of the triangle so that the triangle is divided into a square and two smaller right triangles. The area of one of the two small right triangle is m times the area of the square. The ratio of the area of the other small right triangle to the area of the square is
- (A) $\frac{1}{2m+1}$ (B) m (C) $1-m$ (D) $\frac{1}{4m}$ (E) $\frac{1}{8m^2}$

- 2017B 19. Let ABC be an equilateral triangle. Extend side \overline{AB} beyond B to a point B' so that $BB' = 3AB$. Similarly, extend side \overline{BC} beyond C to a point C' so that $CC' = 3BC$, and extend side \overline{CA} beyond A to a point A' so that $AA' = 3CA$. What is the ratio of the area of $\triangle A'B'C'$ to the area of $\triangle ABC$?
- (A) 9 : 1 (B) 16 : 1 (C) 25 : 1 (D) 36 : 1 (E) 37 : 1
- 2016A 19. In rectangle $ABCD$, $AB = 6$ and $BC = 3$. Point E between B and C , and point F between E and C are such that $BE = EF = FC$. Segments \overline{AE} and \overline{AF} intersect \overline{BD} at P and Q , respectively. The ratio $BP : PQ : QD$ can be written as $r : s : t$, where the greatest common factor of r , s , and t is 1. What is $r + s + t$?
- (A) 7 (B) 9 (C) 12 (D) 15 (E) 20
- 2010B 20. Two circles lie outside regular hexagon $ABCDEF$. The first is tangent to \overline{AB} , and the second is tangent to \overline{DE} . Both are tangent to lines BC and FA . What is the ratio of the area of the second circle to that of the first circle?
- (A) 18 (B) 27 (C) 36 (D) 81 (E) 108