

2004 Mu Alpha Theta Convention

Hustle: Algebra/Geometry

1. The volumes of two similar solids are 250 and 686. Find the scale factor for the two solids.
2. Find the area of a circle inscribed in a square of area 50.
3. Triangle PQR is isosceles with vertex angle P. If  $m\angle Q = (5x)^\circ$  and  $m\angle P = (2x)^\circ$ , find x.
4. The dimensions of a right rectangular prism are in a ratio of 1:2:5. Find the total surface area (in  $m^2$ ) of the prism if its volume is  $640 m^3$ .
5. If (3, 4) is a point on the line  $y = mx - 5$ , find the value of m.
6. If  $10x^2 + x - 24$  is factored as  $(ax + b)(cx + d)$ , what is abcd?
7. 85 is 125% of what number?
8. Find the area of an isosceles trapezoid with legs with length 10 and bases with lengths 8 and 20.
9. Find the area of a square with diagonal 20.
10. Find the slope of a line perpendicular to the line containing the points (8, 2) and (-5, 3).
11. Find the sum of the positive solutions to the equation  $x^4 - 13x^2 + 36 = 0$ .
12. If y varies directly as x and when x is 4, y is -2, find the value of x when y is 4.
13. Find the point of intersection for the lines  $x + y = 11$  and  $y = x - 7$ .
14. Find the volume, in cubic units, of a right cylinder with total surface area  $72\pi$  square units if the length of the radius is also the height of the cylinder.
15. The hypotenuse of a 30-60-90 triangle is 8. Find the area of the triangle.
16. Find the product of all values of x such that  $|x|^2 - 6|x| + 8 = 0$ .
17. Movie ticket prices increased from \$5.25 to \$6.30 over the summer. What was the percent increase in price?
18. How many integral solutions exist for the inequality  $|2x + 7| \leq 15$ ?
19. The hypotenuse of a right triangle has length 8 and one of the legs has length 6. What is the length of the remaining leg?
20. Find the area of the closed figure formed by the x-axis and the graph of  $y = |x| - 6$ .
21. A circle is inscribed in a square. A point inside the square is chosen at random. Find the probability that the point chosen is inside the square and outside the circle.
22. Find the degree measure of one interior angle of a regular nonagon.
23. Find the area of an equilateral triangle with perimeter 24.
24. The base of an isosceles triangle has length 10, and each leg has length 13. Find the length of the altitude drawn to the base of the triangle.
25. Find the larger solution to the equation  $x^2 - 4x - 1 = 0$ .