Level 1 Geometry Blitz 2008

1. Which of the following is a Pythagorean triple?

   a) 3, 5, 6 b) 5, 13, 14 c) 7, 24, 25 d) 9, 30, 31 e) none of these

2. A rectangular solid has length 4, width 4, and height 2. What is the length of a diagonal of this solid?

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

3. How many faces does an icosahedron have?

   a) 15 b) 16 c) 17 d) 18 e) none of these

4. An equilateral triangle has perimeter 6. What is the area of this triangle?

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

5. What is the sum of the measures of the interior angles of a regular n-gon?

   a) 180° b) 360° c) $(n)180^\circ$ d) $(n-2)180^\circ$ e) none of these

6. A sphere has a volume of k units^3 and a surface area of k units^2. What is the radius of this sphere?

   a) k units b) π units c) 1 unit d) 3 units e) none of these

7. A cube has a volume of k units^3 and a surface area of k units^2. What is the edge length of this cube?

   a) k units b) 1 unit c) 3 units d) 5 units e) none of these

8. A 20' tree casts a 25' long shadow. A nearby tree is 50' tall. How long is its shadow?

   a) 55 feet b) 60 feet c) 65 feet d) 70 feet e) none of these

9. A cylindrical cup has diameter 4 cm and height 10 cm. The cup is half full of water. What is the volume of this water?

   a) 20 cm^3 b) 20π cm^3 c) 40 cm^3 d) 40π cm^3 e) none of these

10. A triangle has side lengths 17, 25, and 26. What is the area of this triangle?

    a) 204 b) 221 c) 325 d) 425 e) none of these

11. How many edges does a cube have?

a) 4 b) 12 c) 16 d) 32 e) none of these

12. How many cubic yards of dirt are needed to fill a pit 9 feet by 25 feet by 6 feet?

a) 50 b) 150 c) 450 d) 1,350 e) none of these

13. What is the perimeter of a regular hexagon inscribed within a circle of radius 1?

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

14. What is the perimeter of a regular hexagon circumscribed about a circle of radius 1?

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

15. A circular window with a diameter of 4 feet is surrounded by a 3-inch wide frame of uniform width. What is the area of the frame, in square feet?

a) $1/4\ \pi$ b) $1/16\ \pi$ c) $5/4\ \pi$ d) $17/16\ \pi$ e) none of these

16. A 5 m tall pyramid has a square base 6 m wide on a side. What is the volume of this pyramid?

a) 30 m^3 b) 60 m^3 c) 150 m^3 d) 180 m^3 e) none of these

17. A rectangle has a side length of 5 and a diagonal of 13. What is the area of this rectangle?

a) 17 b) 18 c) 60 d) 65 e) none of these

18. A bag of grass seed will cover an area of 500 square feet. What is the minimum number of bags needed to be purchased to completely cover a patch of lawn 60 feet long and 30 feet wide?

a) 3 b) 4 c) 5 d) 6 e) none of these

19. The radius of a sphere is multiplied by a factor of 10. What factor is the surface area of this sphere multiplied by?

a) 10 b) 100 c) 1000 d) 10,000 e) none of these

20. The edge length of a cube is multiplied by a factor of 5. What factor is the volume of this cube multiplied by?

a) 5 b) 25 c) 125 d) 625 e) none of these

21. A rectangular box is to be filled with cubes of side length x. If the volume of the box is V, how many cubes are needed to fill the box?

a) Vx^3 b) $\frac{V}{x^3}$ c) $3Vx$ d) $\frac{V}{3x}$ e) none of these

22. A rectangular fish tank is 40 cm long, 30 cm wide, and 20 cm tall. What is the volume of the tank, in liters?

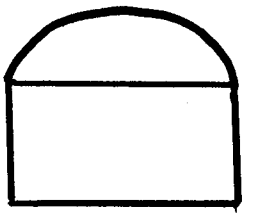
a) 9 b) 24 c) 90 d) 24,000 e) none of these

23. A regular tetrahedron has an edge length of 10. What is the surface area of this tetrahedron?

a) $25\sqrt{3}$ b) 50 c) $100\sqrt{3}$ d) 200 e) none of these

24. A Norman window has a width of 2x, and a total height of 3x. What is the area of this Norman window? See figure.

a) $6x^2$ b) $4x^2 + \frac{1}{2}\pi x^2$ c) $4x^2 + \pi x^2$ d) $6x^2 + \frac{1}{2}\pi x^2$ e) none of these



25. Consider a pair of supplementary angles. One angle has a measure of $(2x + 3)^\circ$. The other angle has a measure of $(x - 33)^\circ$. What is the measure of the larger of these two angles?

a) 70^0 b) 37° c) 47° d) 133° e) none of these

26. A mathlete walks 20 feet south, 15 feet east, 10 feet north, and 5 feet west. How far is the mathlete from her starting point?

a) 10 feet b) $10\sqrt{2}$ feet c) 20 feet d) 50 feet e) none of these

27. A 4-inch-square tile costs \$0.50. How much would it cost to buy the tiles to cover a bathroom floor 8 feet long and 6 feet wide?

a) \$216 b) \$432 c) \$864 d) \$1,728 e) none of these

28. Consider the statement, "not-A or not-B." What is the negation of this statement?

a) A or B b) A and B c) If A then B d) A iff B e) none of these

29. What is the area of a square inscribed in a circle of radius 3?

a) 9 b) 18 c) 9π d) 36 e) none of these

30. What is the area of a circle with diameter d?

a) πd b) $2\pi d$ c) πd^2 d) $\frac{1}{4}\pi d^2$ e) none of these

31. What is the surface area of a closed cylinder with radius 5 and height 10?

a) $50 + 50\pi$ b) 100π c) $100 + 50\pi$ d) 150π e) none of these

32. A pentagon has interior angles measuring x°, $2x^\circ$, $2x^\circ$, $2x^\circ$, and $3x^\circ$. What is the measure of the largest interior angle?

a) 54° b) 108° c) 180° d) 540° e) none of these

33. A parallelogram has side lengths 8 and 10, and the largest interior angle measures 120°. What is the area of this parallelogram?

a) $40\sqrt{3}$ b) 80 c) $80\sqrt{3}$ d) 36 e) none of these

34. Let point C be the center of a circle. Let points A and B be endpoints of a diameter of this circle, and let point D be a third (distinct) point on this circle. Which of the following *must* be true?

a) The area of Δ ACD is greater than the area of Δ BCD.
b) The area of Δ ACD is less than the area of Δ BCD.
c) The area of Δ ACD is equal to the area of Δ BCD.
d) The area of Δ ACD is not equal to the area of Δ BCD.
e) none of these

35. Let point C be the center of a circle. Let points A and B be endpoints of a diameter of this circle, and let point D be a third (distinct) point on this circle. Which of the following *must* be true?

a) The perimeter of Δ ACD is greater than the perimeter of Δ BCD.
b) The perimeter of Δ ACD is less than the perimeter of Δ BCD.
c) The perimeter of Δ ACD is equal to the perimeter of Δ BCD.
d) The perimeter of Δ ACD is not equal to the perimeter of Δ BCD.
e) none of these

36. Let point C be the center of a circle. Let points A and B be endpoints of a diameter of this circle, and let point D be a third (distinct) point on this circle. Which of the following *must* be true?

a) The measure of $\angle$ ADB is greater than 90°.
b) The measure of $\angle$ ADB is less than 90°.
c) The measure of $\angle$ ADB is equal to 90°.
d) The measure of $\angle$ ADB is not equal to 90°.
e) none of these

37. A dog is leashed to a tree. The trunk of the tree has a diameter of 8 inches. The leash is 20 feet long. The dog runs clockwise around the tree until he has the entire leash wound tight around the trunk. How many complete revolutions did this dog make?

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

38. A square piece of cardboard is 12 inches long on a side. Squares of side length x inches are cut from the corners, and the sides are folded up to make an open-topped box. What is the volume of this box?

a) $144\ in^3$ b) $144x\ in^3$ c) $x(12-x)^2\ in^3$ d) $4x(6-x)^2\ in^3$ e) none of these

39. Consider the statement, "If you have the highest score, then you will win a prize." Which of the following is the inverse of this statement?

a) If you won a prize, then you had the highest score.
b) If you didn't have the highest score, then you won't win a prize.
c) If you didn't win a prize, then you didn't have the highest score.
d) You have the highest score, but you didn't win a prize.
e) None of these.

40. Consider the statement, "If you have the highest score, then you will win a prize." Which of the following is the converse of this statement?

a) If you won a prize, then you had the highest score.
b) If you didn't have the highest score, then you won't win a prize.
c) If you didn't win a prize, then you didn't have the highest score.
d) You have the highest score, but you didn't win a prize.
e) None of these.

41. Consider the statement, "If you have the highest score, then you will win a prize." Which of the following is the negation of this statement?

a) If you won a prize, then you had the highest score.
b) If you didn't have the highest score, then you won't win a prize.
c) If you didn't win a prize, then you didn't have the highest score.
d) You have the highest score, but you didn't win a prize.
e) None of these.

42. Consider the statement, "If you have the highest score, then you will win a prize." Which of the following is the contrapositive of this statement?

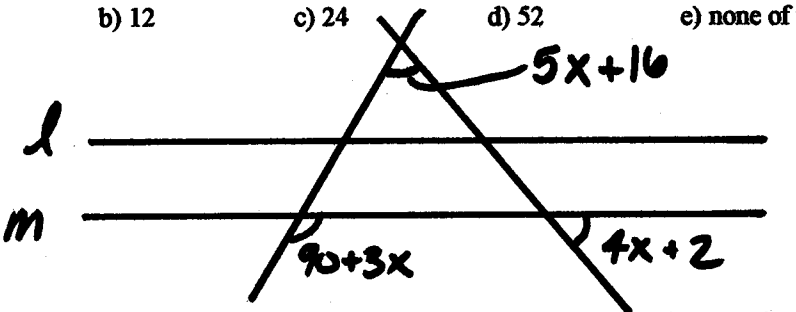
a) If you won a prize, then you had the highest score.
b) If you didn't have the highest score, then you won't win a prize.
c) If you didn't win a prize, then you didn't have the highest score.
d) You have the highest score, but you didn't win a prize.
e) None of these.

43. The Golden Ratio may be expressed by which of the following ratios?

a) $1:\frac{1-\sqrt{3}}{2}$ b) $1:\frac{1+\sqrt{3}}{2}$ c) $1:\frac{1-\sqrt{2}}{5}$ d) $1:\frac{1+\sqrt{5}}{2}$ e) none of these

44. In the figure, lines l and m are parallel. What is the value of x?

a) 6 b) 12 c) 24 d) 52 e) none of these



45. In the figure, the circles are congruent and tangent. The triangle's vertices are the centers of the circles. If the area of the triangle is $25\sqrt{3}$, what is the total area of the three circles?

a) 5π b) 15π c) 25π d) 75π e) none of these