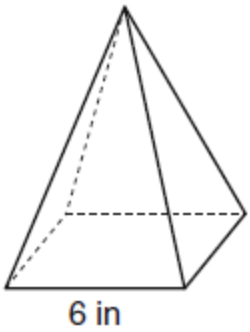
1. As shown in the diagram below, a regular pyramid has a square base whose side measures 6 inches.



If the altitude of the pyramid measures 12 inches, its volume, in cubic inches, is

(1) 72 (2) 144 (3) 288 (4) 432

2. A box in the shape of a cube has a volume of 64 cubic inches. What is the length of a side of the box?

(1) 4 in (2) 16 in (3) $21.\overline{3}$ in (4) 8 in

3. Which figure has the largest area?

(1) an equilateral triangle whose side measures 6
(2) a circle whose diameter measures 6
(3) a square whose side measures 6
(4) a triangle whose base and height each measure 6

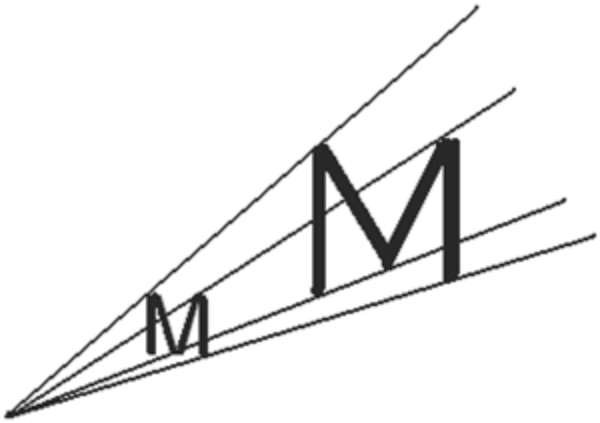
4. If a parallelogram has a base of $6x$ and a height of $2x$, what is the area of the parallelogram in terms of x?

(1) $16x^4$ (2) $12x$ (3) $12x^2$ (4) $16x$

5. If an equilateral triangle is continuously rotated around one of its medians, which 3-dimensional object is generated?

   (1) cone (2) sphere (3) pyramid (4) prism

6. Which transformation for letter M is shown in the accompanying diagram?



   (1) rotation (2) line reflection
   (3) translation (4) dilation

7. A right circular cone has a diameter of $10\sqrt{2}$ and a height of 12. What is the volume of the cone in terms of π?

   (1) 200π (2) 600π (3) 800π (4) 2400π

8. A right circular cylinder has a volume of 1,000 cubic inches and a height of 8 inches. What is the radius of the cylinder to the *nearest tenth of an inch*?

   (1) 39.8 (2) 6.3 (3) 11.2 (4) 19.8

9. The perimeter of a square is $4a$. What is the area of the square?

   (1) 16 (2) a^2 (3) $4a^2$ (4) 4

10. If the length of a rectangle is $5\sqrt{2}$ and the width is $2\sqrt{3}$, what is the area of the rectangle?

(1) $10\sqrt{5}$ (2) $7\sqrt{5}$ (3) $7\sqrt{6}$ (4) $10\sqrt{6}$

11. A side of a cube measures 4 centimeters and a side of a smaller cube measures 2 centimeters. The volume of the larger cube is how many times the volume of the smaller cube?

(1) 2 (2) 8 (3) 4 (4) 6

12. The surface area of a sphere is 2304π square inches. The length of a radius of the sphere, in inches, is

(1) 12 (2) 24 (3) 288 (4) 576

13. If each side of a rectangle is doubled, the area of the rectangle will

(1) be multiplied by 4
(2) remain the same
(3) be divided by 2
(4) double

14. The endpoints of one side of a regular pentagon are $(-1, 4)$ and $(2, 3)$. What is the perimeter of the pentagon?

(1) $\sqrt{10}$ (2) $25\sqrt{2}$ (3) $5\sqrt{2}$ (4) $5\sqrt{10}$

15. A triangle is dilated by a scale factor of 3 with the center of dilation at the origin. Which statement is true?

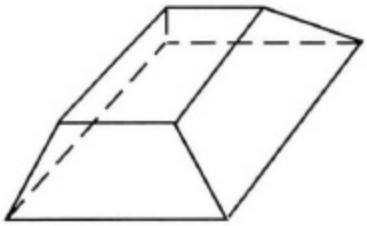
(1) The slope of any side of the image is three times the slope of the corresponding side of the original triangle.
(2) The perimeter of the image is nine times the perimeter of the original triangle.
(3) The area of the image is nine times the· area of the original triangle.
(4) The measure of each angle in the image is three times the measure of the corresponding angle of the original triangle.

16. If the length of a rectangle is doubled and its width is multiplied by 4, the area of the rectangle is multiplied by

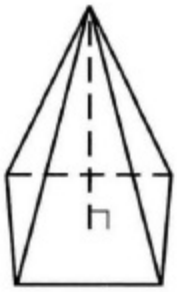
(1) 8 (2) 4 (3) 2 (4) 6

17. Which figure can have the same cross section as a sphere?

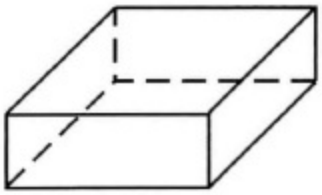
(1)



(2)



(3)



(4)

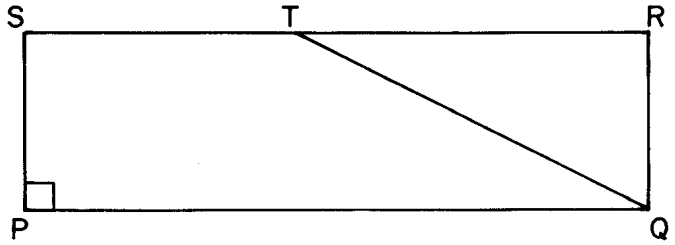
18. A designer needs to create perfectly circular necklaces. The necklaces each need to have a radius of 10 cm. What is the largest number of necklaces that can be made from 1000 cm of wire?

(1) 15 (2) 16 (3) 31 (4) 32

19. The density of the American white oak tree is 752 kilograms per cubic meter. If the trunk of an American white oak tree has a circumference of 4.5 meters and the height of the trunk is 8 meters,
what is the approximate number of kilograms of the trunk?

(1) 13,536 (2) 13 (3) 9694 (4) 30,456

20. In the accompanying diagram, *PQRS* is a rectangle. The measure of $\overline{RQ}$ is represented by x, and the ratio of *RQ* to *RT* is 1:2. The length of $\overline{ST}$ exceeds the length of $\overline{RQ}$ by 4.



If the area of rectangle *PQRS* is 39, what is the value of x ?

(1) 9 (2) 5 (3) 8 (4) 3

21. Two prisms with equal altitudes have equal volumes. The base of one prism is a square with a side length of 5 inches. The base of the second prism is a rectangle with a side length of 10 inches. Determine and state, in inches, the measure of the width of the rectangle.

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22. Find the area of a right triangle whose legs measure 5 and 12.

23. In a rectangle, the length is twice the width, and the perimeter is 48. Find the area of the rectangle.

24. The measure of the length of a rectangle is three times the measure of the width, and the perimeter is 32. Find the area of the rectangle.