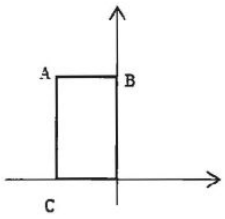
SATPREP

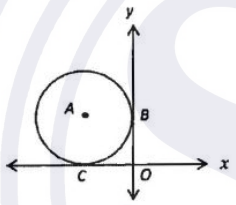
Assignment : *Geometry and Transformation*

Easy

1. In the figure below, $\overline{AC} = 2\overline{AB}$ and the coordinates of A are $(-4, b)$. What is the value of b?



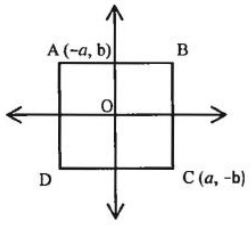
2. In the figure below, a circle with center A is tangent to the x-axis and the y-axis on the xy-coordinate plane. If the coordinates of the center A are $(-2, 2)$, what are the coordinates of point C?



a) $(-2, 0)$
b) $(-4, 0)$
c) $(2, 0)$
d) $(-2, 2)$

3. The following are coordinates of points on the xy-plane. Which of these points is nearest to the origin?

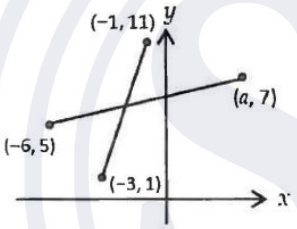
a) (0, -2)
b) (2 , 1)
c) (-1, 0)
d) (-1, -1)



4. In the figure above, rectangle ABCD lies on the xy-coordinate plane. If the origin is located at the center of rectangle, which of the following could be the coordinates of point D?

   a) $(-a, b)$
   b) $(-a, -b)$
   c) $(-b, -a)$
   d) (b, a)

5. In the figure below, if the two segments have the same length, what is the value of a?

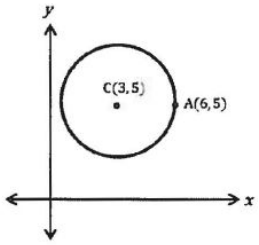


6. Which of the following letters is symmetric with respect to at least two different lines?

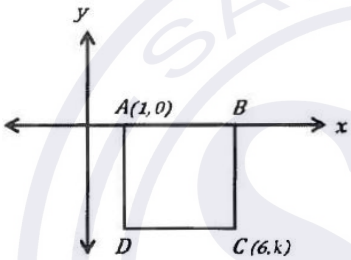
   a) T
   b) S
   c) I
   d) A

7. What is the perimeter of ΔXYZ if vertex X is located at coordinates (1, 2), vertex Y is located at coordinates (1, 5), and vertex Z is located at coordinates (5, 5) in the xy-coordinate system?

   a) 6
   b) 8
   c) 9
   d) 12

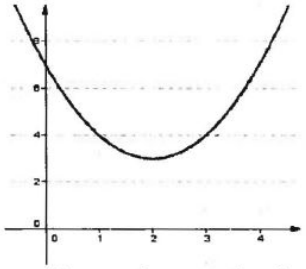


8. In the figure above, what is the circumference of the circle with center C?
   a) 4π
   b) 5π
   c) 6π
   d) 7π



9. In the figure above, ABCD is a square. If the coordinates of A are (1, 0) and the coordinates of C are (6, k), what is the value of k?
   a) 2
   b) −2
   c) −4
   d) −5

10. If the figure above is rotated clockwise 90° about point O, which of the following will be the result?
    a) 
    b) 
    c) 
    d) 



11. The figure above shows the graph of a quadratic function f that has a vertex point of (2, 3) in the xy-coordinate system. If $f(a) = f(4)$, which of the following could be the value of a?

    a) –2
    b) –1
    c) 0
    d) 1

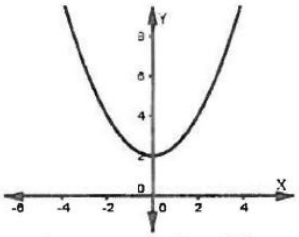
12. Which of the following graphics is symmetric with respect to at least two different lines?

    a) 
    b) 
    c) 
    d) 

Medium

13. What is the perimeter of a triangle that has vertices (–2, 0), (4, 0), and (1, 4) on the xy-coordinates plane?

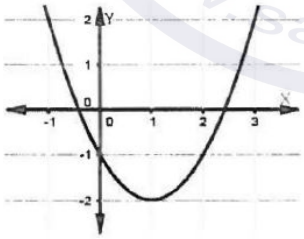
    a) 16
    b) 14
    c) $6 + 2\sqrt{6}$
    d) 10



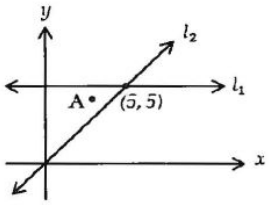
14. The figure above is a parabola of the equation $y = ax^2 + 2$, where a is a constant. If graphed on the same axes, which of the following describes the graph of $y = 2ax^2 + 2$ as compared to the graph above?
    a) The new graph will move to the right.
    b) The new graph will move to the left.
    c) The new graph will be narrower.
    d) The new graph will be the same.

15. Which of the following is the equation of a parabola whose vertex is at (–3, –4)?
    a) $y = x^2 - 4$
    b) $y = (x - 3)^2 + 4$
    c) $y = (x - 4)^2 - 3$
    d) $y = (x + 4)^2 - 3$

16. On a number line, what is the sum, in a fraction, of all possible coordinates of a point P, if the distance from P to $\frac{1}{3}$ is twice the distance from P to $\frac{1}{2}$?

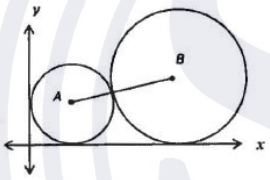


17. What is the equation for the parabola shown above?
    a) $y = (x - 1)^2 - 2$
    b) $y = (x + 1)^2 - 2$
    c) $y = (x - 1)^2 + 2$
    d) $y = (x + 1)^2 + 2$



18. In the xy-coordinate plane, line l_1 is parallel to the x-axis and line l_2 passes through the origin. Which of the following points could be the coordinates of point A?
    a) (-1, 1)
    b) (1, -3)
    c) (4, 2)
    d) (3, 4)

19. In the figure below, two circles with centers A and B are tangent to each other and both tangent to the x-axis in the xy-coordinate system. If circle A has a radius of 1 and circle B has a radius of 4, what is the slope of the segment that connects both centers?

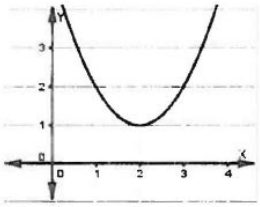


Note: Figure not drawn to scale.

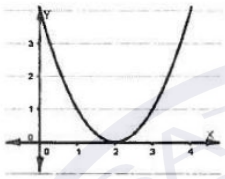
20. Find the equation of a circle that has a diameter with the endpoints given by the points (3, 5) and (−1, 1).
    a) $(x-1)^2+(y-3)^2=8$
    b) $(x+1)^2+(y+3)^2=8$
    c) $(x-1)^2+(y-3)^2=4$
    d) $(x+1)^2+(y-3)^2=8$

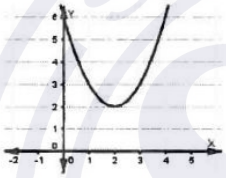
21. If the center of circle $x^2+y^2-4x-6y+8=0$ is (h,k) and the radius is r, then $h+k+r=?$

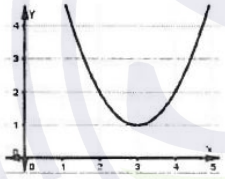
22. On the xy-plane, what is the equation of the line that is a reflection the line $y=-2x-1$ across the x-axis?
    a) $y=-2x+1$
    b) $y=-2x-1$
    c) $y=2x-1$
    d) $y=2x+1$

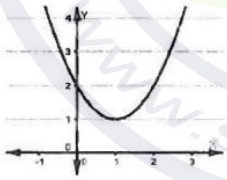


23. The graph of $f(x)$ is shown in the figure above. Which of the following is the graph of $f(x + 1)$?

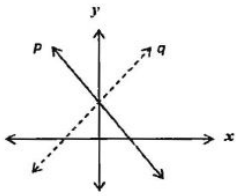
a) 

b) 

c) 

d) 

24. The dimensions of the rectangular storage box shown on the above left are 2 feet by 2 feet by 1 foot. What is the maximum number of Lego blocks (shown on the right) that can fit inside the storage box if each Lego block has dimensions 4 inches by 4 inches by 1 inch?



25. The equation of line p is $y = -x + 2$. If the dotted line q is the reflection of line p over the y-axis, what is the slope of line q?
    a) -2
    b) 1
    c) $-\frac{1}{2}$
    d) $\frac{1}{2}$

26. In the xy-coordinate plane, line m is the reflection of line l about the x-axis. Which of the following could be the sum of the slopes of lines m and l?
    a) 1
    b) −1
    c) 0
    d) $-\frac{1}{2}$

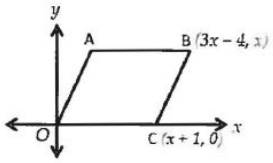
27. In a rectangular coordinate system, the center of a circle has coordinates $(3, y)$. The circle is tangent to both the x-axis and y-axis. What is a possible value of y?

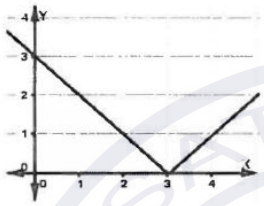
28. In the xy-plane, line r passes through the origin and is perpendicular to line t and intersects at the point $(4, 2)$. What is the slope of line t?
    a) −1
    b) −2
    c) 1
    d) 2

Hard

29. In the xy-coordinate plane, point A has coordinates $(x, -5)$ and point B has coordinates $(3, 7)$. If $\overline{AB} = 13$ and x is a positive value, what is the value of x?

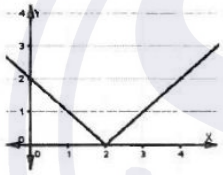
30. In the figure below, if the area of parallelogram OABC is 20, what is the value of x?



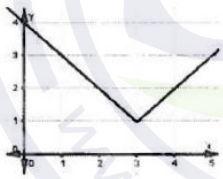


31. The graph of $y = f(x)$ is shown above. Which of the following could be the graph of $y = f(x + 1)$?

a)



b)



c)

d)