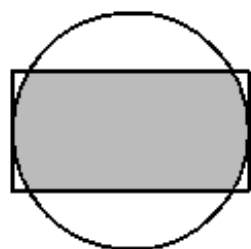




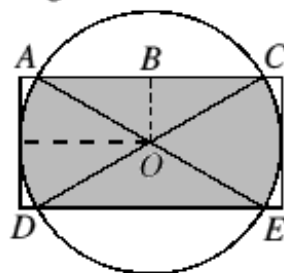
16. The diagram shows a rectangle measuring 6×12 and a circle. The two shorter sides of the rectangle are tangents to the circle. The circle and rectangle have the same centre. The region that lies inside both the rectangle and the circle is shaded. What is its area?



- A $12\pi + 18\sqrt{3}$ B $24\pi - 3\sqrt{3}$ C $18\pi - 8\sqrt{3}$
 D $18\pi + 12\sqrt{3}$ E $24\pi + 18\sqrt{3}$



16. A The diameter of the circle is the same length as the longest sides of the rectangle, so the radius of the circle is 6. The perpendicular distance from the centre of the circle to the longest sides of the rectangle is half of the length of the shortest sides which is 3.



Drawing two diameters AE and DC as shown splits the shaded area into two sectors and two isosceles triangles. As OA is 6 and OB is 3, $\angle AOB = 60^\circ$ and, by Pythagoras' Theorem, $AB = 3\sqrt{3}$. Thus $\angle AOD = 180^\circ - 2 \times 60^\circ = 60^\circ$. So the shaded area is

$$2 \times \frac{60}{360} \times \pi \times 6^2 + 2 \times \frac{1}{2} \times 2 \times 3\sqrt{3} \times 3 = 12\pi + 18\sqrt{3}.$$