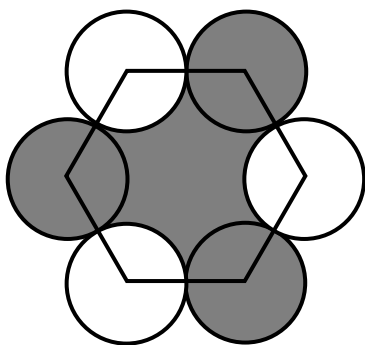
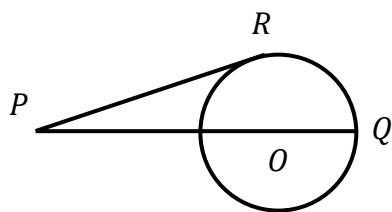


**Condensed Test**

1. What is the area of a triangle whose side lengths are 1515, 2020, and 2525?
2. What is  $\sin 30^\circ + \cos 60^\circ$  ?
3. What is the area of the largest triangle that can be inscribed in a semicircle of radius 10, where the diameter is the base?
4. How many lattice points lie on the graph of the equation  $x^2 + y^2 = 25$ ?
5. What is the sum of all possible positive angle measures, in degrees, whose squares are equal to their complements?
6. Fill in the blank: In  $\triangle ABC$  and  $\triangle DEF$ , if  $AB = DE$ ,  $BC = EF$ , and  $\angle A = \angle D = \underline{\hspace{1cm}}$  degrees, then  $\triangle ABC \cong \triangle DEF$ . If any angle measure suffices, write "any"; if none suffices, write "none".
7. A cube with edge length 4 has a circular hole with radius 1 drilled through it, connecting the centers of two opposite faces. What is the surface area of the modified cube?
8. What is the measure of each interior angle of a 180-sided regular polygon?
9. What's the area of the rhombus with one side length measuring 25 and one diagonal measuring 14?
10. Isosceles trapezoid  $EPIC$  has  $EP = PI = IC = 1$  and  $CE = 2$ . What is its area?
11. Super Radz places six stones at the vertices of a regular hexagon. If Richard chooses three at random without replacement, what is the probability the three he chose form a right triangle?
12. If the hexagon shown below is a regular hexagon with side length 2, and each circular arc shown has radius 1, then what is the area of the shaded region?



13. A particular square pyramid consists of a square with side length 10 for the base and four isosceles triangles with legs of length  $\sqrt{194}$  for the lateral faces. What is its volume?
14. A particular satellite's circular orbit around a planet is concentric with the spherical planet, which has radius 2020 miles. The distance from the orbit to the planet is 5 miles. The satellite operator now wants the satellite to be 1 foot farther away from the planet at all points of its orbit. In feet, how much farther will the satellite travel in a single revolution now, compared to its previous orbit?
15. A circle has a chord of length 6. The part of the chord's perpendicular bisector inside the circle is divided into segments in the ratio 1:3 by the chord's intersection. What is the area of the circle?
16. Two buffalo are tied to stakes in the coordinate plane such that one can only roam the region  $x^2 + y^2 \leq 9$  and the other can only roam the region  $(x - 5)^2 + (y - 7)^2 \leq 16$ . What is the maximum possible distance the buffalo can be from each other?
17. What is the area of the parallelogram whose diagonals intersect at an angle of  $30^\circ$  and have lengths 9 and 12?
18. Find the area of a triangle whose side lengths are 10, 17, and 21.
19. In circle  $O$  below, secant  $PQ$  passes through  $O$ , and  $PR$  is tangent to  $O$  at  $R$ . If  $\angle QPR = 47^\circ$ , what is the degree measure of minor arc  $QR$ ?



20. The two bases of an isosceles trapezoid with area 150 have length 18 and 12. What is the length of one of the trapezoid's diagonals?
21. What is the area of a triangle with vertices  $(3,2)$ ,  $(-4, -1)$ , and  $(0, 6)$ ?
22. In triangle  $AHS$ , medians  $AW$  and  $HI$  intersect at  $N$ . What is the ratio of the area of  $SWNI$  to the area of  $AHS$ ?
23. Where is the circumcenter of the polygon with vertices  $(1, 2)$ ,  $(2, -1)$ ,  $(-2, 1)$ , and  $(-1, -2)$ ? Give your answer as an ordered pair  $(x, y)$ .
24. In  $\triangle ABC$ ,  $D$  is on  $AB$  such that  $AD : DB = 1 : 1$ ,  $E$  is on  $BC$  such that  $BE : EC = 1 : 1$ , and  $F$  is on  $CA$  such that  $CF : FA = 4 : 3$ . What is the ratio of the area of  $\triangle DEF$  to the area of  $\triangle ABC$ ?
25. Inside a right circular conical tent with base radius 10 and height 24, a fly sits on a point along the base. Among all points on the surface that are equidistant from the apex and the base, it then flies in a line to the one that is farthest away from its current position. How far does it travel?