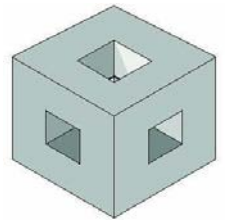
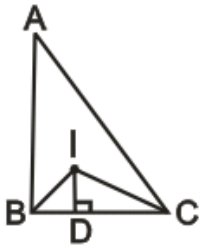
First name: _____ Last name:_____ Student ID: _____

Geometry 3 Homework

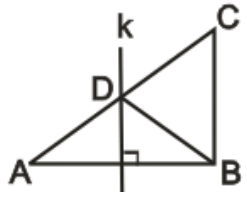
1. A 3 by 3 by 3 cube has three holes, each with a 1 by 1 cross-section running from the centre of each face to the centre of the opposite face. What is the total surface area (in square units) of the resulting solid?



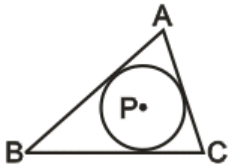
2. I is the incenter of ΔABC. If $\overline{AB} = 110$, $\overline{BC} = 32$, $\overline{AC} = 122$, and $\overline{ID} = 18$, find the area of ΔABC.



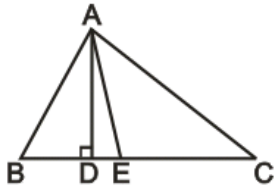
3. Line k is the perpendicular bisector of side $\overline{AB}$. If $\overline{AC} = 11$, $\overline{CD} = 6$, and $\overline{BC} = 7$, find the value of $\overline{BC} - \overline{BD}$.



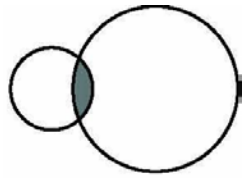
4. In the figure, P is the incenter of ΔABC, the radius of the inscribed circle is 3 cm, and the perimeter of ΔABC is 45 cm. What is the area of ΔABC?



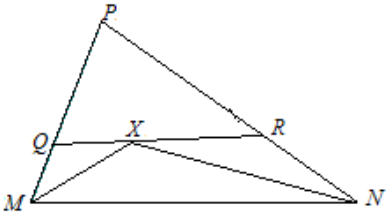
5. In ΔABC, $\overline{AD} \perp \overline{BC}$ and $\overline{AE}$ bisects $\angle BAC$, $\angle B = 80°$, and $\angle C = 34°$. Find $\angle DAE$.



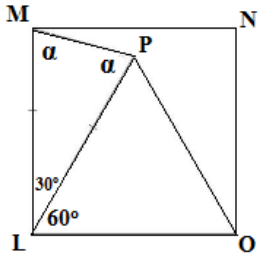
6. A circle of radius 1 unit and a circle of radius 3 units overlap as shown in the diagram. The area of the shaded region is $\pi/3$. What is the total area of the two unshaded regions?



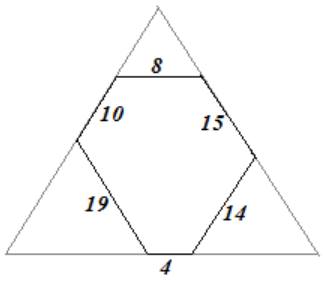
7. Given: QM = QX, RN = RX, PM = 10, MN = 15, PN = 17, then what is the perimeter of triangle PQR?



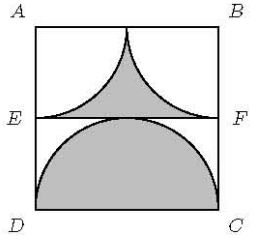
8. LMNO is a square. P is a point inside the square such that LOP is an equilateral triangle. What is the measure of ∠PMN, in degree?



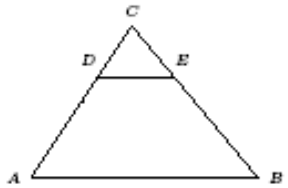
9. The diagram shows an equiangular hexagon side lengths 4, 8, 10, 14, 15, and 19, inscribed in an equilateral triangle of side length n, where n≠ 37. Find the value of n.



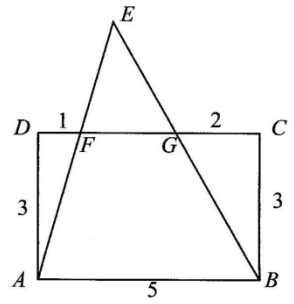
10. In the diagram ABCD is a square. Points E and F are midpoints of the sides AD and BC, respectively. Line segments AE and BF are radii of quarter circles with centres at A and B, respectively. Line segment DC is the diameter of the shaded semi-circle. If DC = 8, then what is the area of the shaded region?



11. In the diagram, sides *AB* and *DE* are parallel and *DE* : *AB* = 1 : 3. If the area of triangle *CDE* is 20, then what is the area of the trapezoid *DEBA?*

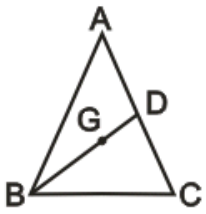


12. In rectangle ABCD, AB = 5 and BC = 3. Points F and G are on CD so that DF = 1 and GC = 2. Lines AF and BG intersect at E. Find the area of ΔAEB.

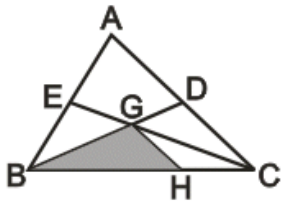


13. A rectangle with a diagonal of length *x* is twice as long as its width. What is the area of the rectangle?

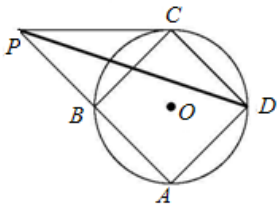
14. ABC is an isosceles triangle. If $\overline{AB} = \overline{AC} = 16$, $\overline{BC} = 8$, D is the midpoint of side $\overline{AC}$, and G is the centroid of ΔABC, find $\overline{BD}$.



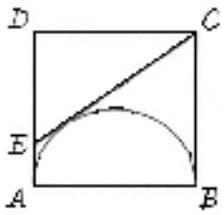
15. $\overline{BD}$ and $\overline{CE}$ are medians of ΔABC. If $\overline{BH} = 3\overline{HC}$, what is the ratio of areas of ΔGBH and ΔABC?



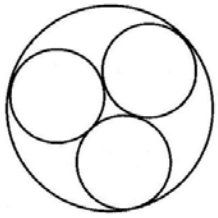
16. The square *ABCD* is inscribed in a circle of radius one unit. *ABP* is a straight line, *PC* is tangent to the circle. Find the length of *PD.*



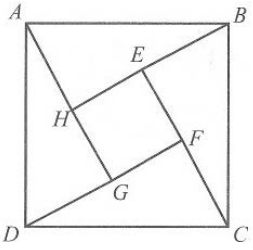
17. Square *ABCD* has side length 2. A semicircle with diameter *AB* is constructed inside the square, and the tangent to the semicircle from C intersects side *AD* at *E.* What is the length of *CE?*



18. Three circles of radius 1 are externally tangent to each other and internally tangent to a larger circle. What is the radius of the large circle?



19. In the figure, the length of side *AB* of square *ABC D* is $\sqrt{50}$, *E* is between *B* and *H*, and *BE* = 1. What is the area of the inner square *EFGH*?



20. An equiangular octagon has four sides of length 1 and four sides of length $\frac{\sqrt{2}}{2}$, arranged so that no two consecutive sides have the same length. What is the area of the octagon?