1. Area

a) Find the area of a regular triangle with side one.

b) Find the area of a regular hexagon with side one.

c) Find the area of a regular pentagon with side one.

2. Find the volume of a regular tetrahedron of side length one.

3. Using the formula for $\sin(x-y)$, compute $\sin 3$.

4. Construct a three degree angle using straightedge and compass.

5. Find n such that $\cos(x) = \sin(x+n)$ for all x.

6. Consider regular pentagon ABCDE. Letting O be its center, extend AO to its intersection with CD and call its intersection P. Also, draw perpendiculars from A to BC and DE; let Q be the intersection of the first perpendicular from A with BC and let R be the intersection of the second perpendicular from A with DE. If $OP = 1$ compute $AO + AQ + AR$.

HINTS:

1c): You will need to compute $\sin 36$, using the value for $\sin 54$ and the formula $\sin^2 x + \cos^2 x = 1$.

2) The volume of a triangular pyramid is $1/3$ times the area of its base times its height.

4) Use $\sin 15$ and $\sin 18$ to construct fifteen and eighteen degree angles.