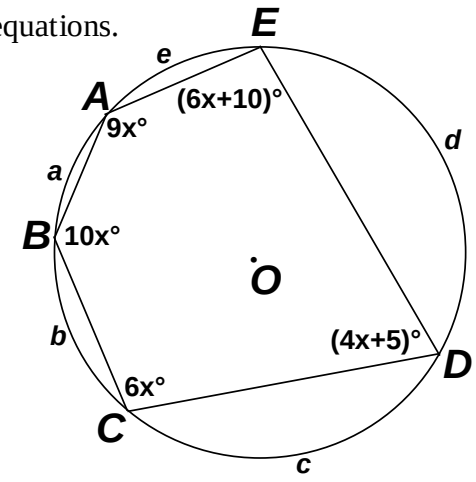
MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 5 - FEBRUARY 2016 SOLUTION KEY

Team Round - continued

E) $9x+10x+6x+(4x+5)+(6x+10)=35x+15=540 \Rightarrow x=\frac{525}{35}=15$

Therefore, the angles of *ABCDE* measure $135°, 150°, 90°, 65°, 100°$.

Since the degree-measure of an intercepted arc is twice the measure of the inscribed angle, we have the following system of equations.



$$\begin{cases} b+c+d=270 \\ c+d+e=300 \\ a+d+e=180 \\ a+b+e=130 \\ a+b+c=200 \end{cases}$$

Subtracting successive equations,

$$\begin{cases} e-b=30 \\ c-a=120 \\ d-b=50 \\ c-e=70 \end{cases}$$

Expressing each arc in terms of the same variable (*e*),

$$\begin{cases} a=c-120=e-50 \\ b=e-30 \\ c=e+70 \\ d=b+50=e+20 \end{cases}$$

$a+b+c+d+e=5e+10=360 \Rightarrow e=70 \Rightarrow (a,b,c,d)=(20,40,140,90)$

$(a_1,a_2,a_3,a_4,a_5)=\underline{(\mathbf{20,40,70,90,140})}$.