Angles Formed by Secants and Tangents

Total points = 32

A.

1. $m\angle ATC = \frac{1}{2}(m\widehat{AC} + m\widehat{BD})$ ✓
   $m\angle ATC = \frac{1}{2}(40^\circ + 80^\circ)$ ✓
   $m\angle ATC = \frac{1}{2}(120^\circ)$ ✓
   $\boxed{m\angle ATC = 60^\circ}$ ✓
2. $m\angle BTC = \frac{1}{2}(m\widehat{AD} + m\widehat{BC})$ ✓
   $142^\circ = \frac{1}{2}(156^\circ + m\widehat{BC})$ ✓
   $2(142^\circ) = 156^\circ + m\widehat{BC}$ ✓
   $284^\circ = 156^\circ + m\widehat{BC}$ ✓
   $284^\circ - 156^\circ = m\widehat{BC}$ ✓
   $\boxed{m\widehat{BC} = 128^\circ}$ ✓
3. $m\widehat{AD} = 360^\circ - (m\widehat{DBC} + m\widehat{AC})$ ✓
   $m\widehat{AD} = 360^\circ - (192^\circ + 52^\circ)$ ✓
   $m\widehat{AD} = 360^\circ - 244^\circ$ ✓
   $\boxed{m\widehat{AD} = 116^\circ}$ ✓

   $m\widehat{BC} = 360^\circ - (m\widehat{ADB} + m\widehat{AC})$ ✓
   $m\widehat{BC} = 360^\circ - (208^\circ + 52^\circ)$ ✓
   $m\widehat{BC} = 360^\circ - 260^\circ$ ✓
   $\boxed{m\widehat{BC} = 100^\circ}$ ✓

   $m\angle ATD = \frac{1}{2}(m\widehat{AD} + m\widehat{BC})$ ✓
   $m\angle ATD = \frac{1}{2}(116^\circ + 100^\circ)$ ✓
   $m\angle ATD = \frac{1}{2}(216^\circ)$ ✓
   $\boxed{m\angle ATD = 108^\circ}$ ✓

B.

1. $64^\circ = \frac{1}{2}(208^\circ - x)$ ✓
   $2(64^\circ) = 208^\circ - x$ ✓
   $128^\circ = 208^\circ - x$ ✓
   $128^\circ - 208^\circ = -x$ ✓
   $-1[-80^\circ = -x]$ ✓
   $\boxed{x = 80^\circ}$ ✓
2. $m\widehat{OIK} = 360^\circ - m\widehat{OK}$ ✓
   $m\widehat{OIK} = 360^\circ - 120$ ✓
   $\boxed{m\widehat{OIK} = 240^\circ}$ ✓
3. $\boxed{m\angle P = 30^\circ}$ ✓

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