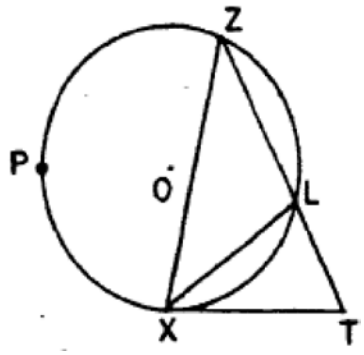
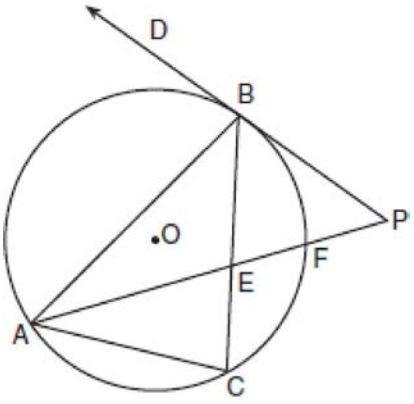
## G.C.A.2: Chords, Secants and Tangents 19

1 Given: circle $O$, tangent $\overline{TX}$, secant $\overline{TLZ}$, chords $\overline{ZX}$ and $\overline{XL}$, $m\overset{\frown}{XL} : m\overset{\frown}{LZ} : m\overset{\frown}{XPZ} = 2:2:5$.



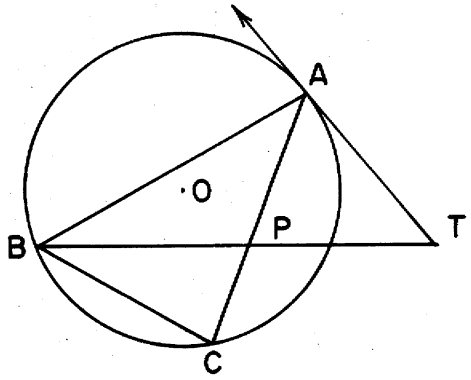

Find: $m\overset{\frown}{XL}$, $m\angle Z$, $m\angle T$, $m\angle ZXT$, $m\angle XLT$

2 In the accompanying diagram, $\triangle ABC$ is inscribed in circle $O$, $\overline{AP}$ bisects $\angle BAC$, $\overrightarrow{PBD}$ is tangent to circle $O$ at $B$, and $m\angle ACB : m\angle CAB : m\angle ABC = 4:3:2$



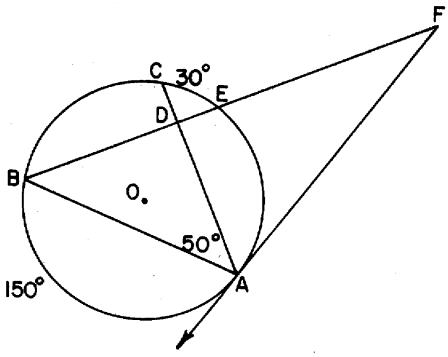

Find: $m\angle ABC$, $m\overset{\frown}{BF}$, $m\angle BEP$, $m\angle P$, $m\angle PBC$

3 In the accompanying figure, $\triangle ABC$ is inscribed in circle $O$, $\overline{BT}$ bisects $\angle CBA$, $\overrightarrow{TA}$ is tangent to circle $O$, and $m\angle BAC : m\angle CBA : m\angle ACB = 2:3:4$.



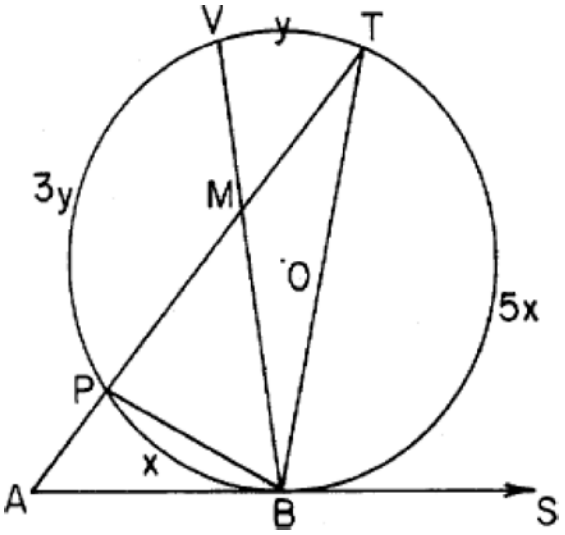

Find: $m\angle BAC$, $m\overset{\frown}{BC}$, $m\angle CPT$, $m\angle PAT$, $m\angle T$

4 In circle $O$, $\overrightarrow{FA}$ is a tangent, $\overline{FEB}$ is a secant, $\overline{AC}$ and $\overline{AB}$ are chords. $m\overset{\frown}{CE} = 30$, $m\overset{\frown}{AB} = 150$, and $m\angle CAB = 50$.



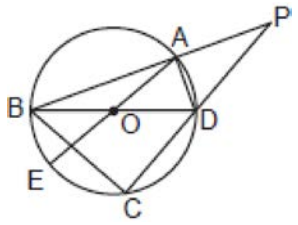

Find: $m\overset{\frown}{BC}$, $m\angle EBA$, $m\angle ADE$, $m\angle F$, $m\angle FAC$

5 In the accompanying figure, $\overleftrightarrow{ABS}$ is tangent to circle $O$, $\overline{APMT}$ is a secant, and $\overline{BP}$, $\overline{BV}$, and $\overline{BT}$ are chords.



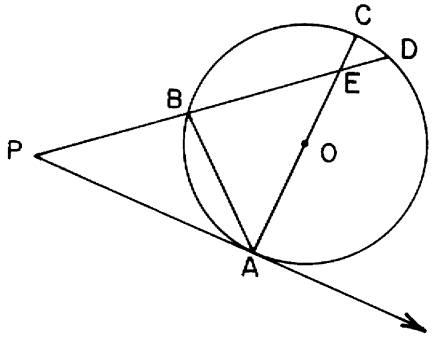

If $\overset{\frown}{mBP}$, $\overset{\frown}{mPV}$, $\overset{\frown}{mVT}$, and $\overset{\frown}{mTB}$ are represented by $x$, $3y$, $y$, and $5x$ respectively, express each of the following in terms of $x$ and $y$: $m\angle AMB$, $m\angle TBS$, $m\angle PBT$, $m\angle TAB$. If $x = 42°$, find the number of degrees represented by $y$.

6 In the accompanying diagram of circle $O$, diameters $\overline{BD}$ and $\overline{AE}$, secants $\overline{PAB}$ and $\overline{PDC}$, and chords $\overline{BC}$ and $\overline{AD}$ are drawn; $\overset{\frown}{mAD} = 40$; and $\overset{\frown}{mDC} = 80$.



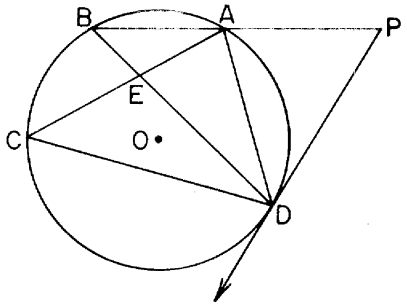

Find: $\overset{\frown}{mAB}$, $m\angle BCD$, $m\angle BOE$, $m\angle P$, $m\angle PAD$

7 In the accompanying diagram, $\overleftrightarrow{PA}$ is a tangent to circle $O$ at point $A$, secant $\overline{PBD}$ intersects diameter $\overline{AC}$ at point $E$, $m\angle P = 40$, and $\overset{\frown}{mCD} : \overset{\frown}{mDA} = 1:8$.



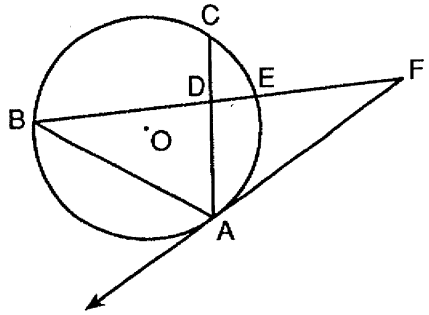

Find $\overset{\frown}{mAD}$, $\overset{\frown}{mAB}$, $m\angle BEA$, $m\angle BAC$, and $m\angle PBA$

8 In the accompanying diagram, $B$ is the midpoint of $\overset{\frown}{AC}$, triangle ADC is inscribed in circle $O$, chords $\overline{AC}$ and $\overline{BD}$ intersect at $E$, $\overleftrightarrow{PR}$ is a tangent to circle $O$ at $D$, $\overline{PAB}$ is a secant, and $\overset{\frown}{mBA} : \overset{\frown}{mAD} : \overset{\frown}{mDC} = 2:3:5$.



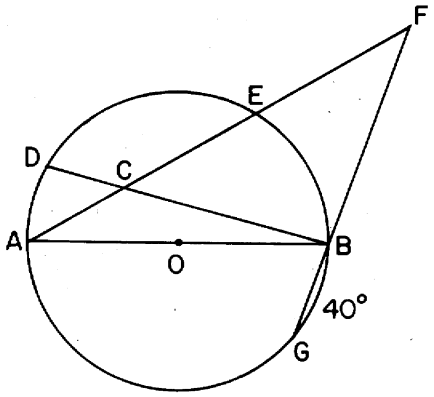

Find: $\overset{\frown}{mBC}$, $m\angle ADC$, $m\angle AEB$, $m\angle ADP$, $m\angle P$

9 In circle $O$, $\overrightarrow{FA}$ is a tangent, $\overline{FEDB}$ is a secant, $\overline{ADC}$ and $\overline{AB}$ are chords, $m\overset{\frown}{CE} = 40$, $m\overset{\frown}{AB} = 130$, and $m\angle CAB = 60$.



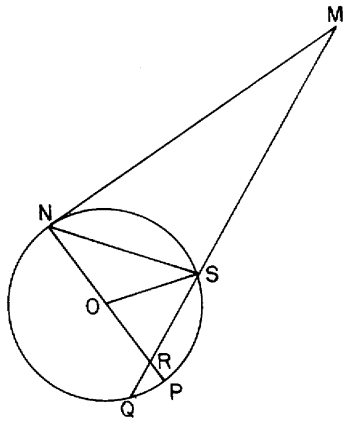

Find: $m\overset{\frown}{BC}$, $m\angle EBA$, $m\angle ADE$, $m\angle F$, $m\angle FAC$

10 In the accompanying diagram, $\overline{AB}$ is a diameter of circle $O$, $\overline{FECA}$ and $\overline{FBG}$ are secants, $m\overset{\frown}{AD} : m\overset{\frown}{DE} : m\overset{\frown}{EB} = 1:3:2$.



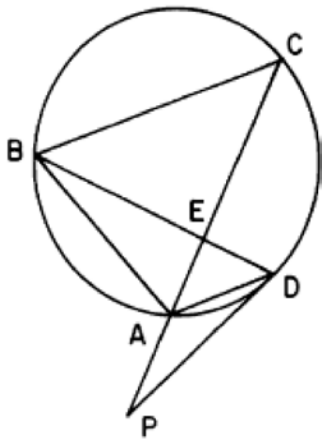

Find $m\overset{\frown}{DE}$, $m\angle ECB$, $m\angle AFG$, $m\angle DBF$, and $m\angle EAB$

11 In circle $O$, $\overline{MN}$ is a tangent, $\overline{NP}$ is a diameter, $\overline{MQ}$ is a secant, $\overline{OS}$ is a radius, $m\overset{\frown}{QN} = 160$, and $m\angle PNS = 40$.



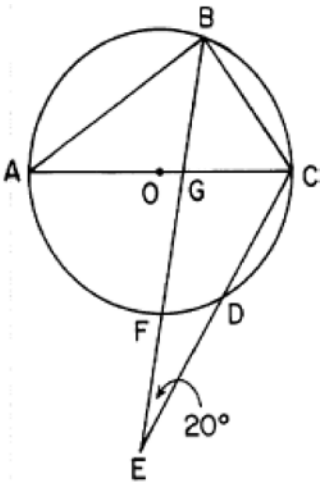

Find $m\overset{\frown}{QP}$, $m\overset{\frown}{PS}$, $m\angle QRP$, $m\angle NOS$, and $m\angle M$

12 In the accompanying diagram, $\triangle ABC$ is isosceles with $\overline{CB} \cong \overline{CA}$, $m\angle DAC = 45$, $m\overset{\frown}{BC} = 135$, $\overline{PD}$ is tangent to circle $O$ at $D$, $\overline{PAC}$ is a secant, and chords $\overline{BD}$ and $\overline{AC}$ intersect at $E$.



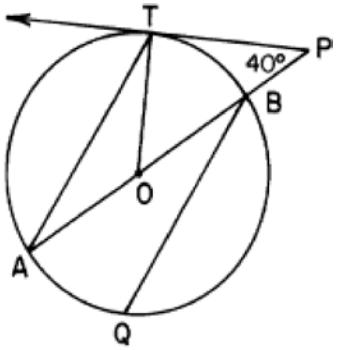

Find: $m\overset{\frown}{AD}$, $m\overset{\frown}{AB}$, $m\angle P$, $m\angle ADP$, $m\angle BEC$

13 In the accompanying diagram, $\triangle ABC$ is inscribed in circle $O$. Secant $\overline{EFB}$ bisects $\angle ABC$ and intersects diameter $\overline{AOC}$ at $G$, $\overline{EDC}$ is a secant, $m\angle E = 20$, and $m\overset{\frown}{AB} : m\overset{\frown}{BC} = 3:2$.



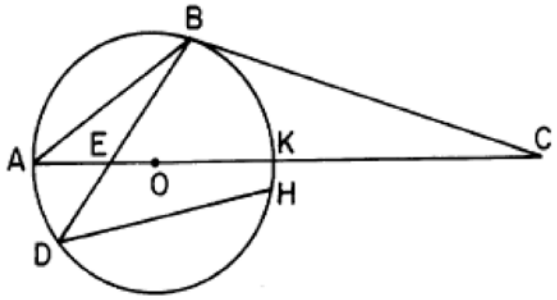

Find: $m\overset{\frown}{BC}$, $m\overset{\frown}{FD}$, $m\angle ABE$, $m\angle FGC$, $m\angle ACD$

14 In the accompanying diagram of circle $O$, $\overline{PBOA}$ is a secant, $\overrightarrow{PT}$ is tangent to circle $O$ at $T$, $m\angle P = 40$, and $\overline{QB} \parallel \overline{AT}$.



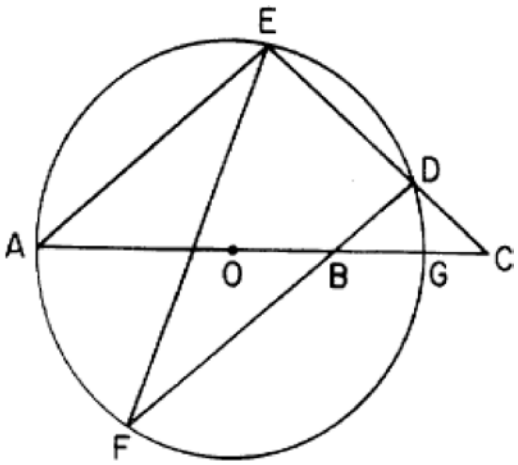

Find: $m\angle BOT$, $m\angle A$, $m\overset{\frown}{AT}$, $m\angle ATO$, $m\angle PBQ$

15 Given: circle $O$ with $m\overset{\frown}{AD} : m\overset{\frown}{AB} : m\overset{\frown}{BK} = 1:3:2$, diameter $\overline{AK}$ is extended to $C$, $\overline{BC}$ is tangent to circle $O$ at $B$, and $\overset{\frown}{HK} = 12°$.



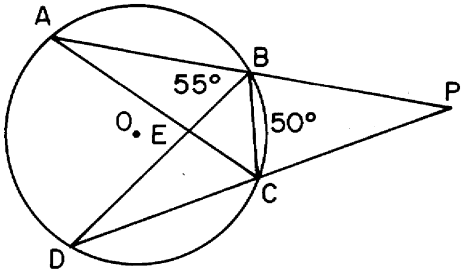

Find: $m\overset{\frown}{AD}$, $m\angle BCK$, $m\angle BDH$, $m\angle AEB$, $m\angle DBC$

16 In the accompanying diagram of circle $O$, $\overline{AE}$ and $\overline{FD}$ are chords, $\overline{AOBG}$ is a diameter and is extended to $C$, $\overline{CDE}$ is a secant, $\overline{AE} \parallel \overline{FD}$, and $m\overset{\frown}{AE} : m\overset{\frown}{ED} : m\overset{\frown}{DG} = 5:3:1$.



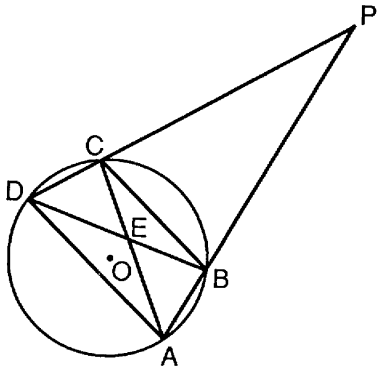

Find $m\overset{\frown}{DG}$, $m\angle AEF$, $m\angle DBG$, $m\angle DCA$, and $m\angle CDF$

17 In the accompanying diagram of circle $O$, $\overline{PBA}$ and $\overline{PCD}$ are secants, chords $\overline{AC}$ and $\overline{BD}$ intersect at $E$, $\overline{BA} \cong \overline{CD}$, chord $\overline{BC}$ is drawn, m$\angle ABD = 55$, and m$\overset{\frown}{BC} = 50$.



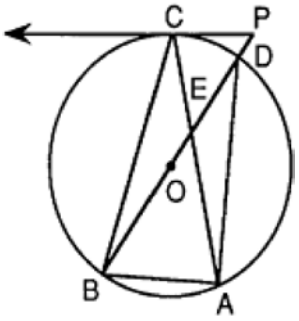

Find: m$\angle ACD$, m$\angle P$, m$\angle DBC$, m$\angle AED$, m$\angle PCB$.

18 In the accompanying diagram, $\overline{PCD}$ and $\overline{PBA}$ are secants from external point $P$ to circle $O$. Chords $\overline{DA}$, $\overline{DEB}$, $\overline{CEA}$, and $\overline{CB}$ are drawn, m$\overset{\frown}{AB}$ = m$\overset{\frown}{DC}$, m$\overset{\frown}{BC}$ is twice m$\overset{\frown}{AB}$, and m$\overset{\frown}{AD}$ is 60 more than m$\overset{\frown}{BC}$.



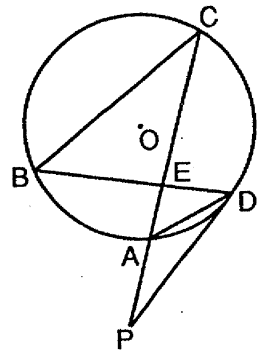

Find: m$\overset{\frown}{AB}$, m$\angle P$, m$\angle DAC$, m$\angle DEA$, m$\angle PCB$

19 In the accompanying diagram, $\triangle ABC$ is inscribed in circle $O$. Diameter $\overline{BD}$ is extended through $D$ to point $P$ and intercepts chord $\overline{AC}$ at $E$, $\overleftrightarrow{PC}$ is tangent to the circle at $C$, chord $\overline{AD}$ is drawn, m$\overset{\frown}{AD} = 122$, and m$\angle BAC = 73$.



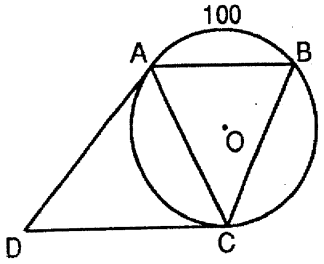

Find: m$\overset{\frown}{BC}$, m$\angle ABC$, m$\angle P$, m$\angle BEA$, m$\angle PDA$

20 In the accompanying diagram, $\overline{PD}$ is tangent to circle $O$ at $D$, $\overline{PAC}$ is a secant, chords $\overline{BD}$ and $\overline{AC}$ intersect at $E$, chord $\overline{AD}$ is drawn, m$\overset{\frown}{BC}$ = m$\overset{\frown}{CA}$, m$\overset{\frown}{BC}$ is twice m$\overset{\frown}{AB}$, and m$\angle DAC = 48$.



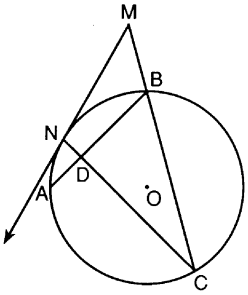

Find m$\overset{\frown}{AB}$, m$\overset{\frown}{AD}$, m$\angle CPD$, m$\angle CED$ and m$\angle ADP$.

21 In the accompanying diagram, $\overline{AB} \parallel \overline{CD}$, $\overline{AD}$ and $\overline{DC}$ are tangent to circle $O$, $m\overset{\frown}{AB} = 100$, and $m\overset{\frown}{AC} = m\overset{\frown}{CB}$.



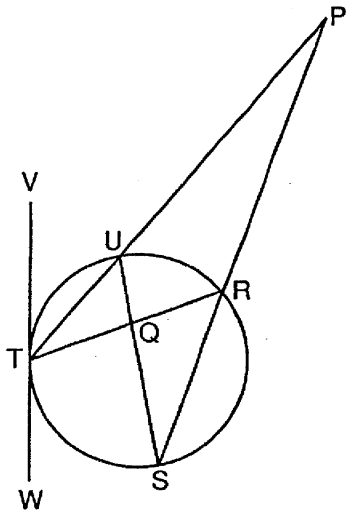

Find $m\overset{\frown}{AC}$, $m\angle B$, $m\angle D$ and $m\angle BCD$
Is $ABCD$ a parallelogram? [Explain your answer.]

22 In the accompanying diagram of circle $O$, the ratio $m\overset{\frown}{BC} : m\overset{\frown}{CA} : m\overset{\frown}{AN} : m\overset{\frown}{NB}$ is 5:4:1:2. Chord $\overline{CB}$ is extended to external point $M$, chords $\overline{AB}$ and $\overline{CN}$ intersect at $D$, and tangent $\overleftrightarrow{MN}$ is drawn.



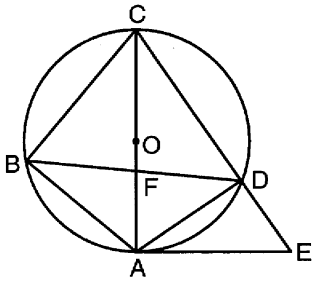

Find: $m\overset{\frown}{BC}$, $m\angle ABC$, $m\angle NMC$, $m\angle NDA$, $m\angle MND$

23 In the accompanying diagram, chords $\overline{RT}$ and $\overline{US}$ intersect at $Q$, secants $\overline{PUT}$ and $\overline{PRS}$ are drawn, $m\overset{\frown}{RS} = 120$, $m\overset{\frown}{UT} = 80$, $m\angle TRS = 50$, and $\overline{VW}$ is tangent to the circle at $T$.



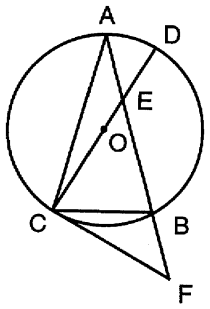

Find $m\overset{\frown}{UR}$, $m\angle SUT$, $m\angle P$, $m\angle RQS$ and $m\angle PTV$.

24 In the accompanying diagram of circle $O$, diameter $\overline{CA}$ intersects chord $\overline{BD}$ at $F$; $\overline{AE}$ is a tangent; $\overline{EDC}$ is a secant, $\overline{CB}$, $\overline{BA}$, and $\overline{AD}$ are chords; $m\overset{\frown}{BC} = 100$; and $m\overset{\frown}{AD} = 70$.



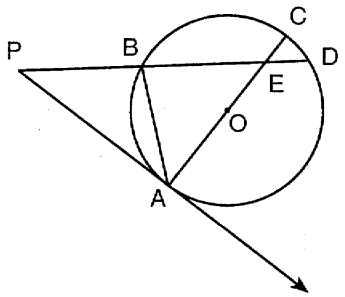

Find: $m\overset{\frown}{AB}$, $m\angle AEC$, $m\angle BCA$, $m\angle DFA$, $m\angle DAE$.

25 In the accompanying diagram of circle $O$ with inscribed isosceles triangle $ABC$, $\overline{AB} \cong \overline{AC}$, $m\overset{\frown}{CB} = 60$, $\overline{FC}$ is a tangent, and secant $\overline{FBA}$ intersects diameter $\overline{CD}$ at $E$.



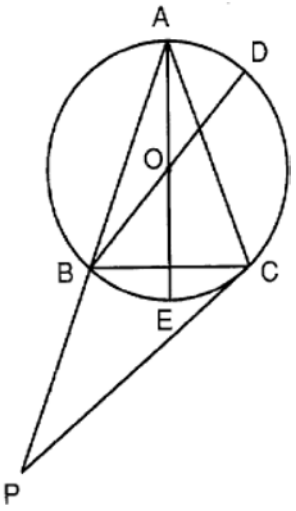

Find: $m\angle ADC$, $m\overset{\frown}{AD}$, $m\angle DEB$, $m\angle AFC$, $m\angle BCF$

26 In the accompanying diagram, $\overrightarrow{PA}$ is tangent to circle $O$ at point $A$, secant $\overline{PBD}$ intersects diameter $\overline{AC}$ at point $E$, chord $\overline{AB}$ is drawn, $m\angle P = 40$, and $m\overset{\frown}{CD} : m\overset{\frown}{DA} = 1:8$.



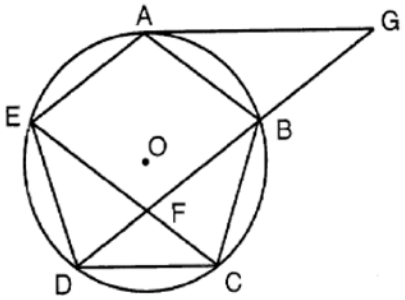

Find: $m\overset{\frown}{DA}$, $m\overset{\frown}{AB}$, $m\angle BEA$, $m\angle BAC$, $m\angle PBA$.

27 In the accompanying diagram, isosceles triangle $ABC$ is inscribed in circle $O$, and vertex angle $BAC$ measures 40º. Tangent $\overline{PC}$, secant $\overline{PBA}$, and diameters $\overline{BD}$ and $\overline{AE}$ are drawn.



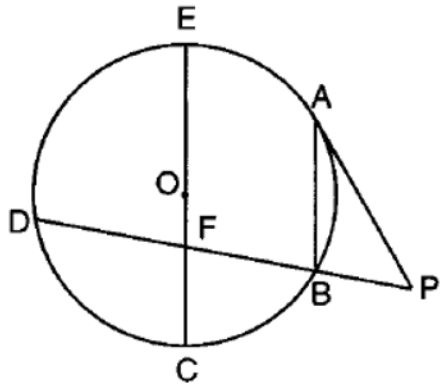

Find: $m\overset{\frown}{BC}$, $m\angle ABD$, $m\angle DOE$, $m\angle P$, $m\angle ACP$.

28 In the accompanying diagram, regular pentagon $ABCDE$ is inscribed in circle $O$, chords $\overline{EC}$ and $\overline{DB}$ intersect at $F$, chord $\overline{DB}$ is extended to $G$, and tangent $\overline{GA}$ is drawn.



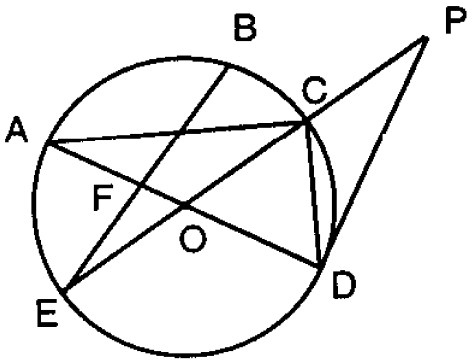

Find: $m\angle BDE$, $m\angle BFC$, $m\angle AGD$

29 In the accompanying diagram of circle $O$, chord $\overline{AB}$ is parallel to diameter $\overline{EC}$, secant $\overline{PBD}$ intersects $\overline{EC}$ at $F$, tangent $\overline{PA}$ is drawn, $m\overset{\frown}{AB} = m\overset{\frown}{BC}$, and $m\overset{\frown}{CD} = 80$.



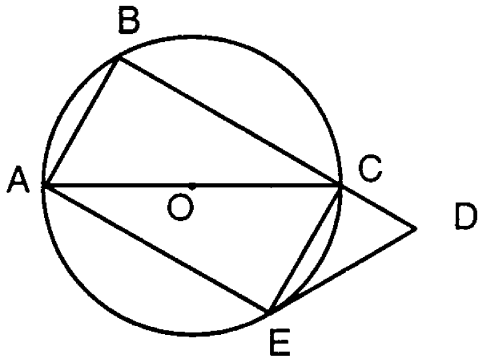

Find: $m\overset{\frown}{AE}$, $m\angle ABD$, $m\angle DFC$, $m\angle P$, $m\angle PAB$.

30 In the accompanying diagram of circle $O$, diameter $\overline{EOC}$ is extended through $C$ to point $P$; diameter $\overline{AFOD}$, tangent $\overline{PD}$, and chords $\overline{AC}$, $\overline{CD}$, $\overline{BFE}$ are drawn; $m\angle COD = 60$; and $m\angle AFB = 100$.



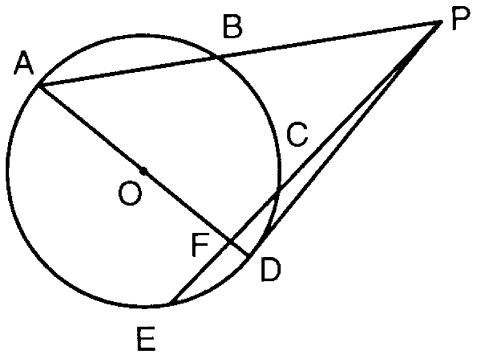

Find: $m\overset{\frown}{DE}$; $m\angle P$; $m\angle ACE$, $m\overset{\frown}{AB}$, $m\angle ACD$.

31 In the accompanying diagram of circle $O$, $m\overset{\frown}{AB} : m\overset{\frown}{BC} = 1:2$; diameter $\overline{CA}$ and chord $\overline{AE}$ are drawn; chord $\overline{EC}$ is parallel to chord $\overline{AB}$; chord $\overline{BC}$ is extended through $C$ to $D$; and tangent $\overline{DE}$ is drawn.



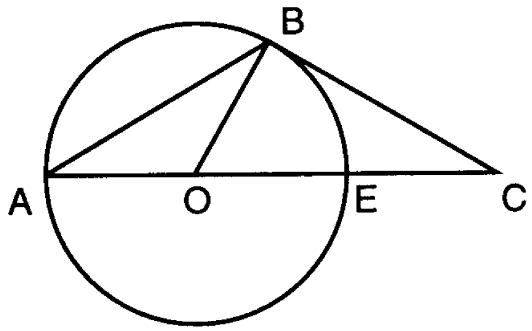

Find: $m\overset{\frown}{BC}$, $m\overset{\frown}{CE}$, $m\angle AEC$, $m\angle CED$, $m\angle BDE$.

32 In the accompanying diagram of circle $O$, $m\overset{\frown}{AC} = 140$, $m\overset{\frown}{AE} = 130$, $m\overset{\frown}{AB} : m\overset{\frown}{BC} = 6:4$, $\overline{PD}$ is a tangent, secant $\overline{PCE}$ intersects diameter $\overline{AD}$ at $F$, and secant $\overline{PBA}$ is drawn.



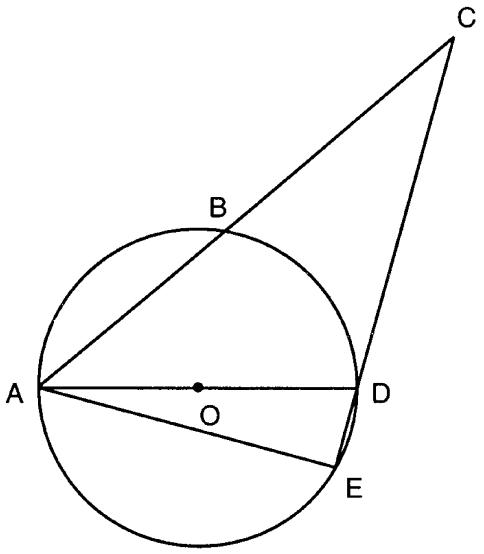

Find $m\overset{\frown}{ED}$, $m\overset{\frown}{AB}$, $m\angle BAD$, $m\angle APE$, $m\angle EFD$

33 In the accompanying diagram of circle $O$, diameter $\overline{AE}$ is extended through $E$ to $C$; tangent $\overline{CB}$, chord $\overline{AB}$, and radius $\overline{OB}$ are drawn; and $m\overset{\frown}{AB} : m\overset{\frown}{BE} = 2:1$.



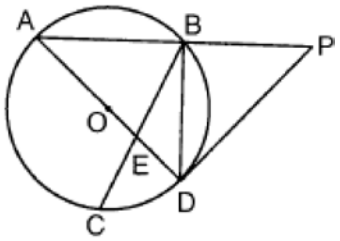

*a* Find: $m\overset{\frown}{AB}$, $m\angle BAC$, $m\angle C$, $m\angle ABC$.
*b* Is $\triangle OBC$ acute, right, obtuse or equiangular? Explain your answer.

34 In the accompanying diagram of circle $O$, diameter $\overline{AD}$, chord $\overline{AE}$, and secants $\overline{CBA}$ and $\overline{CDE}$ are drawn; $m\angle BAD = 40$; and $m\overset{\frown}{AE} = 5(m\overset{\frown}{ED})$.



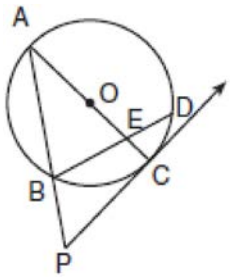

Find: $m\overset{\frown}{BD}$, $m\overset{\frown}{AE}$, $m\angle ACE$, $m\angle AED$, $m\angle ADC$.

35 In the accompanying diagram of circle $O$, $\overline{AOED}$ is a diameter, $\overline{PD}$ is a tangent, $\overline{PBA}$ is a secant, chords $\overline{BD}$ and $\overline{BEC}$ are drawn, $m\angle DAB = 43$, and $m\angle DEC = 72$.



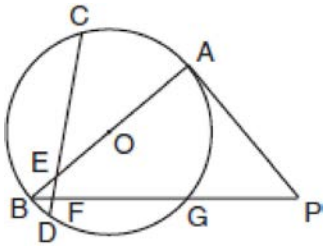

Find: $m\angle BDP$, $m\overset{\frown}{AB}$, $m\overset{\frown}{AC}$, $m\angle P$, $m\angle CBD$

36 In the accompanying diagram of circle $O$, $\overline{AOEC}$ is a diameter, $\overrightarrow{PC}$ is a tangent, $\overline{PBA}$ is a secant, $\overline{BED}$ is a chord, $\overline{AO} = 8$, and $m\overset{\frown}{AB} : m\overset{\frown}{BC} : m\overset{\frown}{CD} : m\overset{\frown}{DA} = 3:2:1:4$.



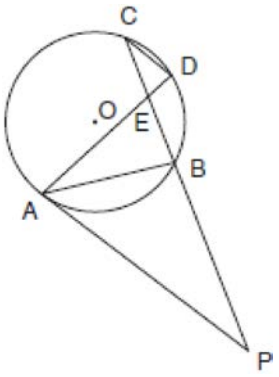

Find: $m\overset{\frown}{BC}$, $m\angle P$, $m\angle BEC$, $AP$ to the *nearest tenth*

37 In the accompanying diagram of circle $O$, tangent $\overline{PA}$, secant $\overline{PGFB}$, diameter $\overline{AOEB}$, and chord $\overline{CEFD}$ are drawn; $m\overset{\frown}{CA} = 70$; $m\overset{\frown}{DG} = 90$; and $m\angle CEA = 40$.



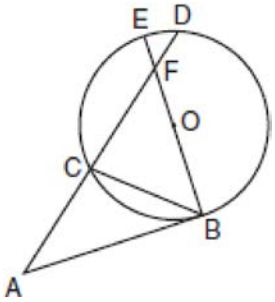

Find: $m\overset{\frown}{CB}$, $m\overset{\frown}{BD}$, $m\angle APB$, $m\angle PAB$, $m\angle ABG$

38 In the accompanying diagram of circle $O$, tangent $\overline{PA}$, secant $\overline{PBEC}$, and chords $\overline{AB}$, $\overline{AD}$, and $\overline{CD}$ are drawn; $m\angle C = 30$, $m\overset{\frown}{AB} = 100$; $m\overset{\frown}{AC} : m\overset{\frown}{CD} = 4:1$.



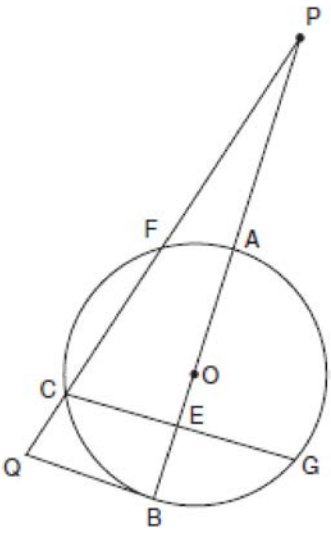

Find: $m\overset{\frown}{CD}$, $m\angle BAP$, $m\angle CDA$, $m\angle AEB$, $m\angle P$

39 In the accompanying diagram of circle $O$, tangent $\overline{AB}$ and chord $\overline{BC}$ are drawn, secant $\overline{ACD}$ intersects diameter $\overline{EB}$ at $F$, $m\overset{\frown}{BD} = 160$, and $m\overset{\frown}{BC} = 80$.



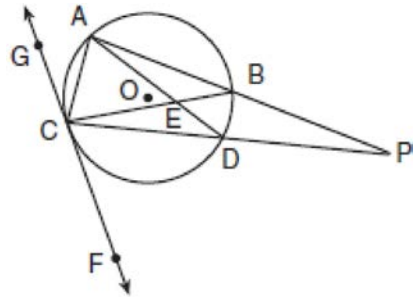

Find: $m\angle A$, $m\angle ABE$, $m\angle ABC$, $m\angle EFC$, $m\angle ACB$

40 In the accompanying diagram of circle $O$, secant $\overline{PFCQ}$, secant $\overline{PAOEB}$, tangent $\overline{QB}$, and chord $\overline{CEG}$ are drawn; $m\overset{\frown}{BC} : m\overset{\frown}{CF} : m\overset{\frown}{FA} = 7:8:3$; and $m\angle AEG = 95$.



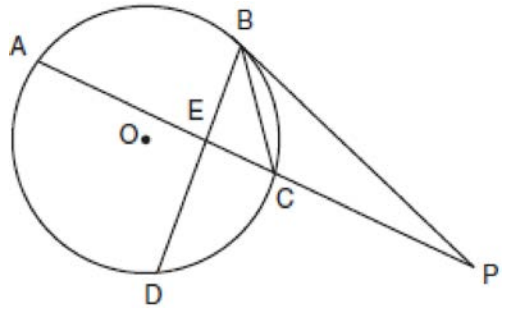

Find: $m\overset{\frown}{CF}$, $m\overset{\frown}{AG}$, $m\angle P$, $m\angle FCG$, $m\angle FQB$

41 In the accompanying diagram of circle $O$, secant $\overline{ABP}$, secant $\overline{CDP}$, and chord $\overline{AC}$ are drawn; chords $\overline{AD}$ and $\overline{BD}$ intersect at $E$, tangent $\overleftrightarrow{GCF}$ intersects circle $O$ at $C$, and $\overset{\frown}{mAB} : \overset{\frown}{mBD} : \overset{\frown}{mDC} : \overset{\frown}{mCA} = 8:2:5:3$.



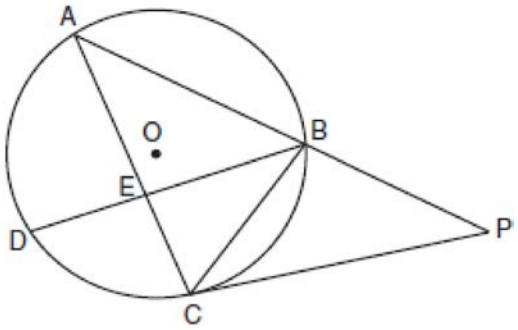

Find: $\overset{\frown}{mCA}$, $m\angle ACB$, $m\angle P$, $m\angle AEB$, $m\angle DCF$

42 In the accompanying diagram of circle $O$, tangent $\overline{PB}$, secant $\overline{AECP}$, chord $\overline{DEB}$, and chord $\overline{CB}$ are drawn; $\overset{\frown}{mDC} = 90$; $m\angle DEC = 85$; $BP = 15$; and $CB = 8$.



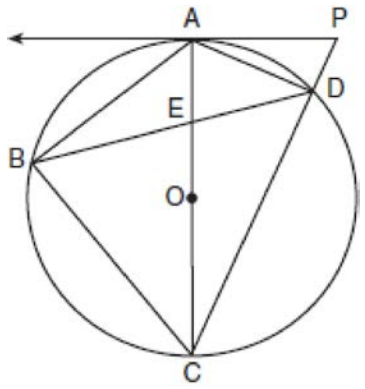

Find: $\overset{\frown}{mAB}$; $m\angle ACB$; $m\angle P$ to the *nearest degree*.

43 In the accompanying diagram of circle $O$, chords $\overline{BD}$, $\overline{BC}$, and $\overline{AC}$, tangent $\overline{PC}$, and secant $\overline{ABP}$ are drawn; $m\angle DBC = 40$, $m\angle AEB = 110$; and $\overset{\frown}{mAD} : \overset{\frown}{mCB} = 9:5$.



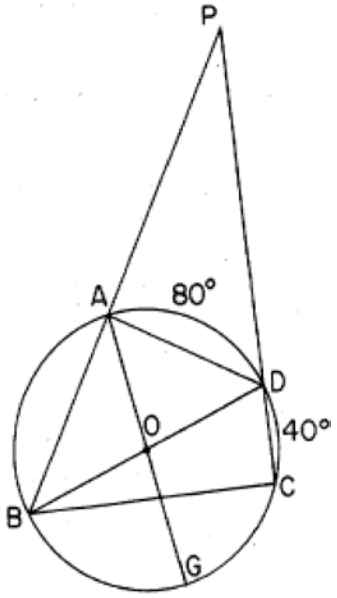

Find: $\overset{\frown}{mAB}$, $\overset{\frown}{mAD}$, $m\angle P$, $m\angle BCP$, $m\angle ACP$

44 In the accompanying diagram of circle $O$, $\overrightarrow{PA}$ is tangent to the circle at $A$; $\overline{PDC}$ is a secant; diameter $\overline{AEOC}$ intersects chord $\overline{BD}$ at $E$; chords $\overline{AB}$, $\overline{BC}$, and $\overline{DA}$ are drawn; $\overset{\frown}{mDA} = 46$; and $\overset{\frown}{mBC}$ is 32 more than $\overset{\frown}{mAB}$.



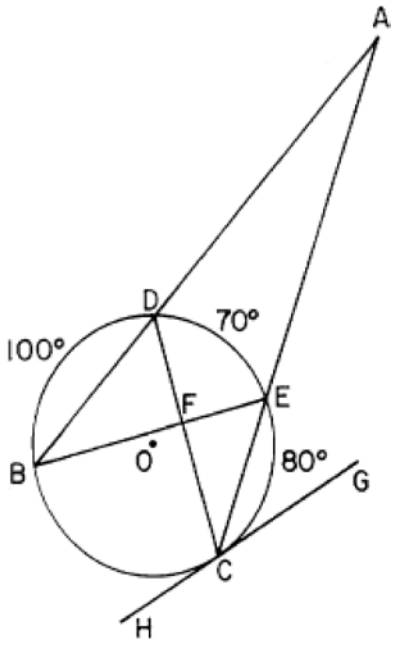

Find: $\overset{\frown}{mAB}$; $m\angle BAC$; $m\angle P$; $m\angle DEC$; $m\angle PDA$

45 Quadrilateral $ABCD$ is inscribed in circle $O$, $\overline{BD}$ and $\overline{AG}$ are diameters, $\overline{PAB}$ and $\overline{PDC}$ are secants, $m\overset{\frown}{AD} = 80$, and $m\overset{\frown}{DC} = 40$.




Find $m\overset{\frown}{AB}$, $m\angle BCD$, $m\angle BOG$, $m\angle P$, and $m\angle BAG$

46 In the accompanying diagram of circle $O$, $\overline{ADB}$ and $\overline{AEC}$ are secants, chords $\overline{BE}$ and $\overline{CD}$ intersect at $F$, tangent $\overline{GH}$ intersects circle $O$ at $C$, $m\overset{\frown}{BD} = 100$, $m\overset{\frown}{DE} = 70$, and $m\overset{\frown}{EC} = 80$.




Find: $m\angle BAC$, $m\angle BDC$, $m\angle CFE$, $m\angle GCE$, $m\angle AEB$

## G.C.A.2: Chords, Secants and Tangents 19
## Answer Section

1 ANS:
80, 40, 60, 80, 80

REF: 068138siii

2 ANS:
40, 60, 70, 50, 60

REF: 010436siii

3 ANS:
40, 80, 110, 60, 50

REF: 018437siii

4 ANS:
100, 40, 90, 35, 55

REF: 068438siii

5 ANS:
$\frac{1}{2}(x+y)$; $\frac{5x}{2}$, $2y$, $2x$, 27

REF: 088439siii

6 ANS:
140, 90, 40, 30, 90

REF: 080036siii

7 ANS:
160, 80, 50, 50, 100

REF: 068640siii

8 ANS:
60, 60, 105, 45, 60

REF: 068542siii

9 ANS:
120, 35, 95, 30, 55

REF: 019537siii

10 ANS:
90, 45, 40, 95, 30

REF: 018539siii

11 ANS:
20, 80, 60, 100, 30

REF: 088641siii

12 ANS:
45, 90, 22º30’, 22º30’, 90

REF: 018736siii

13 ANS:
72, 32, 45, 99, 61

REF: 068741siii

14 ANS:
50, 25, 130, 25, 155

REF: 088742siii

15 ANS:
36, 18, 42, 126, 108

REF: 088940siii

16 ANS:
20, 30, 40, 40, 100

REF: 018937siii

17 ANS:
55, 30, 50, 80, 75

REF: 068939siii

18 ANS:
50, 30, 25, 130, 75

REF: 069037siii

19 ANS:
146, 78, 56, 46, 151

REF: 089039siii

20 ANS:
72, 48, 24, 84, 24

REF: 069437siii

21 ANS:
130, 65, 50, 115, no, because $\angle B$ is not congruent to $\angle D$

REF: 089439siii

22 ANS:
150, 60, 45, 90, 105

REF: 069537siii

23 ANS:
60, 50, 20, 100, 40

REF: 089537siii

24 ANS:
80, 55, 40, 85, 35

REF: 019639siii

25 ANS:
75, 30, 135, 45, 30

REF: 069636siii

26 ANS:
160, 80, 50, 50, 100

REF: 089636siii

27 ANS:
80, 20, 140, 30, 110

REF: 069737siii

28 ANS:
72, 72, 36

REF: 089738siii

29 ANS:
60, 80, 100, 50, 30

REF: 019839siii

30 ANS:
120, 30, 30, 80, 90

REF: 069837siii

31 ANS:
120, 60, 90, 30, 60

REF: 089842siii

32 ANS:
50, 84, 48, 37, 95

REF: 019937siii

33 ANS:
120, 30, 30, 120, right because m$\angle OBC = 90$

REF: 069939siii

34 ANS:
80, 150, 35, 90, 105

REF: 089937siii

35 ANS:
43, 94, 130, 47, 25

REF: 010036siii

36 ANS:
72, 54, 108, 19.8

REF: 010136siii

37 ANS:
110, 10, 50, 90, 40

REF: 060136siii

38 ANS:
40, 50, 80, 70, 30

REF: 080140siii

39 ANS:
40, 90, 40, 130, 100

REF: 010239siii

40 ANS:
80, 120, 20, 75, 70

REF: 060240siii

41 ANS:
60, 80, 10, 130, 50

REF: 080242siii

42 ANS:
80, 40, 20

REF: 010336siii

43 ANS:
140, 90, 60, 25, 95

REF: 060336siii

44 ANS:
74, 53, 67, 104, 90

REF: 080338siii

45 ANS:
100, 90, 80, 30, 40

REF: 088538siii

46 ANS:
20, 55, 90, 40, 125

REF: 068840siii