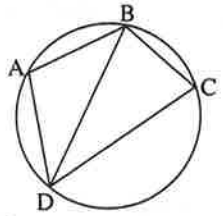
PROPERTIES OF CIRCLES: GUIDED PROOFS

Complete the following guided proofs.

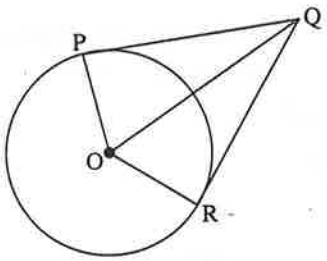
F1.



Given: AB = BC
Prove: BD bisects ∠ADC

statement	reason
	given
∠ADB = _____	

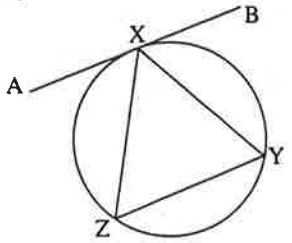
F2.



Given: PQ and RQ are tangents
Prove: ∠POQ = ∠ROQ

statement	reason
PQ = _____	
	SSS

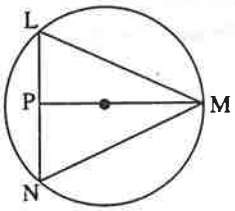
F3.



Given: AB is a tangent, AB || ZY
Prove: XZ = XY

statement	reason
AB is a tangent	
∠AXZ = ∠XYZ	given
∠AXZ = ∠XZY	
	both equal ∠AXZ

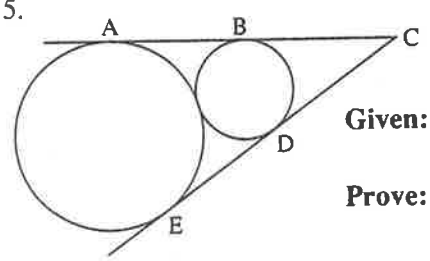
F4.



Given: LN ⊥ PM
Prove: Δ LMN is isosceles

statement	reason
LP = PN	
∠LPM = ∠NPM = 90°	
	SAS
	CPCTC

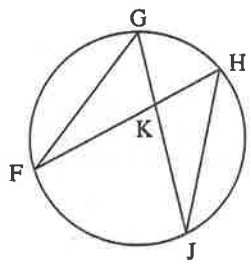
F 5.



Given: CA and CE are tangents
Prove: AB = ED

statement	reason
CA = _____	
CB = _____	
CA – CB = ___ – ___	

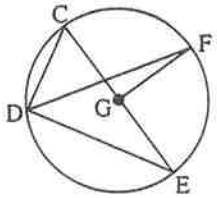
F 6.



Given: FG = HJ
Prove: Δ FGK ≅ Δ JHK

statement	reason
∠FGJ = _____	
	given

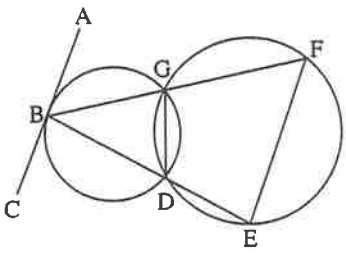
F 7.



Given: FD bisects ∠CDE
Prove: ∠FGE = 90°

statement	reason
∠CDE = _____ °	
	given
∠FDE = _____ °	

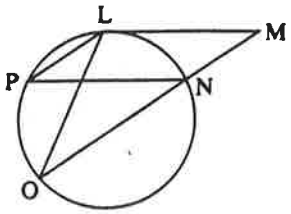
F 8.



Given: AC is a tangent
Prove: AC || FE

statement	reason
AC is a tangent	
_____ = ∠BDG	∠ between chord and tangent = inscribed ∠
∠BDG + ∠GDE = _____ °	
∠GFE + ∠GDE = _____ °	
∠GFE = ∠BDG	
	both equal ∠BDG

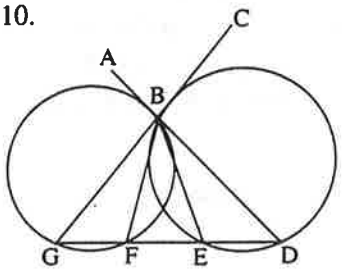
F 9.



Given: LMNP is a parallelogram
Prove: Δ LMO is isosceles

statement	reason
	given
∠LMN = ∠LPN	
_____ = ∠LPN	inscribed ∠s on same arc

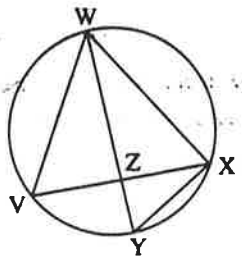
F 10.



Given: AD and CG are tangents
Prove: BF = BE

statement	reason
	given
∠ABG = _____	∠ between chord and tangent = inscribed ∠
_____ = ∠BED	
∠ABG = ∠CBD	
	both = to = ∠s
∠BFE = ∠BEF	

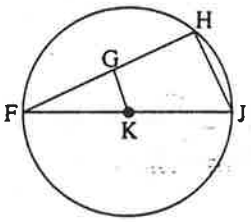
F 11.



Given: YW bisects ∠VWX
Prove: ∠WZV = ∠WXY

statement	reason
∠WVZ = _____	

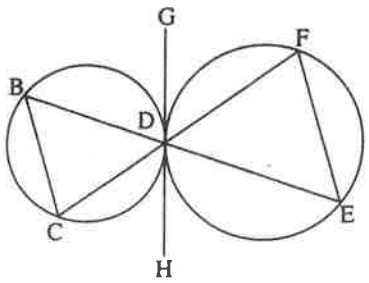
F 12.



Given: G is the mid-point of FH
Prove: GK || HJ

statement	reason
∠KGF = _____ °	
_____	inscribed ∠ in semicircle
	both equal _____ °

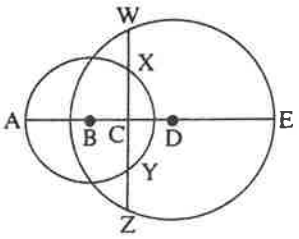
F 13.



Given: GH is tangent to both circles
Prove: BC || FE

statement	reason
GH is a tangent	given
∠CBD = _____	
∠FED = _____	
	vertically opposite ∠s

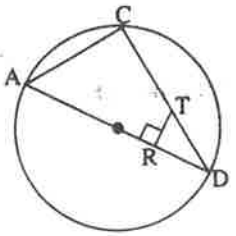
F 14.



Given: WZ ⊥ AE
Prove: WX = YZ

statement	reason
WZ ⊥ AE	given
WC = _____	
XC = _____	
WC – ___ = CZ – ___	

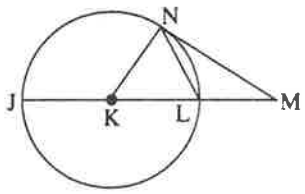
F 15.



Given: TR ⊥ AD
Prove: CART is a cyclic quadrilateral

statement	reason
___ = 90°	
∠ACD = ___ °	
∠ACD + ∠ ___ = ___ °	

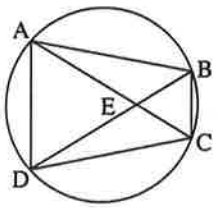
F 16.



Given: Δ KLN is equilateral, KL = LM
Prove: MN is a tangent

statement	reason
ΔKLN is equilateral	
∠KLN = ___ °	
∠NLM = ___ °	
	given
KL = NL	
	both = KL
∠LNM = ___ °	
∠KNL = ___ °	
∠KNM = ___ °	

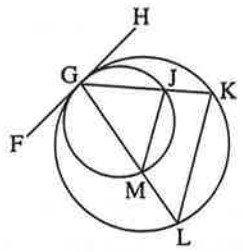
F 17.



Given: EB = EC
Prove: AB = DC

statement	**reason**
∠EBC = _____	

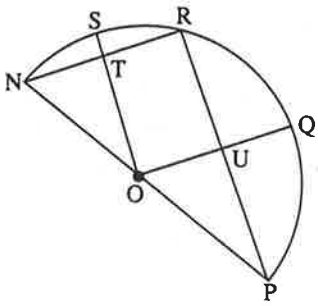
F 18.



Given: FG is a tangent
Prove: MJ || LK

statement	**reason**
FG is a tangent	
∠FGM = _____	
∠FGL = _____	

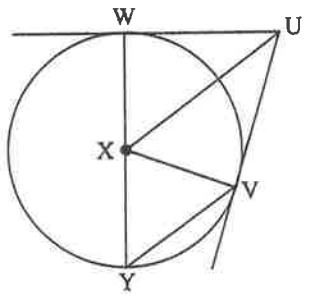
F 19.



Given: OS bisects RN, OQ bisects RP
Prove: SO ⊥ QO

statement	**reason**
OS bisects RN	given
∠ _____ = 90°	
	given
_____ = 90°	
∠TOU = _____ °	

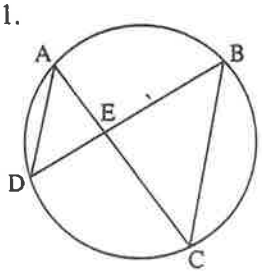
F 20.



Given: UV and UW are tangents
Prove: UX || VY

statement	reason
	given
$\Delta XWU \cong \Delta XVU$	
$\angle WXU =$ ____	CPCTC
$\angle VYW = \frac{1}{2}\ \angle VXW$	
$\angle WXU = \frac{1}{2}\ \angle VXW$	
$\angle VYW = \angle WXU$	

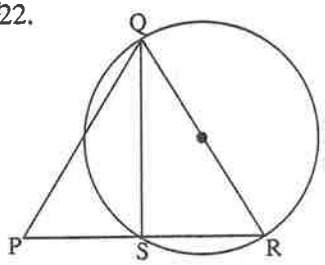
F 21.



Given: $\angle DAE = \angle ADE$
Prove: AC = DB

statement	reason
	given
$\angle DAE = \angle EBC$	
$\angle ADE =$ ____	
$\angle EBC =$ ____	
$AE =$ ____	
$BE =$ ____	

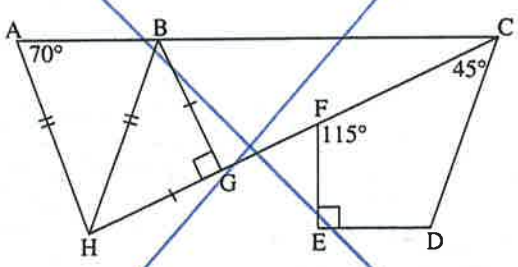
F 22.



Given: QP = QR
Prove: S is the mid-point of PR

statement	reason
$\angle QPS =$ ____	
$\angle QSR =$ ____ °	
$\angle QSP =$ ____ °	
$\angle QSR = \angle QSP$	

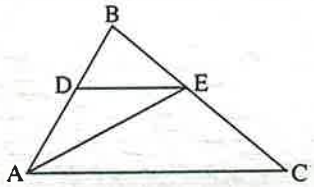
5. Find the measure of each angle in the diagram. Then identify any pairs of parallel segments. Give a reason for each answer.



Complete the following.

F23.

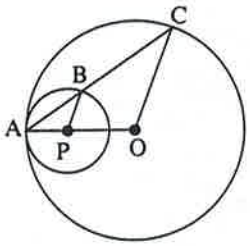
6.



Given: DA = DE,
DE || AC
Prove: AE bisects
∠BAC

statement	**reason**
DA = DE	
∠DAE = _____	
	given
∠CAE = _____	
∠DAE = ∠CAE	

F24.

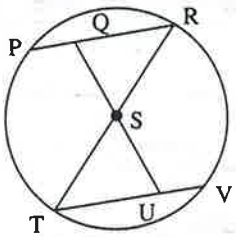


Prove: BP || CO

statement	**reason**
PA = ___	
∠PAB = _____	
	radii
	∠s opposite equal sides
∠PBA = ∠OCA	

F25.

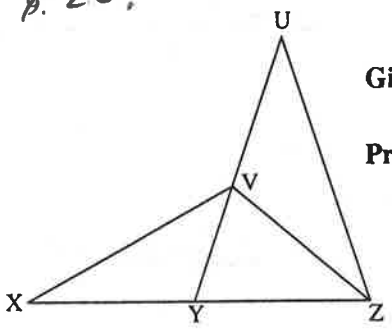
8.



Given: PR || TV
Prove: Δ QSR ≅ UST

statement	**reason**
	given
	alternate interior ∠s
RS = TS	
	ASA

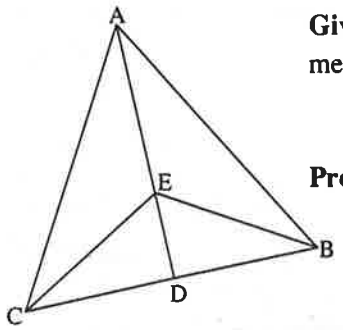
F
6. 26.



Given: XY = YZ = VZ,
UV = VY
Prove: XV = UZ

statement	reason
XY = YZ = VZ	
∠ZVY = _____	
∠ZVU = ∠XYV	
	given
Δ ZVU ≅ Δ XYV	

F
16. 27.

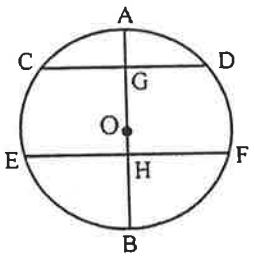


Given: AD is a median,
∠EAC = ∠ACE
AE = EB
Prove: AD ⊥ BC

statement	reason
AD is a median	
CD = DB	definition of median
∠EAC = _____	
	sides opposite equal ∠s
	given
EC = EB	
	same side
∠CDE = _____	CPCTC
∠CDE + ∠BDE = ____°	
∠CDE = ____°	2 equal ∠s adding to 180°

Central, inscribed angle questions

10. G1

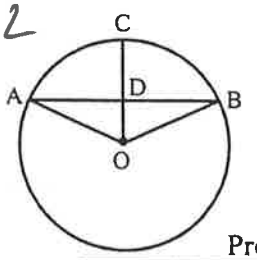


Given: AB is a diameter of circle O that bisects chord CD and EF

Prove: CD || EF

Proof

10. G2

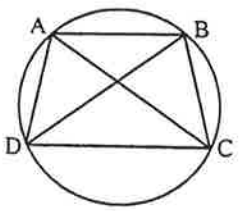


Given: AB ⊥ OC

Prove: $\overset{\frown}{AC} = \overset{\frown}{BC}$

Proof

10. G3

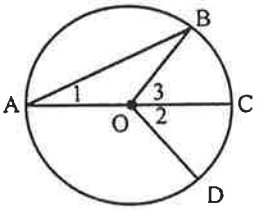


Given: AD = BC

Prove: □ABCD is an isosceles trapezoid

Proof

10. G4

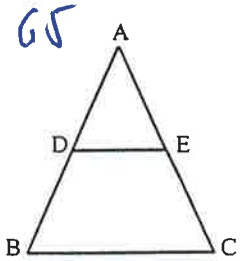


Given: $\angle 1 = \frac{1}{2}\angle 2$

Prove: $\overset{\frown}{BC} = \overset{\frown}{CD}$

Proof

9. G5

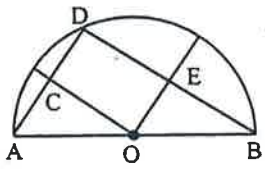


Given: AB = AC
: DE ∥ BC

Prove: □BCED is cyclic

Proof

2. G6

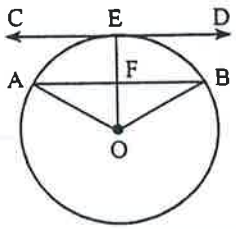


Given: AC = CD
: DE = EB

Prove: EO ⊥ CO

Proof

7. G7

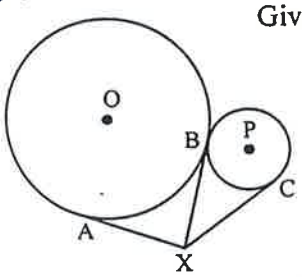


Given: tangent CD to circle O at E
: CD ∥ AB

Prove: $\overset{\frown}{AE} = \overset{\frown}{BE}$

Proof

10. G8



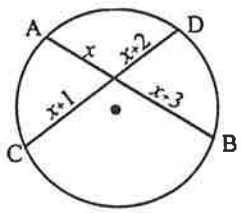
Given: XA and XB are tangent to circle O
: XB and XC are tangent to circle P

Prove: AX = CX

Proof

10. G9

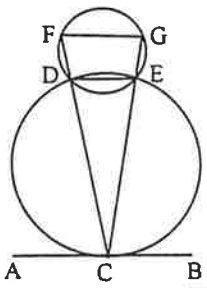
Given: intersecting chords AB = CD



Prove: there is no integer such that
$x \cdot (x + 3) = (x + 1) \cdot (x + 2)$

Proof

10. G10



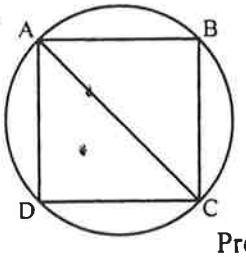
Given: tangent AB
: FG || DE

Prove: ∠GFC = ∠GCB

Proof

Proofs

H1.

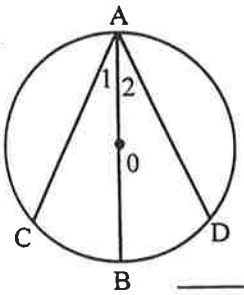


Given: □ABCD is a square

Prove: AC is a diameter

Proof

H2.

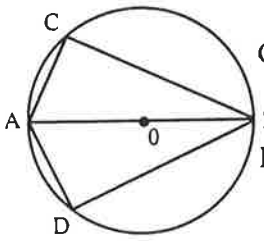


Given: circle O with diameter AB
: $\angle 1 = \angle 2$

Prove: AC = AD

Proof

H3.

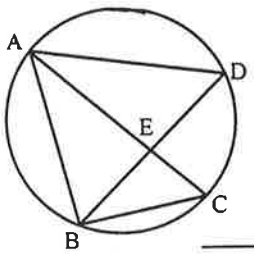


Given: diameter AB
: $\overset{\frown}{AC} = \overset{\frown}{AD}$

Prove: $\Delta ACB \cong \Delta ADB$

Proof

H4.

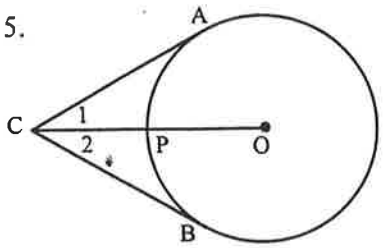


Given: $\overset{\frown}{BC} = \overset{\frown}{CD}$

Prove: $\Delta ADE \sim \Delta ABC$

Proof

H 5.

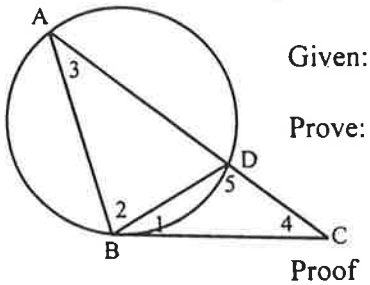


Given: tangent AC and BC

Prove: $\angle 1 = \angle 2$

Proof

H6.

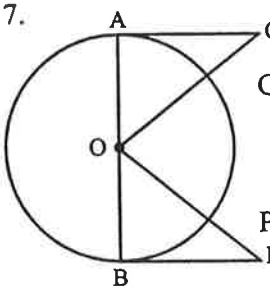


Given: BC is tangent

Prove: $\angle 5 = \angle 1 + \angle 2$

Proof

H 7.

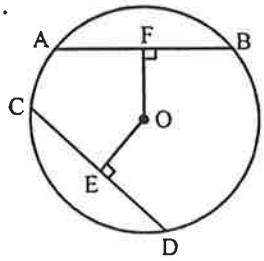


Given: AB is a diameter
: AC , BD are tangents
: AC = BD

Prove : OC = OD

Proof

H8.

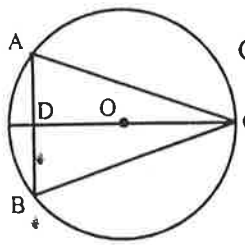


Given: OF = OE ,
: AB ⊥ FO,
CD ⊥ EO

Prove : AB = CD

Proof

H9.

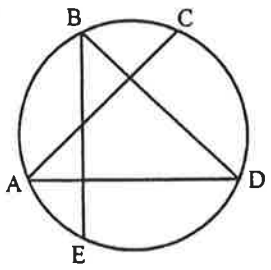


Given: CD bisects AB

Prove: ΔABC is iososceles

Proof

H10.

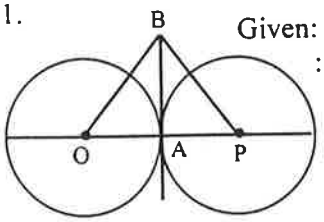


Given: $AC \perp BD$
$BE \perp AD$

Prove: $\overset{\frown}{CD} = \overset{\frown}{DE}$

Proof

H 11.

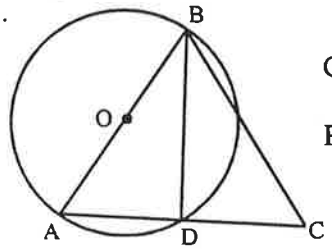


Given: circle O = circle P
: AB is tangent to both circles

Prove: OB = PB

Proof

H12.

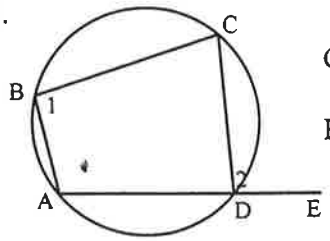


Given: AB = CB

Prove: AD = CD

Proof

H13.

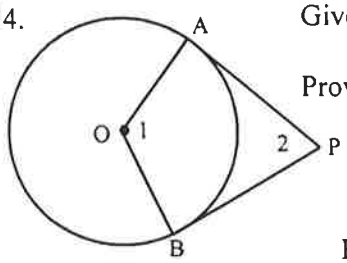


Given: $\overline{ADE}$

Prove: $\angle 1 = \angle 2$

Proof

H14.

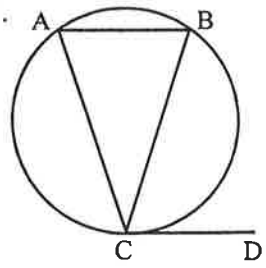


Given: tangent AP and BP

Prove: $\angle 1 + \angle 2 = 180°$

Proof

H15.



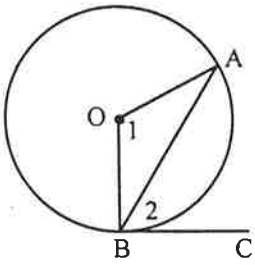
Given: tangent CD

: AC = BC

Prove: AB || CD

Proof

H16.

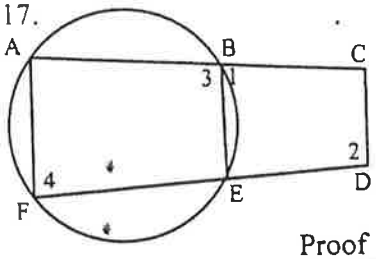


Given: tangent to BC

Prove: $\angle 2 = \frac{1}{2}\angle 1$

Proof

H 17.

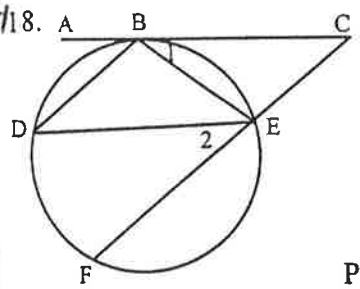


Given: AF || CD

Prove: ∠1 and ∠2 are supplementary

Proof

H 18.

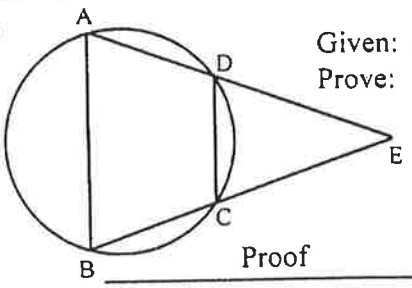


Given: AC tangent at B
: ∠1 = ∠2

Prove: BD || FC

Proof

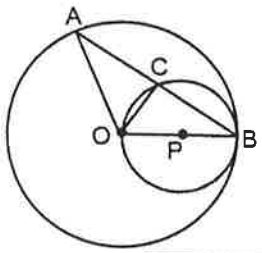
H 19.



Given: AB || CD
Prove: ΔABE is isosceles

Proof

H 20.



Given: circle O and P tangent at B

Prove: AC = CB

Proof

