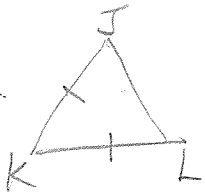


Directions: Show all work for full credit. Circle final answers.

1. In  $\triangle JKL$ ,  $\overline{JK} \cong \overline{KL}$ ,  $m\angle J = 2x - y$ ,  $m\angle K = 2x + 2y$  and  $m\angle L = x + 2y$ . Find the value of each interior angles of the triangle.

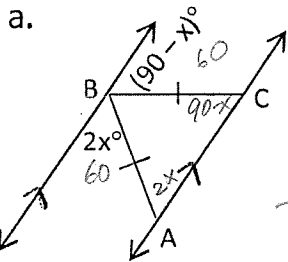


$$\begin{aligned}
 2x - y &= x + 2y \\
 2x - y + x + 2y + 2x + 2y &= 180 \\
 5x + 3y &= 180 \\
 x - 3y &= 0 \\
 \hline
 6x &= 180 \rightarrow x = 30
 \end{aligned}$$

$$\begin{aligned}
 2(30) - y &= 30 + 2y \\
 30 &= 3y \\
 10 &= y
 \end{aligned}$$

$$\begin{aligned}
 m\angle J &= 50 \\
 m\angle L &= 50 \\
 m\angle K &= 80
 \end{aligned}$$

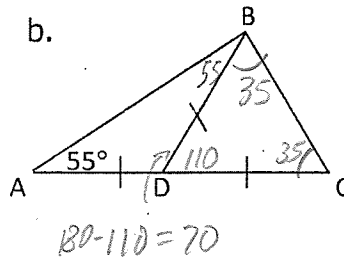
2. Find the  $m\angle ABC$ .



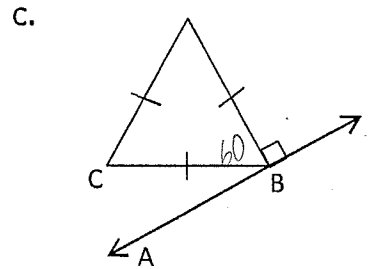
$$\begin{aligned}
 2x &= 90 - x \\
 3x &= 90 \\
 x &= 30
 \end{aligned}$$

$$\begin{array}{r}
 180 \\
 -120 \\
 \hline
 60
 \end{array}$$

$m\angle ABC = 60$

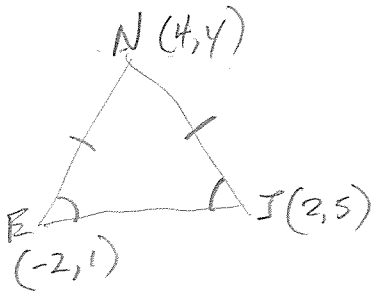


$$\begin{aligned}
 180 - 110 &= 70 \\
 m\angle ABC &= 55 + 35 \\
 &= 90^\circ
 \end{aligned}$$



$m\angle ABC = 30$

3.  $\triangle JEN$  is isosceles with vertex  $\angle N$ . If  $J(2,5)$ ,  $E(-2,1)$  and  $N(4,y)$ , find  $y$ .

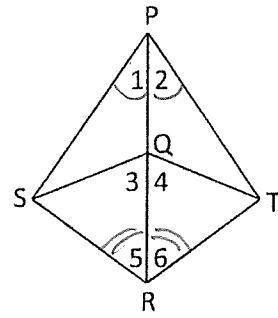


$$\begin{aligned}
 d_{\overline{EN}} &= d_{\overline{JN}} \\
 \sqrt{(4+2)^2 + (y-1)^2} &= \sqrt{(4-2)^2 + (y-5)^2} \\
 6^2 + y^2 - 2y + 1 &= 2^2 + y^2 - 10y + 25 \\
 8y &= 29 - 37 \\
 8y &= -8 \\
 y &= -1
 \end{aligned}$$

4. Write a flow proof for each of the following.

a. Given:  $\overline{PR}$  bisects  $\angle SPT$  and  $\angle SRT$

Plan  
 ①  $\triangle SPR \cong \triangle TPR$



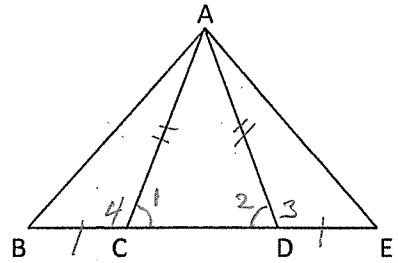
Prove:  $\overline{PR}$  bisects  $\angle SQT$

- ①  $\overline{PR}$  bisects  $\angle SPT \rightarrow$  ②  $\angle 1 \cong \angle 2$   
 ③  $\overline{PR}$  bisects  $\angle SRT \rightarrow$  ④  $\angle 5 \cong \angle 6$   
 ⑤  $\overline{PR} \cong \overline{PR}$  }  $\rightarrow$  ⑥  $\triangle SPR \cong \triangle TPR$   
 ⑦  $\overline{SR} \cong \overline{TR}$   
 ④  $\angle 5 \cong \angle 6$   
 ⑧  $\overline{QR} \cong \overline{QR}$  }  $\rightarrow$  ⑨  $\triangle SQR \cong \triangle TQR$   
 ⑩  $\angle 3 \cong \angle 4 \rightarrow$  ⑪  $\overline{PR}$  bisects  $\angle SQT$

- ① Given  
 ② Def of bisector  
 ③ Given  
 ④ Def of bisector  
 ⑤ Reflexive Prop  
 ⑥ ASA  $\cong$  ASA  
 ⑦ CPCTC  
 ⑧ Reflexive Prop  
 ⑨ SAS  $\cong$  SAS  
 ⑩ CPCTC  
 ⑪ Def of bisector

b. Given:  $\triangle ADC$  isosceles with vertex  $\angle A$   
 $\overline{BC} \cong \overline{ED}$

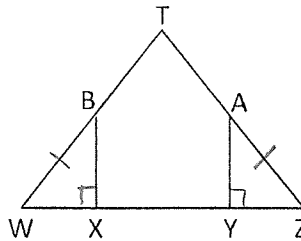
Prove:  $\triangle ABE$  isosceles



- ①  $\triangle ADC$  isosceles  $\rightarrow$  ②  $\overline{AC} \cong \overline{AD} \rightarrow$  ③  $\angle 1 \cong \angle 2$   
 ④  $\angle 1$  &  $\angle 4$  linear pair  $\rightarrow$  ⑤  $\angle 1$  supp  $\angle 4$   
 $\angle 2$  &  $\angle 3$  linear pair  $\rightarrow$   $\angle 2$  supp  $\angle 3$  }  $\rightarrow$  ⑥  $\angle 4 \cong \angle 3$   
 ②  $\overline{AC} \cong \overline{AD}$   
 ⑦  $\overline{BC} \cong \overline{ED}$  }  $\rightarrow$  ⑧  $\triangle ABC \cong \triangle AED$   
 ⑨  $\overline{AB} \cong \overline{AE} \rightarrow$  ⑩  $\triangle ABE$  isosceles.

- ① Given  
 ② In isos.  $\triangle$ , opp sides  $\cong$   
 ③ If 2 sides  $\cong$ , opp  $\angle$ s  $\cong$   
 ④ Def linear pair  
 ⑤ Linear pair postulate  
 ⑥  $\cong$  supplements Thm  
 ⑦ Given  
 ⑧ SAS  $\cong$  SAS  
 ⑨ CPCTC  
 ⑩ Def of isosceles  $\triangle$

c. Given:  $\overline{BX} \perp \overline{WZ}$ ;  $\overline{AY} \perp \overline{WZ}$   
 $\overline{WY} \cong \overline{XZ}$ ;  $\overline{BW} \cong \overline{AZ}$



Prove:  $\triangle TWZ$  isosceles

Plan: Show  $\triangle BWX \cong \triangle AYZ$  (hyleg)

①  $\overline{BX} \perp \overline{WZ} \rightarrow$  ②  $\sphericalangle BXW$  is Rt.  $\sphericalangle \rightarrow$  ③  $\triangle BWX$  is Rt.  
 ④  $\overline{AY} \perp \overline{WZ} \rightarrow$  ⑤  $\sphericalangle AYZ$  is Rt.  $\sphericalangle \rightarrow$  ⑥  $\triangle AYZ$  is Rt. }  $\rightarrow$  ⑩  $\triangle BWX \cong \triangle AYZ$   
 ⑦  $\overline{WY} \cong \overline{XZ} \rightarrow$  ⑧  $\overline{WX} \cong \overline{YZ}$   
 ⑨  $\overline{BW} \cong \overline{AZ}$

⑪  $\sphericalangle W \cong \sphericalangle Z \rightarrow$  ⑫  $\overline{TW} \cong \overline{TZ} \rightarrow$  ⑬  $\triangle TWZ$  isosceles.

① Given

②  $\perp$  lines form Rt  $\sphericalangle$ s

③ Def of Rt.  $\triangle$

④ Given

⑤  $\perp$  lines form Rt  $\sphericalangle$ s

⑥ Def of Rt.  $\triangle$

⑦ Given

⑧ Common Segment Thm

⑨ Given

⑩ hyleg  $\cong$  hyleg

⑪ CPCTC

⑫ If 2  $\sphericalangle$ s  $\cong$ , sides opp  $\cong$

⑬ Def isosceles  $\triangle$ .

