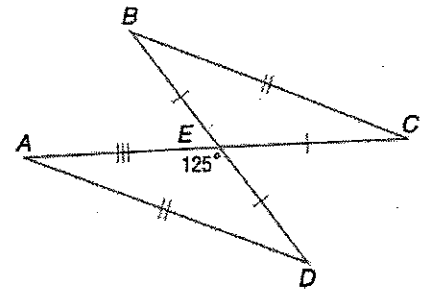


Use the picture to the right to name each.

1. Classify $\triangle BEC$ by it's sides Isosceles
2. Classify $\triangle AED$ by it's angles Scalene
3. Name a side opposite $\angle C$ \overline{BE}



Find the measures of $\angle 1$, $\angle 2$, and $\angle 3$ in each diagram below.

4.

$\angle 1 = 76^\circ$
 $\angle 2 = 76^\circ$
 $\angle 3 = 49^\circ$

5.

$\angle 1 = 123^\circ$
 $\angle 2 = 28^\circ$
 $\angle 3 = 14^\circ$

123
 - 95

 28

$123 - 109 = 14$

Find the value of a .

6.

$90 = 2a + \frac{a}{2}$
 $180 = 4a + a$
 $a = 36$

Use the information below about the angles of a triangle to find the measure of each angle.

7.

ALGEBRA The measure of the second angle of a triangle is three times the measure of the first, and the measure of the third angle is 25 more than the measure of the first. Find the measure of each angle.

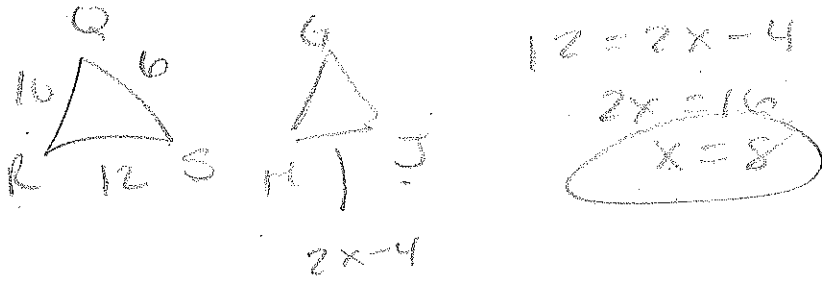
$\angle 1 = x = 31^\circ$
 $\angle 2 = 3x = 93^\circ$
 $\angle 3 = 20 + x = 56^\circ$

$x + 3x + x + 25 = 180$
 $5x + 25 = 180$
 $5x = 155$
 $x = 31$

Given the information below. Find the value of x .

8.

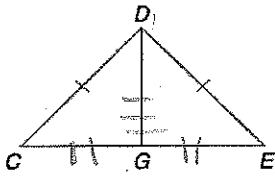
$\triangle QRS \cong \triangle GHJ$, $RS = 12$, $QR = 10$, $QS = 6$, and $HJ = 2x - 4$.



Given the information below, fill in the congruency statement and the postulate that justifies it. If no such postulate exists, write NA for both.

9.

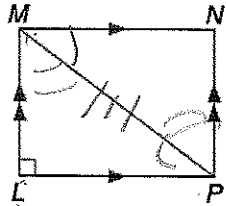
$\triangle CDE$ is isosceles.
 G is the midpoint of \overline{CE} .



$\triangle DGC \cong \triangle DGE$

Postulate: SSS

10.

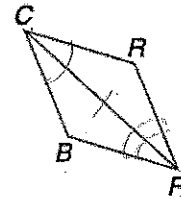


$\triangle MLP \cong \triangle PNM$

Postulate: ASA

11.

\overline{CP} bisects $\angle BCR$ and $\angle BPR$

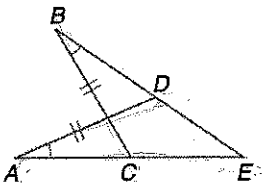


$\triangle PBC \cong \triangle PRC$

Postulate: ASA

12.

$\angle EAD \cong \angle EBC$
 $\overline{AD} \cong \overline{BC}$

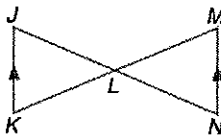


$\triangle DAE \cong \triangle CBE$

Postulate: AAS

13.

$\overline{JK} \parallel \overline{MN}$

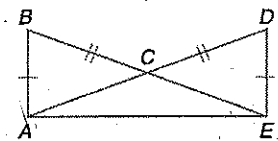


$\triangle JKL \cong$ NA

Postulate: _____

14.

$\overline{BA} \cong \overline{DE}$, $\overline{DA} \cong \overline{BE}$



$\triangle ABE \cong \triangle EDA$

Postulate: SSS

Find the value of x and y.

$$\overline{AB} \cong \overline{BC}, \overline{DE} \cong \overline{EF}$$

$$AB = x^2$$

$$BC = 6x + 16$$

$$DE = x + 2$$

$$EF = 3y$$

$$x^2 = 6x + 16$$

$$x^2 - 6x - 16 = 0$$

$$(x - 8)(x + 2) = 0$$

$$x = 8, -2$$

$$x + 2 = 3y$$

$$8 + 2 = 3y$$

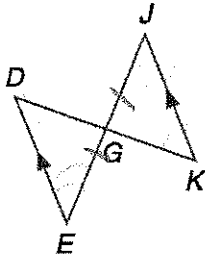
$$3y = 10 \quad y = \frac{10}{3}$$

$$x = 8$$

$$y = \frac{10}{3}$$

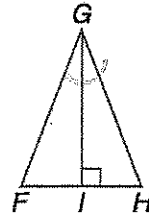
Do the following practice proofs on a separate sheet of paper.

15. Given: $\overline{DE} \parallel \overline{JK}$, \overline{DK} bisects \overline{JE} .
 Prove: $\triangle EGD \cong \triangle JGK$

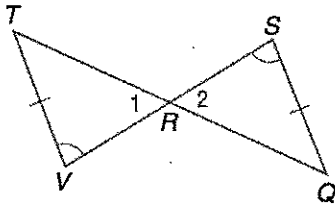


16. Given: $\angle FGI \cong \angle IGH$
 $\overline{GI} \perp \overline{FH}$

Prove: $\angle F \cong \angle H$

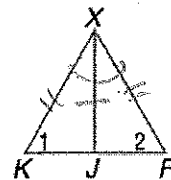


17. Given: $\angle V \cong \angle S$, $\overline{TV} \cong \overline{QS}$
 Prove: $\overline{VR} \cong \overline{SR}$



18. Given: $\triangle XKF$ is equilateral.
 \overline{XJ} bisects $\angle X$.

Prove: J is the midpoint of \overline{KF} .



15. $\overline{DE} \parallel \overline{JK}$ 1. given
 2. $\angle D \cong \angle K, \angle E \cong \angle J$ 2. alt int \angle s w/ \parallel lines are \cong
 3. \overline{DK} bisects \overline{JE} 3. given
 4. $\overline{GE} \cong \overline{GJ}$ 4. def bisector
 5. $\triangle EGD \cong \triangle JGK$ 5. AAS (2, 2, 4)

16. 1. $\angle FGH \cong \angle GHI$ 1. given
 2. $\overline{GI} \perp \overline{FH}$ 2. Given
 3. $\angle GIF, \angle GIH$ are $\perp \angle$ s 3. def \perp
 4. $\angle GIF \cong \angle GIH$ 4. all $\perp \angle$ s \cong
 5. $\overline{GI} \cong \overline{GI}$ 5. reflexive \cong
 6. $\triangle GIF \cong \triangle GIH$ 6. ASA (1, 5, 4)
 7. $\angle F \cong \angle H$ 7. CPCTC

17. 1. $\overline{KV} \cong \overline{KS}, \overline{TV} \cong \overline{QS}$ 1. given
 2. $\angle 1 \cong \angle 2$ 2. \angle AOC
 3. $\triangle TVR \cong \triangle SQR$ 3. AAS (1, 2, 1)
 4. $\overline{VR} \cong \overline{SR}$ 4. CPCTC

18. 1. $\triangle XKF$ is equilateral, \overline{XJ} bisects $\angle X$ 1. given
 2. $\angle KXJ \cong \angle FXJ$ 2. def \angle bisector
 3. $\overline{XJ} \cong \overline{XJ}$ 3. reflexive \cong
 4. $\overline{XK} \cong \overline{XF}$ 4. def equilateral \triangle
 5. $\triangle KXJ \cong \triangle FXJ$ 5. SAS
 6. $\overline{KJ} \cong \overline{FJ}$ 6. CPCTC
 7. J is the mdpt of \overline{KF} 7. def mdpt

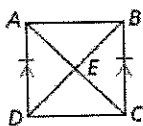
Triangle Proofs Worksheet

For each problem below, write a two-column proof on a separate piece of paper.

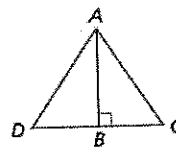
I. Proving Triangles Congruent:

1. Use AAS to prove the triangles congruent.

Given: $\overline{AD} \parallel \overline{BC}$, $\overline{AD} \cong \overline{CB}$
 Prove: $\triangle AED \cong \triangle CEB$



5. Given: B is the midpoint of \overline{DC} . $\overline{AB} \perp \overline{DC}$
 Prove: $\triangle ABD \cong \triangle ABC$



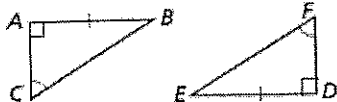
2. Given: $\overline{KM} \perp \overline{JL}$, $\overline{JM} \cong \overline{LM}$, $\angle JMK \cong \angle LMK$

Prove: $\triangle JKM \cong \triangle LKM$



3. Given: $\overline{AB} \cong \overline{DE}$, $\angle C \cong \angle F$

Prove: $\triangle ABC \cong \triangle DEF$

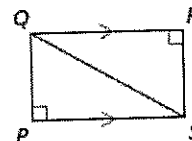


6. Use AAS to prove the triangles congruent.

Given: $\angle R$ and $\angle P$ are right angles.

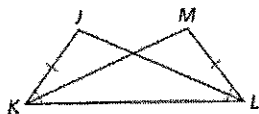
$\overline{QR} \parallel \overline{SP}$

Prove: $\triangle QPS \cong \triangle SRQ$



4. Given: $\overline{JK} \cong \overline{ML}$, $\angle JKL \cong \angle MLK$

Prove: $\triangle JKL \cong \triangle MLK$

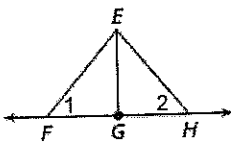


II. Using CPCTC

7. Given: G is the midpoint of \overline{FH} .

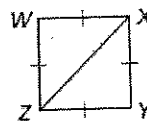
$\overline{EG} \cong \overline{GH}$

Prove: $\angle 1 \cong \angle 2$



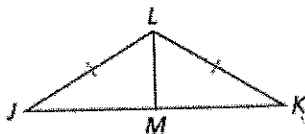
10. Given: $\overline{WX} \cong \overline{XY} \cong \overline{YZ} \cong \overline{ZW}$

Prove: $\angle W \cong \angle Y$



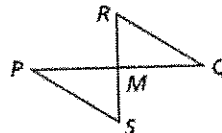
8. Given: \overline{LM} bisects $\angle JLK$. $\overline{JL} \cong \overline{KL}$

Prove: M is the midpoint of \overline{JK} .



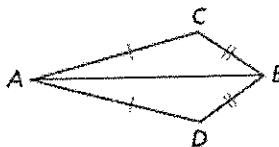
11. Given: M is the midpoint of \overline{PQ} and \overline{RS} .

Prove: $\overline{QR} \cong \overline{PS}$



9. Given: $\overline{AC} \cong \overline{AD}$, $\overline{CB} \cong \overline{DB}$

Prove: \overline{AB} bisects $\angle CAD$.





①

S 1. $\overline{AD} \parallel \overline{BC}, \overline{AD} \cong \overline{CB}$

A 2. $\angle DAE \cong \angle BCE$

A 3. $\angle AED \cong \angle CEB$

4. $\triangle AED \cong \triangle CEB$

1. given

2. alt int \angle s \cong

3. VACT

4. AAS (2, 3, 1)

②

1. $\overline{KM} \perp \overline{JL}$

2. $\angle MKJ, \angle MKL$ vert \angle s

A 3. $\angle MKJ \cong \angle MKL$

S 4. $\overline{JM} \cong \overline{LM}$

A 5. $\angle JMK \cong \angle LMK$

6. $\triangle JKM \cong \triangle LKM$

1. given

2. def \perp lines

3. alt int \angle s \cong

4. given

5. given

6. AAS

* if you use $\overline{KM} \cong \overline{KM}$ you could also use SAS or ASA

③

1. $\overline{AB} \cong \overline{DE}, \angle C \cong \angle F$

2. $\angle A, \angle D$ vert \angle s

3. $\angle A \cong \angle D$

4. $\triangle ABC \cong \triangle DEF$

1. given

2. given

3. alt int \angle s \cong

4. AAS

④

1. $\overline{JK} \cong \overline{ML}, \angle JKL \cong \angle LMK$ 1 given

2. $\overline{KL} \cong \overline{LK}$ 2 dynamic (S)

3. $\triangle JKL \cong \triangle MLK$ 3. SAS (2, 1, 1)

2. dynamic (S)

3. SAS (2, 1, 1)

⑤ 1. Bis mdpt of DC

• 2. $\overline{DB} \cong \overline{CB}$

3. $\overline{AB} \perp \overline{DC}$

4. $\angle ABD \cong \angle CBD$ or $\angle A \cong \angle C$

5. $\angle ABD \cong \angle ABC$

6. $\overline{AB} \cong \overline{AC}$

7. $\triangle ABD \cong \triangle ABC$

1. given

2. def mdpt

3. given

4. def \perp

5. alt int \angle \cong

6. reflexive (\cong)

7. SAS (2, 5, 6)

⑥ 1. $\angle R$, $\angle P$ are \angle \cong

2. $\angle R \cong \angle P$

3. $\overline{QR} \cong \overline{PR}$

4. $\angle RQS \cong \angle PRQ$

• 5. $\overline{QS} \cong \overline{SQ}$

6. $\triangle QRS \cong \triangle PRQ$

1. given

2. alt int \angle \cong

3. given

4. alt int \angle \cong

5. reflexive (\cong)

6. AAS (2, 4, 5)

7. G is the mdpt of FH
- $\overline{FG} \cong \overline{HG}$
 - $\overline{EF} \cong \overline{EH}$
 - $\overline{EG} \cong \overline{EG}$
 - $\triangle EGF \cong \triangle EGH$
 - $\angle 1 \cong \angle 2$

- given
- def mdpt
- given
- reflexive (\cong)
- SSS (2,3,4)
- CPCCTC

8. \overline{LM} bisects $\angle JKL$
- $\angle JLM \cong \angle KLM$
 - $JL \cong KL$
 - $\overline{LM} \cong \overline{LM}$
 - $\triangle LMJ \cong \triangle LMK$
 - $\overline{JM} \cong \overline{KM}$
 - M is the mdpt of \overline{JK}

- given
- def \angle bisector
- given
- reflexive (\cong)
- SAS (3,2,4)
- CPCCTC
- def mdpt

9. $\overline{AC} \cong \overline{AD}$, $\overline{CB} \cong \overline{DB}$
- $\overline{AB} \cong \overline{AB}$
 - $\triangle ACB \cong \triangle ADB$
 - $\angle CAB \cong \angle DAB$
 - \overline{AB} bisects $\angle CAD$

- given
- reflexive (\cong)
- SSS (1,1,2)
- CPCCTC
- def \angle bisector

10. $\overline{WX} \cong \overline{XY} \cong \overline{YZ} \cong \overline{ZW}$
- $\overline{XZ} \cong \overline{XZ}$
 - $\triangle ZWX \cong \triangle ZXY$
 - $\angle W \cong \angle Y$

- given
- reflexive (\cong)
- ~~CPCCTC~~ SSS (1,1,2)
- CPCCTC

11. M is the mdpt of \overline{PQ} & \overline{RS}
- $\overline{PM} \cong \overline{QM}$, $\overline{RM} \cong \overline{SM}$
 - $\angle RMQ \cong \angle SMP$
 - $\triangle RMQ \cong \triangle SMP$
 - $\overline{QR} \cong \overline{PS}$

- Given
- def mdpt
- VACT
- SAS (2,3,2)
- CPCCTC

hw 4.6.2

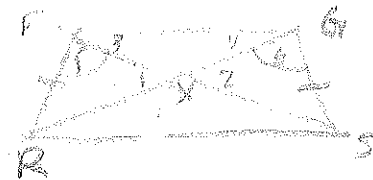


- 36.
- $\angle 3 \cong \angle 4$
 - $\angle 3, \angle 1$ and $\angle 2, \angle 4$ form a linear pair
 - $\angle 2, \angle 4$ and $\angle 3, \angle 1$ are opp
 - $\angle 2 \cong \angle 1$
 - $\overline{MA} \cong \overline{MC}$

- Given
- def linear pair
- if $\angle 2 \cong \angle 4$ form a l.p. \rightarrow opp
- $\angle 3$ opp $\angle 1 \cong \angle 3$ are \cong
- if \triangle then \triangle

- 37.
- $\angle 5 \cong \angle 6, \overline{FR} \cong \overline{GS}$
 - $\angle 1 \cong \angle 2$
 - $\triangle FRX \cong \triangle GSX$
 - $\overline{FX} \cong \overline{GX}$
 - $\angle 3 \cong \angle 4$

- given
- VACT
- AAS
- CPLTC
- if \triangle then \triangle



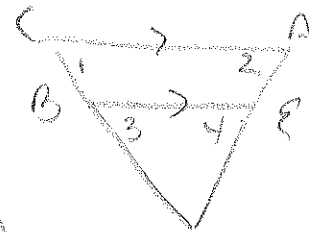
- 38.
- $\angle 1 \cong \angle 4, \overline{NA}, \overline{TC}$
 - $\overline{NE} \cong \overline{TE}$
 - $\triangle ENA \cong \triangle ETC$
 - $\overline{EA} \cong \overline{EC}$
 - $\angle 2 \cong \angle 3$

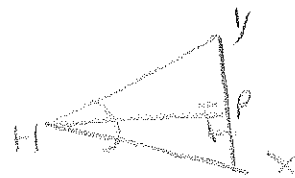
- given
- if \triangle then \triangle
- SAS
- CPLTC
- if \triangle then \triangle



- 39.
- $\triangle CAN$ is \cong $\triangle ENB$
 - $\overline{CN} \cong \overline{EN}$
 - $\angle 1 \cong \angle 2$
 - $\angle 1 \cong \angle 3, \angle 2 \cong \angle 4$
 - $\angle 3 \cong \angle 4$
 - $\overline{BN} \cong \overline{EN}$
 - $\triangle NEB$ is an isos. \triangle

- Given
- iso \triangle have \triangle
- if \triangle then \triangle
- Corresp. \angle // lines are \cong
- subst \cong
- if \triangle then \triangle
- def iso \triangle





1. PH bisects $\angle YHX$
2. $\angle YHP \cong \angle XHP$
3. $HP \perp YX$
4. $\angle YPH, \angle XPH$ are rts
5. $\angle YPH \cong \angle XPH$
6. $HP \cong HP$
7. $\triangle YHP \cong \triangle XHP$
8. $HP \cong HP$
9. $\triangle YHX$ is an iso \triangle

1. Given
2. def \angle bisector
3. given
4. def \perp
5. all rts \cong
6. reflexive
7. ASA
8. CPCTC
9. Def iso \triangle

Geometry Chapter 4 Review Answer Section

MULTIPLE CHOICE

1. C
2. B
3. D
4. B
5. B
6. A
7. C
8. C
9. D
10. A
11. B
12. A
13. D
14. C
15. B
16. C
17. A
18. A
19. B
20. D
21. C
22. A
23. D
24. B
25. D
26. B
27. B
28. A

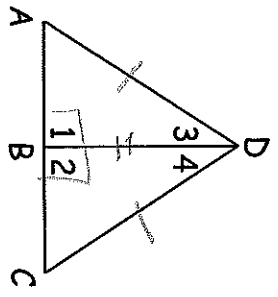
32.
 - a. 4; A reflection in the x -axis creates a mirror image of the hour hand in a horizontal line.
 - b. 10; A reflection in the y -axis creates a mirror image of the hour hand in a vertical line.
 - c. 5; A rotation 90° clockwise turns the hour hand about the center of the clock 90° in a clockwise direction.
 - d. 10; A rotation 120° counterclockwise turns the hour hand about the center of the clock 120° in a counterclockwise direction.
33.
 - a. Using the distance formula, $\overline{AB} \cong \overline{BC} \cong \overline{CD} \cong \overline{DA}$.
 - b. Using the distance formula and SSS, $\triangle ABC \cong \triangle ADC$.
 - c. Using the distance formula and SSS, $\angle BEC \cong \angle BEA \cong \angle DEC \cong \angle DEA$.
 - d. Using the distance formula and HL, $\triangle AEB$, $\triangle CEB$, $\triangle CED$, and $\triangle AED$ are right triangles.

SHORT ANSWER

29. a -4; b -2; c -5; d -1; e -3
30. $x = 26$
31. 125.5

15. Given: $\angle 1$ and $\angle 2$ are right \angle s
 $\overline{AD} \cong \overline{CD}$

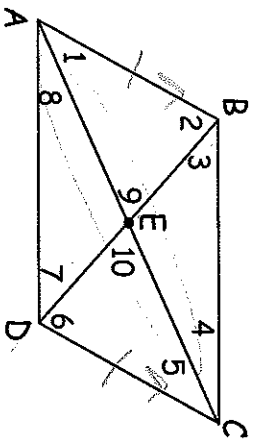
Prove: \overline{BD} bisects $\angle ADC$



- | | |
|--|-------------------------------------|
| 1. $\angle 1, \angle 2$ are right \angle s | 1. given |
| 2. $\angle 1 \cong \angle 2$ | 2. $\text{corr. } \angle$ s \cong |
| 3. $\overline{AD} \cong \overline{CD}$ | 3. given |
| 4. $\overline{DB} \cong \overline{DB}$ | 4. reflexive \cong |
| 5. $\triangle DAB \cong \triangle DCB$ | 5. HL (3, 4) |
| 6. $\angle 3 \cong \angle 4$ | 6. CPCTC |
| 7. \overline{BD} bisects $\angle ADC$ | 7. def. \angle bisector |

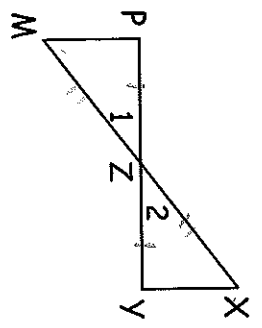
16. Given: $\overline{AB} \parallel \overline{CD}$
 $\overline{AB} \cong \overline{CD}$

Prove: \overline{BD} bisects \overline{AC}



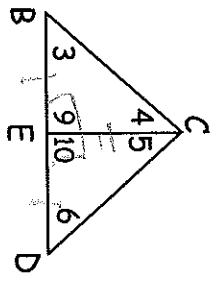
- | | |
|--|---|
| 1. $\overline{AB} \parallel \overline{CD}$, $\overline{AB} \cong \overline{CD}$ | 1. given |
| 2. $\angle 2 \cong \angle 7$, $\angle 1 \cong \angle 8$ | 2. $\text{alt. int. } \angle$ s \parallel lines \cong |
| 3. $\triangle ABE \cong \triangle CDE$ | 3. ASA (2, 1, 2) |
| 4. $\overline{AE} = \overline{CE}$ | 4. CPCTC |
| 5. \overline{BD} bisects \overline{AC} | 5. def. seg. bisector |

13. Given: Z is the midpoint of \overline{PY} and \overline{MX}
 Prove: $\overline{PM} \parallel \overline{YX}$



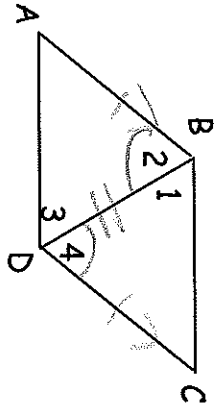
- | | |
|--|-------------------------------------|
| 1. Z is the midpoint of \overline{PY} and \overline{MX} | 1. Given |
| 2. $\overline{PZ} \cong \overline{YZ}$, $\overline{MZ} \cong \overline{XZ}$ | 2. def. midpoint |
| 3. $\angle 1 \cong \angle 2$ | 3. vert. \angle s \cong |
| 4. $\triangle PZM \cong \triangle YZX$ | 4. SAS (2, 3, 2) |
| 5. $\angle M \cong \angle X$ | 5. CPCTC |
| 6. $\overline{PM} \parallel \overline{YX}$ | 6. converse alt. int. \angle Thm. |

14. Given: $\overline{CE} \perp \overline{BD}$
 E is the midpoint of \overline{BD}
 Prove: $\triangle BCD$ is Isosceles



- | | |
|--|-----------------------------|
| 1. $\overline{CE} \perp \overline{BD}$ | 1. Given |
| 2. $\angle 9, \angle 10$ are rt \angle s | 2. def. \perp |
| 3. $\angle 9 \cong \angle 10$ | 3. vert. \angle s \cong |
| 4. E is the midpoint of \overline{BD} | 4. Given |
| 5. $\overline{BE} \cong \overline{DE}$ | 5. def. midpoint |
| 6. $\overline{CE} \cong \overline{CE}$ | 6. reflexive \cong |
| 7. $\triangle CEB \cong \triangle CED$ | 7. SAS (5, 3, 6) |
| 8. $\overline{CB} \cong \overline{CD}$ | 8. CPCTC |
| 9. $\triangle BCD$ is iso. | 9. def. iso. \triangle |

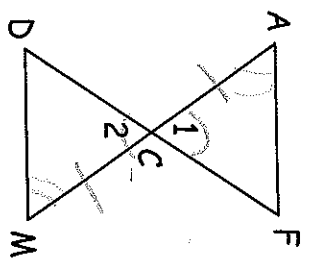
11. Given: $\overline{AB} \parallel \overline{CD}$
 $\overline{AB} \cong \overline{CD}$
 Prove: $\overline{BC} \parallel \overline{DA}$



1. $\overline{AB} \parallel \overline{CD}$, $\overline{AB} \cong \overline{CD}$
2. $\angle 2 \cong \angle 4$
3. $\overline{BD} \cong \overline{DB}$
4. $\triangle BAD \cong \triangle DCB$
5. $\angle 1 \cong \angle 3$
6. $\overline{BC} \parallel \overline{DA}$

1. given
2. alternate angles
3. symmetric
4. SAS (1, 2, 3)
5. CPCTC
6. converse alt. int. thm

12. Given: $\overline{CA} \cong \overline{CM}$
 $\overline{AF} \parallel \overline{MD}$
 Prove: C is midpoint of \overline{FD}

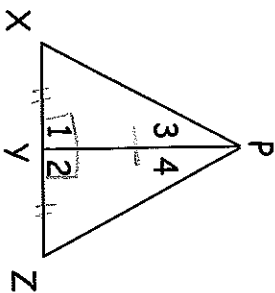


1. $\overline{CA} \cong \overline{CM}$, $\overline{AF} \parallel \overline{MD}$
2. $\angle 1 \cong \angle 2$
3. $\angle A \cong \angle M$
4. $\triangle AFC \cong \triangle MCD$
5. $\overline{FC} \cong \overline{DC}$
6. C is midpoint of \overline{FD}

1. given
2. VACT
3. alt. int. \parallel lines
4. ASA (2, 1, 3)
5. CPCTC
6. def. midpoint

9. Given: \overline{Y} is the midpoint of \overline{XZ}
 $\overline{PY} \perp \overline{XZ}$

Prove: $\triangle XPZ$ is isosceles

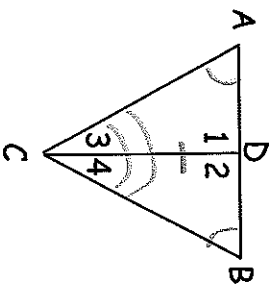


1. \overline{Y} is the midpoint \overline{XZ}
2. $\overline{XY} \cong \overline{YZ}$
3. $\overline{PY} \perp \overline{XZ}$
4. $\angle 1, \angle 2$ are rt angles
5. $\angle 1 \cong \angle 2$
6. $\overline{PY} \cong \overline{PY}$
7. $\triangle PXY \cong \triangle PYZ$
8. $\overline{PX} \cong \overline{PZ}$
9. $\triangle XPZ$ is isosceles

1. given
2. def. midpt
3. given
4. def. \perp lines
5. def. rt angles
6. reflexive
7. SAS (2, 5, 6)
8. CPCTC
9. def. isosceles \triangle

10. Given: \overline{CD} bisects $\angle ACB$
 $\angle A \cong \angle B$

Prove: D is the midpoint of \overline{AB}



1. \overline{CD} bisects $\angle ACB$
2. $\angle 3 \cong \angle 4$
3. $\overline{DC} \cong \overline{DC}$
4. $\triangle ADC \cong \triangle BDC$
5. $\overline{AD} \cong \overline{BD}$
6. D is the midpoint of \overline{AB}

1. given
2. def. bisector
3. reflexive
4. AAS (1, 2, 3)
5. CPCTC
6. def. midpt