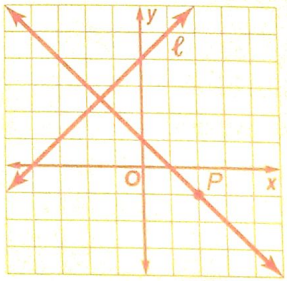
Lesson 3-5

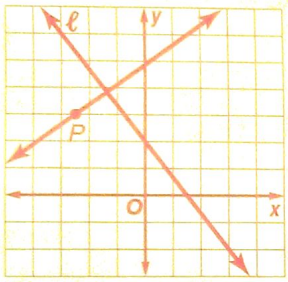
1. $c \parallel d$; ≅ alternate exterior ∠s
2. none
3. $c \parallel d$; ≅ alternate interior ∠s
4. $c \parallel d$; supplementary consecutive interior ∠s

Lesson 3-6

7. $d = \frac{7\sqrt{2}}{2}$;



8. $d = 1.4$:



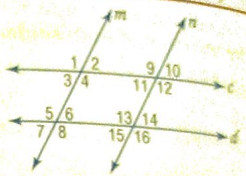
Extra Practice

Lesson 3-5

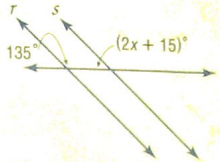
(pages 151–157)

Given the following information, determine which lines, if any, are parallel. State the postulate or theorem that justifies your answer.

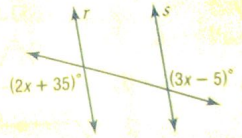
1. $\angle 9 \cong \angle 16$
2. $\angle 10 \cong \angle 16$
3. $\angle 12 \cong \angle 13$
4. $m\angle 12 + m\angle 14 = 180$ 1–4. See margin.



Find x so that $r \parallel s$.

5. 

15

6. 

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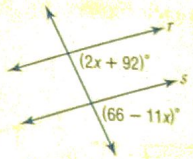
7. 

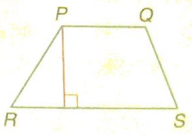
−2

Lesson 3-6

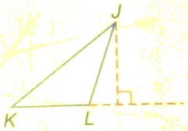
(pages 159–164)

Copy each figure. Draw the segment that represents the distance indicated.

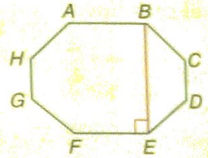
1. P to $\overline{RS}$



2. J to $\overline{KL}$



3. B to $\overline{FE}$



Find the distance between each pair of parallel lines.

4. $y = \frac{2}{3}x - 2$ ≈ 2.08
   $y = \frac{2}{3}x + \frac{1}{2}$
5. $y = 2x + 4$ ≈ 4.02
   $y - 2x = -5$
6. $x + 4y = -6$ ≈ 2.43
   $x + 4y = 4$

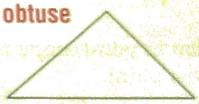
COORDINATE GEOMETRY Construct a line perpendicular to ℓ through P. Then find the distance from P to ℓ. 7–8. See margin.

7. Line ℓ contains points (0, 4) and (−4, 0). Point P has coordinates (2, −1).
8. Line ℓ contains points (3, −2) and (0, 2). Point P has coordinates (−2.5, 3).

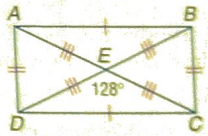
Lesson 4-1

(pages 178–183)

Use a protractor to classify each triangle as *acute*, *equiangular*, *obtuse*, or *right*.

1.  equiangular
2.  right
3.  obtuse

Identify the indicated type of triangles in the figure if $\overline{AB} \cong \overline{CD}$, $\overline{AD} \cong \overline{BC}$, $\overline{AE} \cong \overline{BE} \cong \overline{EC} \cong \overline{ED}$, and $m\angle BAD = m\angle ABC = m\angle BCD = m\angle ADC = 90$.



4. right △*DAB*, △*ABC*, △*BCD*, △*ADC*
5. obtuse △*ABE*, △*CDE*
6. acute △*BEC*, △*AED*
7. isosceles △*ABE*, △*CDE*, △*BEC*, △*AED*
8. Find a and the measure of each side of equilateral triangle MNO if $MN = 5a$, $NO = 4a + 6$, and $MO = 7a - 12$. $a = 6$; $MN = NO = MO = 30$
9. Triangle TAC is an isosceles triangle with $\overline{TA} \cong \overline{AC}$. Find b, TA, AC, and TC if $TA = 3b + 1$, $AC = 4b - 11$, and $TC = 6b - 2$. $b = 12$; $TA = AC = 37$, $TC = 70$

Lesson 4-3

5. Given: △*ANG* ≅ △*NGA*, △*NGA* ≅ △*GAN*

Prove: △*AGN* is equilateral and equiangular.

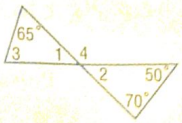
Proof: Statements (Reasons)

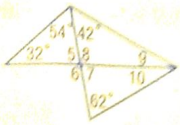
1. △*ANG* ≅ △*NGA* (Given)
2. $\overline{AN} \cong \overline{NG}$, $\angle A \cong \angle N$ (CPCTC)
3. △*NGA* ≅ △*GAN* (Given)
4. $\overline{NG} \cong \overline{GA}$, $\angle N \cong \angle G$ (CPCTC)
5. $\overline{AN} \cong \overline{NG} \cong \overline{GA}$ (Transitive Property of ≅)
6. △*AGN* is equilateral. (Def. of equilateral △)
7. $\angle A \cong \angle N \cong \angle G$ (Transitive Property of ≅)
8. △*AGN* is equiangular. (Def. of equiangular △)

Lesson 4-2 (pages 185–191)

Find the measure of each angle.

1. ∠1 60
2. ∠2 60
3. ∠3 55
4. ∠4 120
5. ∠5 94
6. ∠6 86
7. ∠7 94
8. ∠8 86
9. ∠9 52
10. ∠10 24





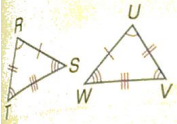
Lesson 4-3 (pages 192–198)

Identify the congruent triangles in each figure.

$\triangle ABC \cong \triangle FDE$

2.

$\triangle JKH \cong \triangle JIH$



$\triangle RTS \cong \triangle UVW$

4.

$\triangle LMN \cong \triangle NOP$

Write a two-column proof. See margin.

Given: $\triangle ANG \cong \triangle NGA$
$\triangle NGA \cong \triangle GAN$

Prove: $\triangle AGN$ is equilateral and equiangular.

Lesson 4-4 (pages 200–206)

Determine whether $\triangle RST \cong \triangle JKL$ given the coordinates of the vertices. Explain.

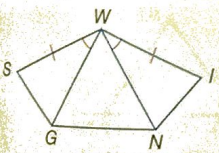
$R(-6, 2), S(-4, 4), T(-2, 2), J(6, -2), K(4, -4), L(2, -2)$ Yes; see margin for explanation.

$R(-6, 3), S(-4, 7), T(-2, 3), J(2, 3), K(5, 7), L(6, 3)$ No; see margin for explanation.

Write a two-column proof. 3–4. See margin.

3. Given: $\triangle GWN$ is equilateral.
$\overline{WS} \cong \overline{WI}$
$\angle SWG \cong \angle IWN$

Prove: $\triangle SWG \cong \triangle IWN$



4. Given: $\triangle ANM \cong \triangle ANI$
$\overline{DI} \cong \overline{OM}$
$\overline{ND} \cong \overline{NO}$

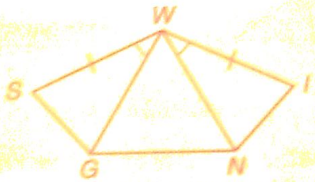
Prove: $\triangle DIN \cong \triangle OMN$

Extra Practice

$RS = JK$, $ST = KL$, and $RT = JL$. By definition of congruent segments, all corresponding segments are congruent. Therefore, $\triangle RST \cong \triangle JKL$.

2. $RS = \sqrt{(-6 - (-4))^2 + (3 - 7)^2}$
$= \sqrt{4 + 16}$ or $\sqrt{20}$
$JK = \sqrt{(2 - 5)^2 + (3 - 7)^2}$
$= \sqrt{9 + 16}$ or 5
Since, $RS \neq JK$ the triangles are not congruent.

3. Given: $\triangle GWN$ is equilateral.
$\overline{WS} \cong \overline{WI}$
$\angle SWG \cong \angle IWN$
Prove: $\triangle SWG \cong \triangle IWN$



Proof:

Statements (Reasons)

1. $\triangle GWN$ is equilateral. (Given)
2. $\overline{WG} \cong \overline{WN}$ (Def. of equilateral triangle)
3. $\overline{WS} \cong \overline{WI}$ (Given)
4. $\angle SWG \cong \angle IWN$ (Given)
5. $\triangle SWG \cong \triangle IWN$ (SAS)

4. Given: $\triangle ANM \cong \triangle ANI$
$\overline{DI} \cong \overline{OM}$
$\overline{ND} \cong \overline{NO}$
Prove: $\triangle DIN \cong \triangle OMN$

Proof:

Statements (Reasons)

1. $\triangle ANM \cong \triangle ANI$ (Given)
2. $\overline{IN} \cong \overline{MN}$ (CPCTC)
3. $\overline{DI} \cong \overline{OM}$ (Given)
4. $\overline{ND} \cong \overline{NO}$ (Given)
5. $\triangle DIN \cong \triangle OMN$ (SSS)

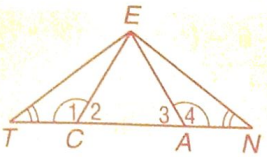
Lesson 4-4

1. $RS = \sqrt{(-6 - (-4))^2 + (4 - 2)^2}$
$= \sqrt{4 + 4}$ or $\sqrt{8}$
$ST = \sqrt{(-4 - (-2))^2 + (4 - 2)^2}$
$= \sqrt{4 + 4}$ or $\sqrt{8}$
$RT = \sqrt{(-6 - (-2))^2 + (2 - 2)^2}$
$= \sqrt{16}$ or 4

$JK = \sqrt{(6 - 4)^2 + (-2 - (-4))^2}$
$= \sqrt{4 + 4}$ or $\sqrt{8}$
$KL = \sqrt{(4 - 2)^2 + (-4 - (-2))^2}$
$= \sqrt{4 + 4}$ or $\sqrt{8}$
$JL = \sqrt{(6 - 2)^2 + (-2 - (-2))^2}$
$= \sqrt{16}$ or 4

1. Given: $\triangle TEN$ is isosceles with base $\overline{TN}$. $\angle 1 \cong \angle 4$, $\angle T \cong \angle N$

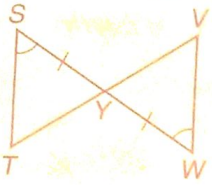
Prove: $\triangle TEC \cong \triangle NEA$



Proof: If $\triangle TEN$ is isosceles with base $\overline{TN}$, then $\overline{TE} \cong \overline{NE}$. Since $\angle 1 \cong \angle 4$ and $\angle T \cong \angle N$ are given, then $\triangle TEC \cong \triangle NEA$ by AAS.

2. Given: $\angle S \cong \angle W$, $\overline{SY} \cong \overline{YW}$

Prove: $\overline{ST} \cong \overline{WV}$

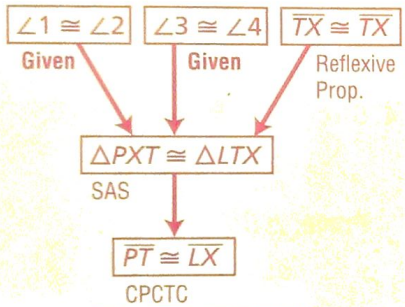


Proof: $\angle S \cong \angle W$ and $\overline{SY} \cong \overline{YW}$ are given and $\angle SYT \cong \angle WYV$ since vertical angles are congruent. Then $\triangle SYT \cong \triangle WYV$ by ASA and $\overline{ST} \cong \overline{WV}$ by CPCTC.

3. Given: $\angle 1 \cong \angle 2$, $\angle 3 \cong \angle 4$

Prove: $\overline{PT} \cong \overline{LX}$

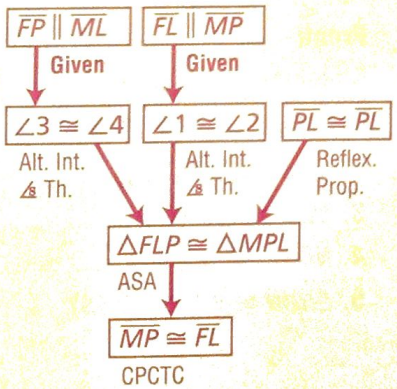
Proof:



4. Given: $\overline{FP} \parallel \overline{ML}$, $\overline{FL} \parallel \overline{MP}$

Prove: $\overline{MP} \cong \overline{FL}$

Proof:



Extra Practice

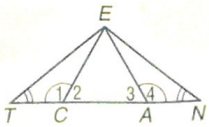
Lesson 4-5

(pages 207–213)

Write a paragraph proof. 1–2. See margin.

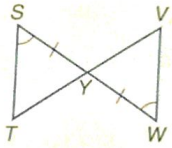
1. Given: $\triangle TEN$ is isosceles with base $\overline{TN}$. $\angle 1 \cong \angle 4$, $\angle T \cong \angle N$

Prove: $\triangle TEC \cong \triangle NEA$



2. Given: $\angle S \cong \angle W$, $\overline{SY} \cong \overline{YW}$

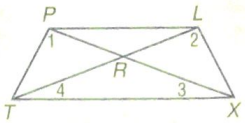
Prove: $\overline{ST} \cong \overline{WV}$



Write a flow proof. 3–4. See margin.

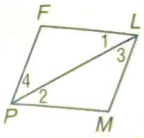
3. Given: $\angle 1 \cong \angle 2$, $\angle 3 \cong \angle 4$

Prove: $\overline{PT} \cong \overline{LX}$



4. Given: $\overline{FP} \parallel \overline{ML}$, $\overline{FL} \parallel \overline{MP}$

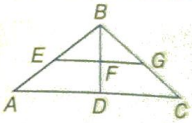
Prove: $\overline{MP} \cong \overline{FL}$



Lesson 4-6

(pages 216–221)

Refer to the figure for Exercises 1–6.



1. If $\overline{AD} \cong \overline{BD}$, name two congruent angles. $\angle DAB \cong \angle DBA$
2. If $\overline{BF} \cong \overline{FG}$, name two congruent angles. $\angle FBG \cong \angle FGB$
3. If $\overline{BE} \cong \overline{BG}$, name two congruent angles. $\angle BEF \cong \angle BGF$
4. If $\angle FBE \cong \angle FEB$, name two congruent segments. $\overline{FB} \cong \overline{FE}$
5. If $\angle BCA \cong \angle BAC$, name two congruent segments. $\overline{BA} \cong \overline{BC}$
6. If $\angle DBC \cong \angle BCD$, name two congruent segments. $\overline{BD} \cong \overline{CD}$

Lesson 4-7

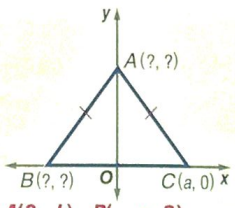
(pages 222–226)

Position and label each triangle on the coordinate plane. 1–4. See margin for sample answers.

1. isosceles $\triangle ABC$ with base $\overline{BC}$ that is r units long
2. equilateral $\triangle XYZ$ with sides $4b$ units long
3. isosceles right $\triangle RST$ with hypotenuse $\overline{ST}$ and legs $(3 + a)$ units long
4. equilateral $\triangle CDE$ with base $\overline{DE}$ $\frac{1}{4}b$ units long.

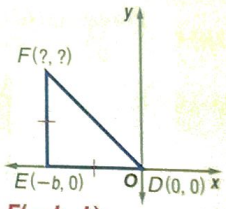
Name the missing coordinates of each triangle.

5.



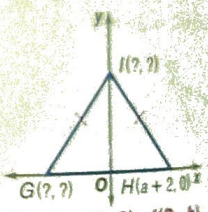
A(0, b), B(−a, 0)

6.



F(−b, b)

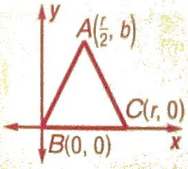
7.



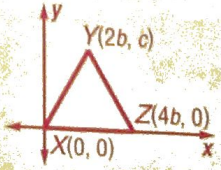
G(−a − 2, 0), I(0, b)

Lesson 4-7

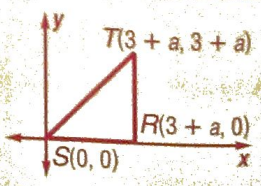
1.



2.



3.



4.