Topic 1: Classifying Triangles

1. Classify each triangle by its angles and sides.

a. ΔABE: _right, scalene_

b. ΔBEC: _acute, isosceles_

c. ΔDEF: _equiangular, equilateral_

d. ΔCDF: _obtuse, scalene_
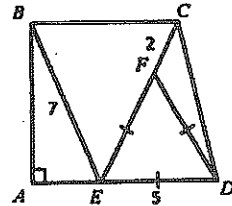
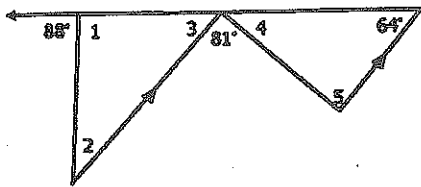**2.** Using the isosceles triangle at right, identify the following:

The vertex angle(s): _∠J_

The base angle(s): _∠K and ∠L_

The base(s): _KL_

The leg(s): _KJ and LJ_
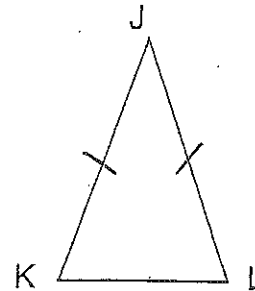
For questions 3 and 4, find the measure of each missing angle.

3.

$m\angle 1 = 92°$

$m\angle 2 = 24°$

$m\angle 3 = 64°$

$m\angle 4 = 35°$

$m\angle 5 = 81°$

4.
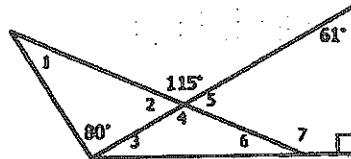
$m\angle 1 = 35°$

$m\angle 2 = 65°$

$m\angle 3 = 29°$

$m\angle 4 = 115°$

$m\angle 5 = 65°$

$m\angle 6 = 36°$

$m\angle 7 = 144°$

For questions 5 and 6, find the value of x.

5.

(6x − 5)°
(8x − 35)°
(3x − 1)°
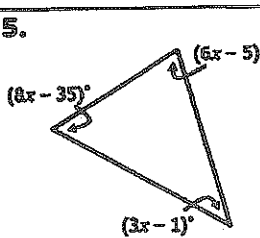
$8X - 35 + 6X - 5 + 3X - 1$

$17X - 41 = 180$

$17X = 221$

$X = 13$

x = _13_

6.
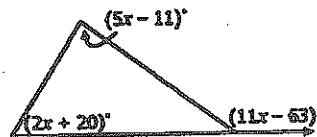
(5x − 11)°
(2x + 20)°
(11x − 63)°

$11X - 63 = 2X + 20 + 5X - 11$

$11X - 63 = 7X + 9$

$4X = 72$

$X = 18$

x = _18_

For questions 7 and 8, find the measure of ∠A.

7.

(9x + 17)° A
(3x − 4)°
B
(6x − 31)°
C
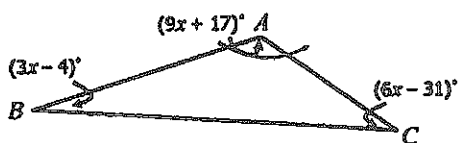
$3x-4 + 9x+17 + 6x-31$
$18x - 18 = 180$
$18x = 198$
$x = 11$

$m\angle A = \underline{116°}$

8.

B (7x − 26)°
(5x − 27)°
A
C
(10x − 23)°
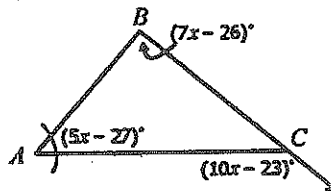
$10x-23 = 5x-27+7x-26$
$10x-23 = 12x - 53$
$30 = 2x$
$x = 15$

$m\angle A = \underline{48°}$

Topic 3: Isosceles & Equilateral Triangles
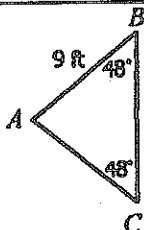
For questions 9-12, find each missing measure.

9.
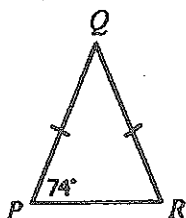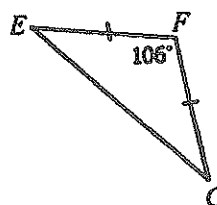
Q
74°
P   R

$m\angle Q = \underline{32°}$
$m\angle R = \underline{74°}$

10.

E   F
106°
G

$m\angle E = \underline{37°}$
$m\angle G = \underline{37°}$

11.

B
9 ft   48°
A
48°
C

$m\angle A = \underline{84°}$
$AC = \underline{9 ft}$

12.

N
M   P
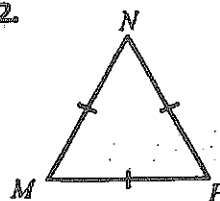
$m\angle M = \underline{60°}$
$m\angle N = \underline{60°}$
$m\angle P = \underline{60°}$

For questions 13 and 14, find the value of x.

13.
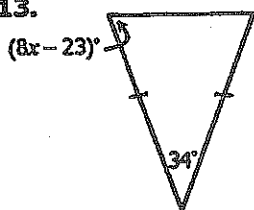
(8x − 23)°
34°

$8x-23 = 73$
$8x = 96$
$x = 12$

$x = \underline{12}$

14.

(9x−3)°

$9x-3=60$
$9x=63$
$x=7$

$x = \underline{7}$
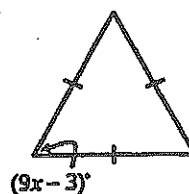
15. △CDE is an isosceles triangle with ∠D ≅ ∠E. If CD = 4x + 9, DE = 7x − 5, and CE = 16x − 27, find x and the measure of each side.

C
D   E

$4x+9 = 16x-27$
$36 = 12x$
$x = 3$

$x = \underline{3}$
$CD = \underline{21}$
$DE = \underline{16}$
$CE = \underline{21}$
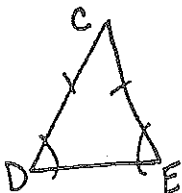
16. $\triangle QRS$ is an equilateral triangle. If QR is seventeen more than twice x, RS is 19 less than six times x, and QS is one less than four times x, find x and the measure of each side.

$QR = 2x + 17$
$RS = 6x - 19$
$QS = 4x - 1$

$2x + 17 = 4x - 1$
$18 = 2x$
$x = 9$

$x =$ __9__
$QR =$ __35__
$RS =$ __35__
$QS =$ __35__

17. In $\triangle JKL$, if $\overline{JK} \cong \overline{JL}$, $m\angle J = 23x - 4$, $m\angle K = 4x - 1$, and $m\angle L = 9x - 31$, find x and the measure of each angle.
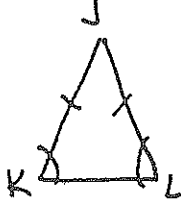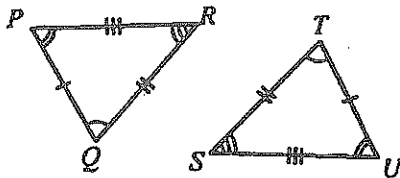

$4x - 1 = 9x - 31$
$30 = 5x$
$6 = x$

$x =$ __6__
$m\angle J =$ __134°__
$m\angle K =$ __23°__
$m\angle L =$ __23°__

Topic 4: Congruent Triangles

18. Write three valid congruency statements given the triangles below.

a) $\triangle QPR \cong \triangle TUS$

b) $\triangle PQR \cong \triangle UTS$

c) $\triangle RPQ \cong \triangle SUT$

19. If $\triangle KPL \cong \triangle ACM$, complete each part.

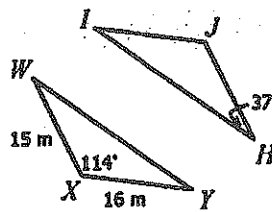a) $\overline{KL} \cong \overline{AM}$ d) $\angle P \cong \angle C$

b) $\overline{AC} \cong \overline{KP}$ e) $\angle K \cong \angle A$

c) $\overline{PL} \cong \overline{CM}$ f) $\angle M \cong \angle L$

20. If $\triangle WXY \cong \triangle HJI$, complete each part.

a) $JI =$ __16m__
b) $JH =$ __15m__
c) $m\angle W =$ __37°__
d) $m\angle J =$ __114°__
e) $m\angle I =$ __29°__

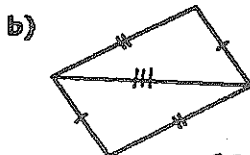## Topic 5: Triangle Congruence & Proofs

21. What are the methods to prove triangles are congruent?
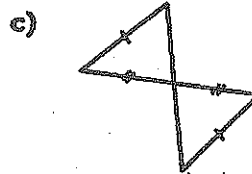
SSS, SAS, ASA, AAS, HL

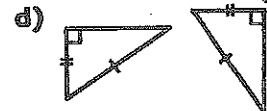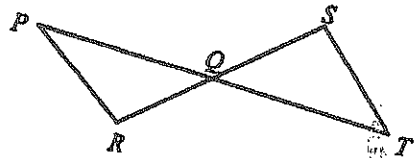**22.** Determine if the triangles below are congruent. If yes, state which method.

a) yes - ASA
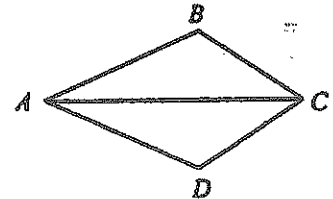
b) yes - SSS

c) not ≅

d) yes - HL

Complete the following proofs. Some may require CPCTC.

23. **Given:** Q is the midpoint of $\overline{PT}$ and $\overline{RS}$
   **Prove:** $\triangle PQR \cong \triangle TQS$

Statements	Reasons
1. Q is the midpt of $\overline{PT}$ and $\overline{RS}$	1. given
2. $\overline{PQ} \cong \overline{TQ}$	2. def. of midpoint
3. $\overline{RQ} \cong \overline{SQ}$	3. def of midpoint
4. $\angle PQR \cong \angle TQS$	4. vertical angles
5. $\triangle PQR \cong \triangle TQS$	5. SAS

24. **Given:** $\overline{AC}$ bisects $\angle BAD$ and $\angle BCD$
   **Prove:** $\triangle ABC \cong \triangle ADC$

Statements	Reasons
1. $\overline{AC}$ bisects $\angle BAD$ and $\angle BCD$	1. given
2. $\angle BAC \cong \angle DAC$	2. def. of angle bisector
3. $\angle BCA \cong \angle DCA$	3. def. of angle bisector
4. $\overline{AC} \cong \overline{AC}$	4. reflexive property
5. $\triangle ABC \cong \triangle ADC$	5. ASA

25. **Given:** $\triangle WZX$ and $\triangle YZX$ are right triangles,
    $\overline{WX} \cong \overline{YX}$
    Prove: $\angle WXZ \cong \angle YXZ$
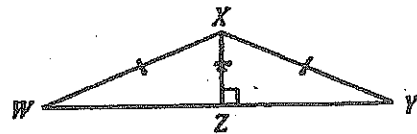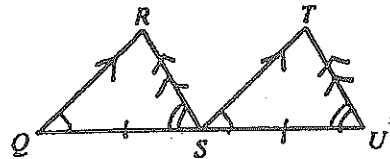
Statements	Reasons
1. $\triangle WZX$ & $\triangle YZW$ are right $\triangle$'s	1. given
2. $\overline{WX} \cong \overline{YX}$	2. given
3. $\overline{XZ} \cong \overline{XZ}$	3. reflexive property
4. $\triangle WZX \cong \triangle YZX$	4. HL
5. $\angle WXZ \cong \angle YXZ$	5. CPCTC

26. Given: $\overline{BC} \parallel \overline{AD}$, $\angle BAD \cong \angle DCB$

Prove: $\overline{AB} \cong \overline{CD}$
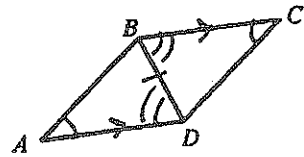
Statements	Reasons
1. $\overline{BC} \parallel \overline{AD}$	1. given
2. $\angle CBD \cong \angle ADB$	2. alternate interior ∠'s
3. $\angle BAD \cong \angle DCB$	3. given
4. $\overline{BD} \cong \overline{BD}$	4. reflexive property
5. $\triangle BAD \cong \triangle DCB$	5. AAS
6. $\overline{AB} \cong \overline{CD}$	6. CPCTC

27. Given: $\overline{QR} \parallel \overline{ST}$, $\overline{RS} \parallel \overline{TU}$, $\overline{QS} \cong \overline{SU}$

Prove: $\angle QRS \cong \angle STU$

Statements	Reasons
1. $\overline{QR} \parallel \overline{ST}$	1. given
2. $\overline{RS} \parallel \overline{TU}$	2. given
3. $\overline{QS} \cong \overline{SU}$	3. given
4. $\angle RQS \cong \angle TSU$	4. Corresponding ∠'s
5. $\angle RSQ \cong \angle TUS$	5. Corresponding ∠'s
6. $\triangle RQS \cong \triangle TSU$	6. ASA
7. $\angle QRS \cong \angle STU$	7. CPCTC