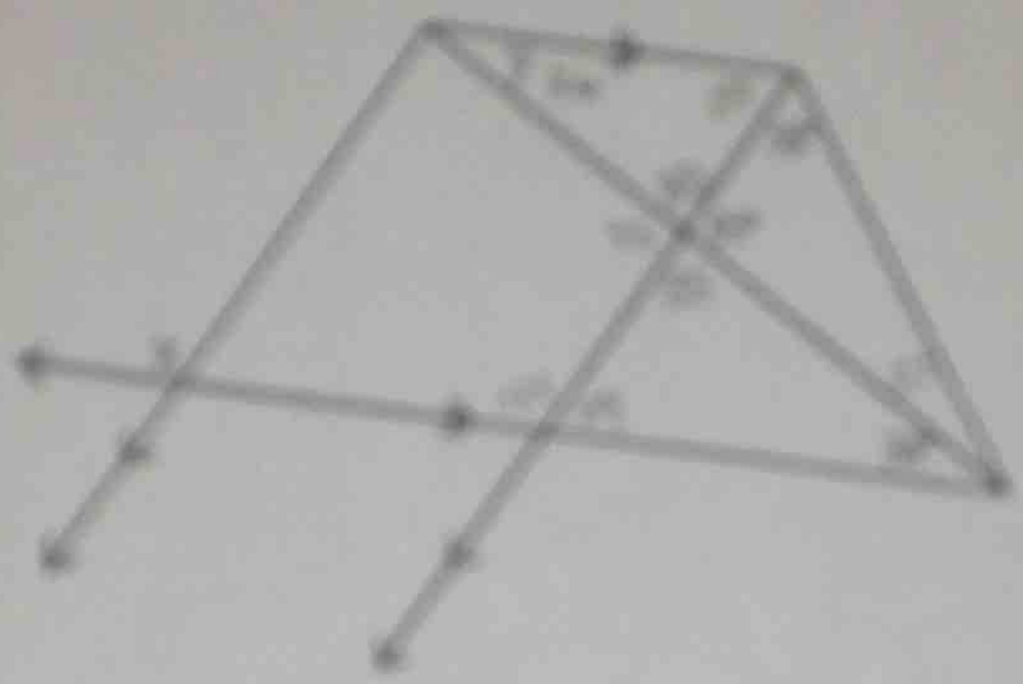
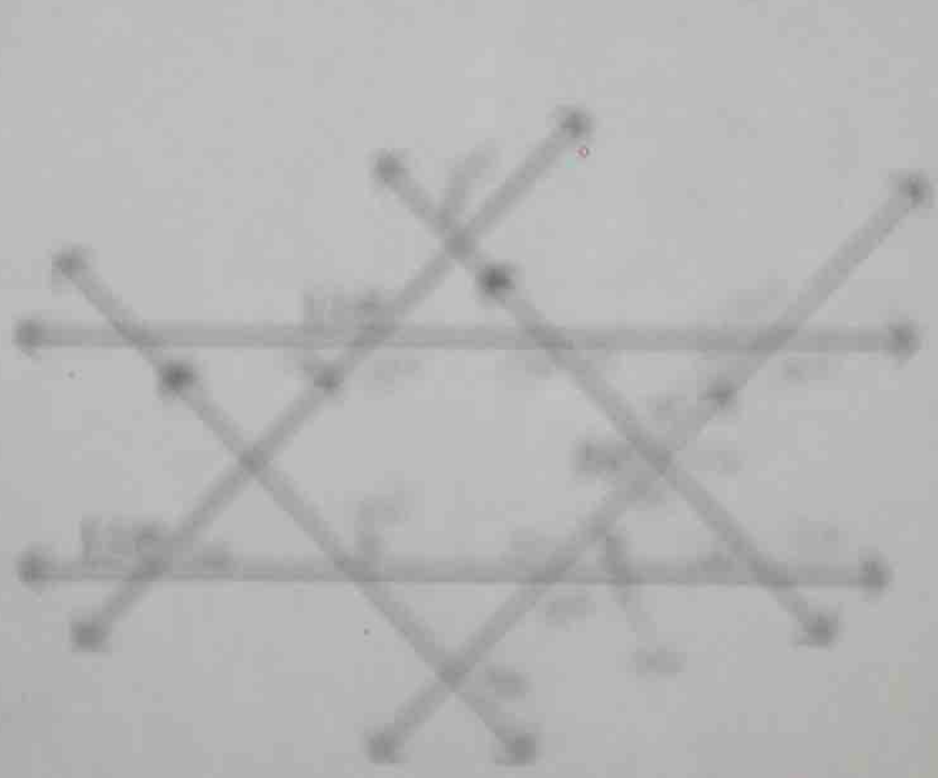
STATION #1:

Geometric Properties

1. Find the values of x and y in the picture.

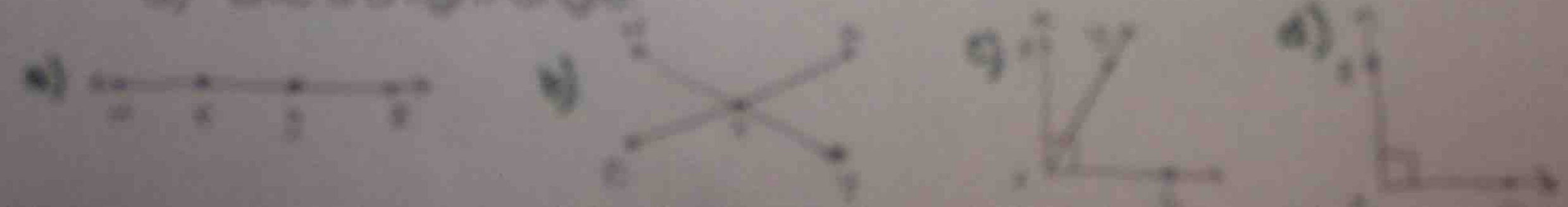


2. Find the values of q, r, and s in the picture.



3. Draw and label a picture to represent the following:

a) Line WZ includes points X and Y so that X is the midpoint of segment WY and Y is the midpoint of XZ.
b) Angles WXA and BXY are obtuse vertical angles.
c) Angles AXY and YXC are complementary.
d) BXC is a right angle.

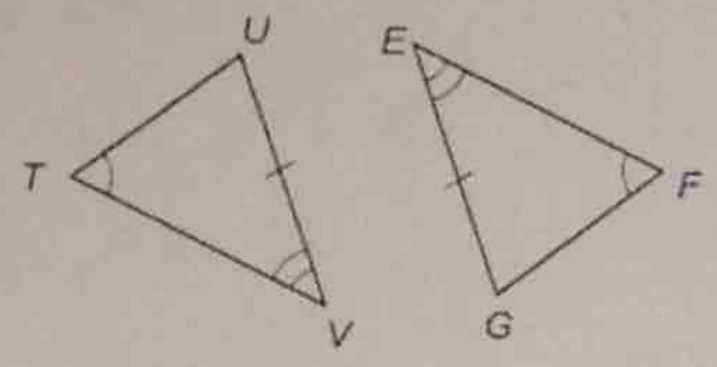


STATION #2:

Triangle Congruence

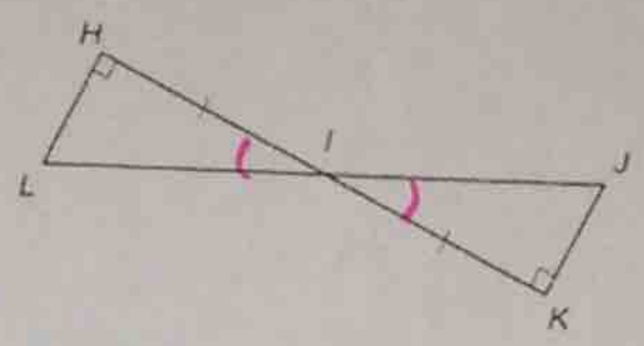
Determine whether each pair of triangles is congruent. If so, write a congruence statement and explain why the triangles are congruent. If it is not possible, write *not possible.*

1.



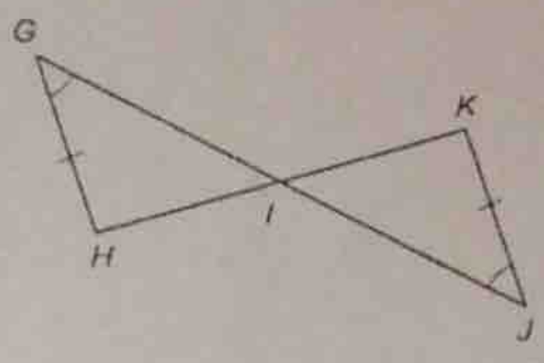
$\triangle TVU \cong \triangle FEG$ by AAS $\cong$

2.



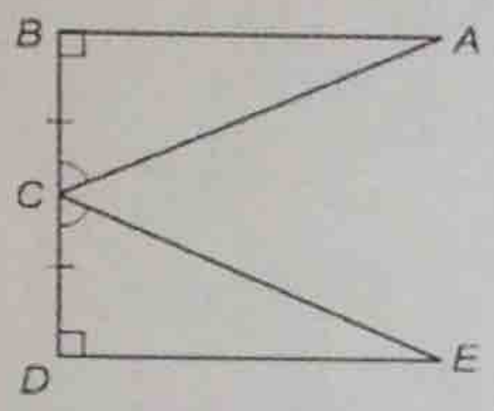
$\triangle LHI \cong \triangle JKI$ ASA $\cong$

3.



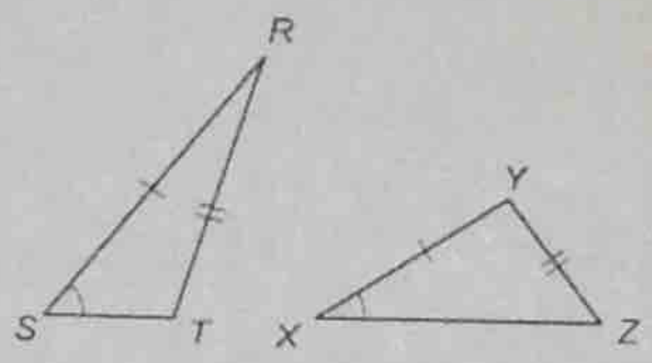
$\triangle HGI \cong \triangle KJI$ AAS $\cong$

4.



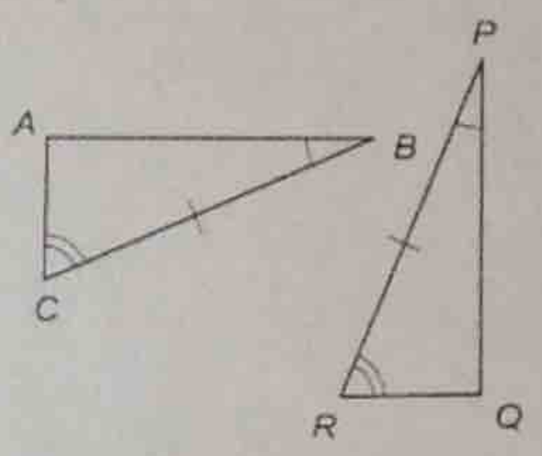
$\triangle ABC \cong \triangle EDC$ ASA $\cong$

5.



Not possible

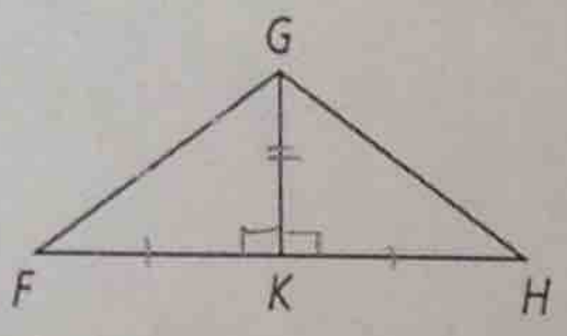
6.



$\triangle BCA \cong \triangle PRQ$ ASA $\cong$

Write a two column proof.

4. **Given:** $\overline{GK}$ is the perpendicular bisector of $\overline{FH}$.
Prove: $\overline{FG} \cong \overline{HG}$



Statement	Reason
1. $\overline{GK}$ is $\perp$ bisector of $\overline{FH}$	1. Given
2. $\angle FKG$ & $\angle HKG$ are right $\angle$s	2. Def. of $\perp$
3. $\angle FKG \cong \angle HKG$	3. All right $\angle$s $\cong$
4. $\overline{FK} \cong \overline{KH}$	4. Def of bisect
5. $\overline{GK} \cong \overline{GK}$	5. reflexive
6. $\triangle FKG \cong \triangle HKG$	6. SAS $\triangle \cong$
7. $\overline{FG} \cong \overline{FG}$	7. CPCTC

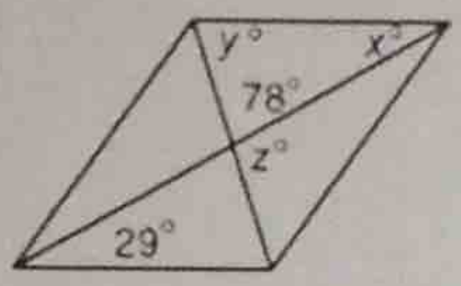
- def of $\perp$
- all right $\angle$s $\cong$
- reflexive
- def of bisect
- SAS $\cong$
- CPCTC

STATION #3:

Parallelograms

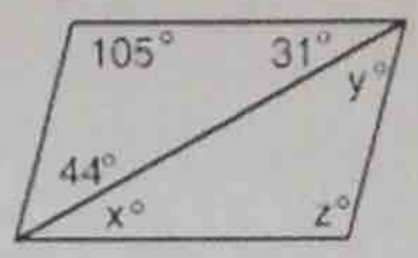
If each quadrilateral is a parallelogram, find the values of x, y, and z.

1.



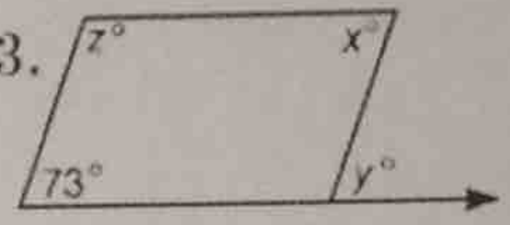
x = 29°
y = 73°
z = 102°

2.



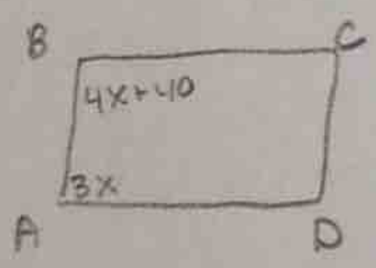
x = 31°
y = 44°
z = 105°

3.



x = 73°
y = 73°
z = 107°

4. In parallelogram $ABCD$, $m\angle A = 3x$ and $m\angle B = 4x + 40$. Find the measure of angles A, B, C, and D.



3x + 4x + 40 = 180
7x + 40 = 180
7x = 140
x = 20

m∠A = 60°
m∠B = 120°
m∠C = 60°
m∠D = 120°

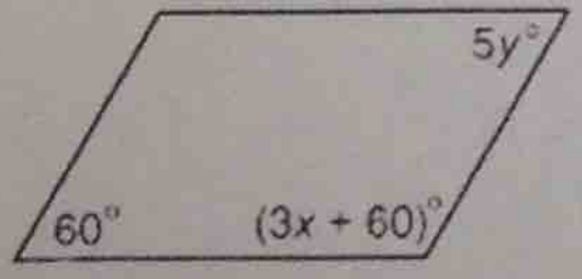
5. In parallelogram $RSTV$, diagonals $\overline{RT}$ and $\overline{VS}$ intersect at Q. If $RQ = 5x + 1$ and $QT = 3x + 15$, find QT.

5x + 1 = 3x + 15
2x + 1 = 15
2x = 14
x = 7

$\overline{QT}$ = 36

Find the values of x and y that ensure each quadrilateral is a parallelogram.

6.

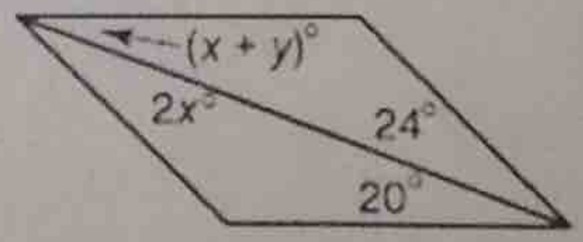


3x + 60 + 60 = 180
3x + 120 = 180
3x = 60
x = 20

5y = 60
y = 12

x = 20
y = 12

7.



2x = 24
12 + y = 20

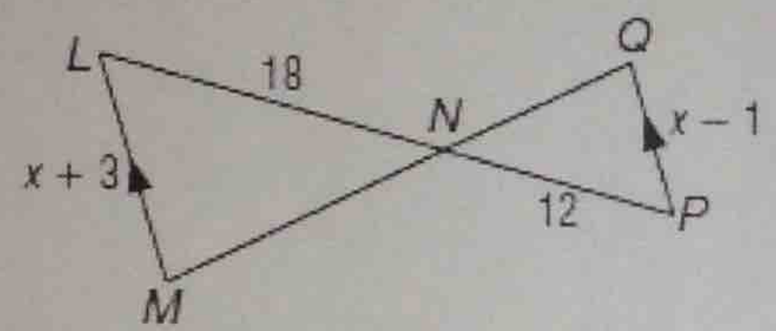
x = 12
y = 8

STATION #4:

Similar Polygons

ALGEBRA Identify the similar triangles, and find x and the measures of the indicated sides.

3. $\overline{LM}$ and $\overline{QP}$



$\frac{12}{18} = \frac{x-1}{x+3}$

$12x + 36 = 18x - 18$

$54 = 6x$

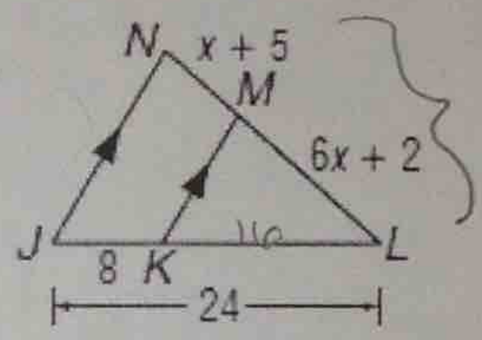
$x = 9$

$LM = 12$

$QP = 8$

$x = 9$

4. $\overline{NL}$ and $\overline{ML}$



$7x + 7$

$\frac{16}{24} = \frac{6x+2}{7x+7}$

$112x + 112 = 144x + 48$

$-32x = -64$

$x = 2$

$\overline{NL} = 21$

$\overline{ML} = 14$

$x = 2$

5. Chris wants to reduce a triangular pattern with sides 16, 16, and 20 centimeters. If the longest side of the new pattern is to be 15 cm, how long should the other two sides be?

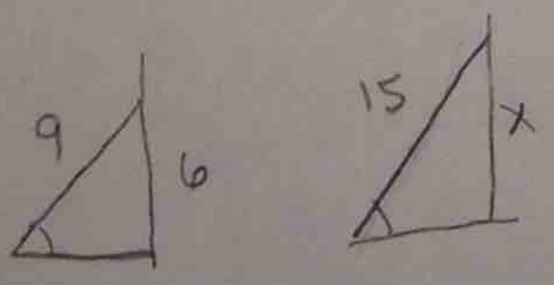
$\frac{15}{20} = \frac{x}{16}$

$20x = 240$

$x = 12$

12 cm and 12 cm

6. A 9-foot ladder leans against a building six feet above the ground. At what height would a 15-foot ladder touch the building if both ladders for the same angle with the ground?



$\frac{9}{15} = \frac{6}{x}$

$9x = 90$

$x = 10$

10 feet above the ground

STATION #5:

Parallel Lines and Transversals

$5x-15 = 3x+1$

$2x = 16$

$x = 8$

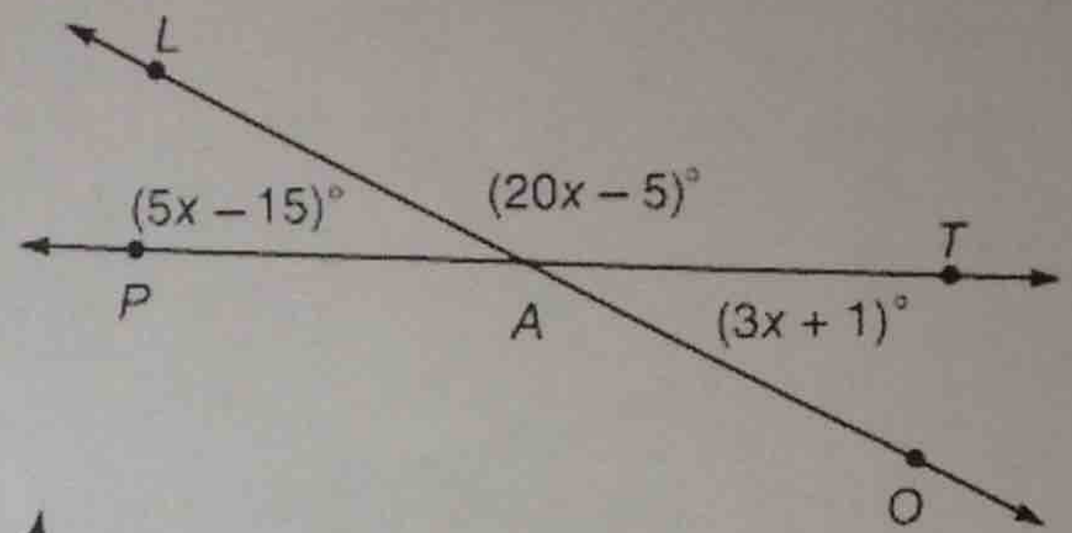
1. Use the figure to find:

   a. x = 8

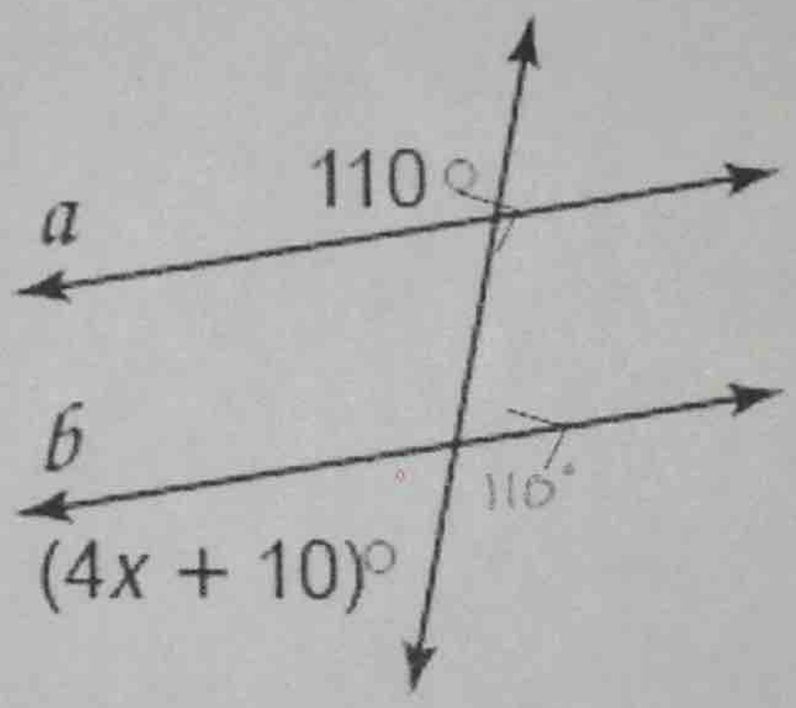
   b. m∡LAT = 155°

   c. m∡TAO = 25°

   d. m∡PAO = 155°



2. Find x.



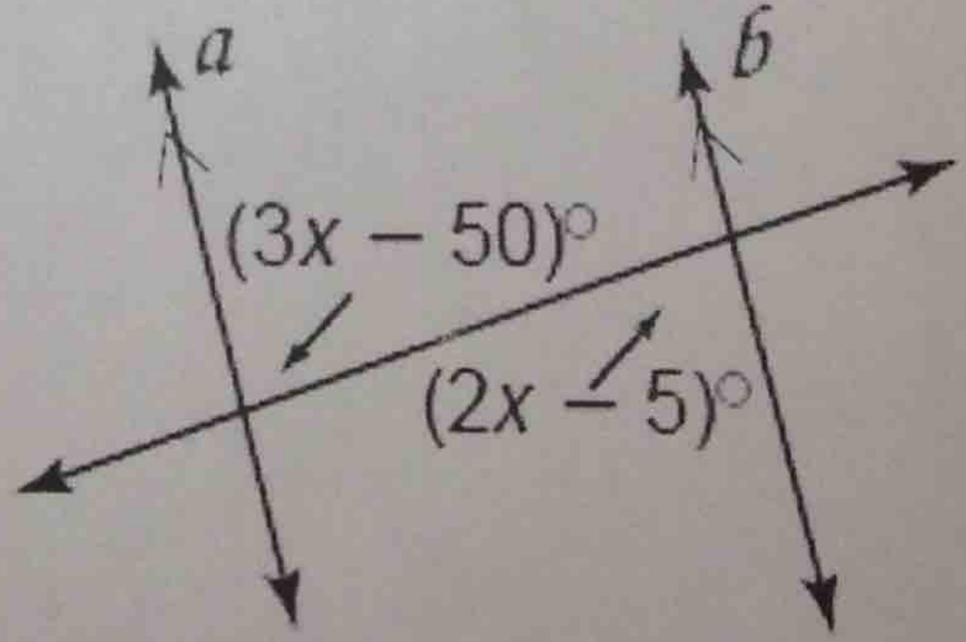
$4x+10+110 = 180$

$4x+120 = 180$

$4x = 60$

$\boxed{x = 15}$

3. Find x.



$3x-50 = 2x-5$

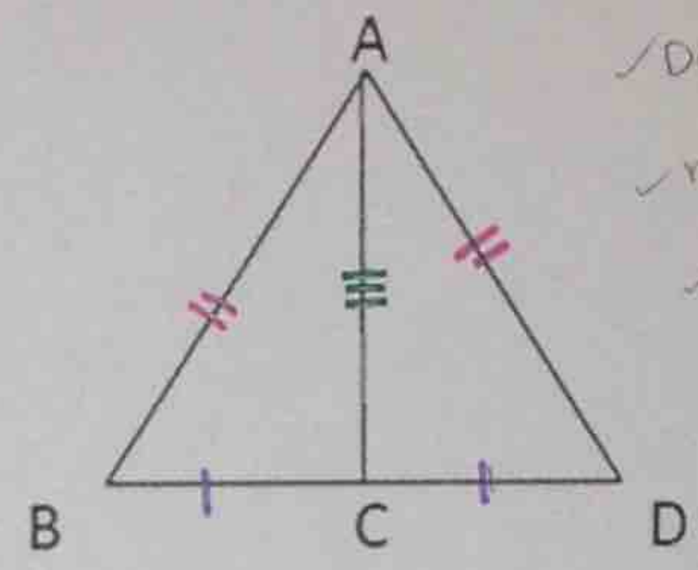
$\boxed{x = 45}$

STATION #6:

Proofs

1. Given: C is the midpoint of BD, $AB \cong AD$

Prove:
$\Delta ABC \cong \Delta ADC$

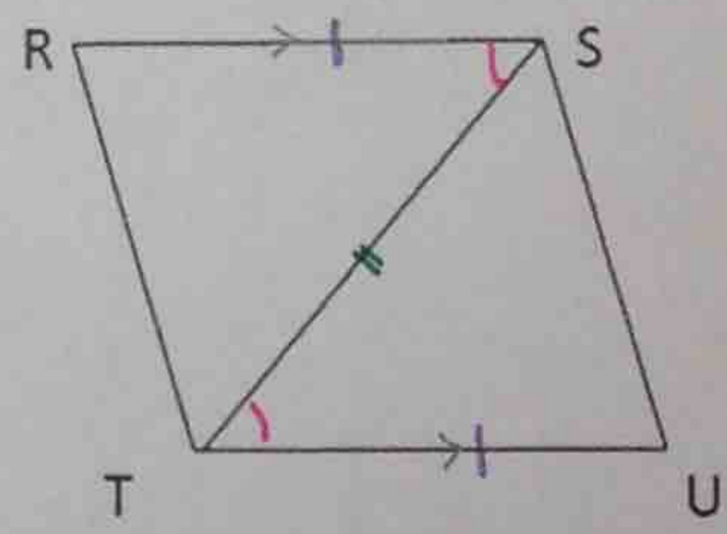


✓Def. of midpoint
✓reflexive
✓SSS ≅

statement	Given
1. C is midpoint of B, $\overline{AB} \cong AD$	1. Given
2. $\overline{BC} \cong \overline{CD}$	2. Def. of midpoint
3. $\overline{AC} \cong \overline{AC}$	3. reflexive
4. $\Delta ABC \cong \Delta ADC$	4. SSS $\Delta \cong$

2. Given: RS || TU , RS ≅ TU

Prove:
$\Delta RST \cong \Delta UTS$



✓ Alt int ∠s
✓ reflexive
✓ SAS ≅

statement	Reason
1. RS // TU	1. Given
2. $\overline{RS} \cong TU$	2. Given
3. ∠RST ≅ ∠UTS	3. Alt. int ∠s ≅
4. $\overline{ST} \cong \overline{ST}$	4. reflexive
5. $\Delta RST \cong \Delta UTS$	5. SAS $\Delta \cong$

STATION #7:

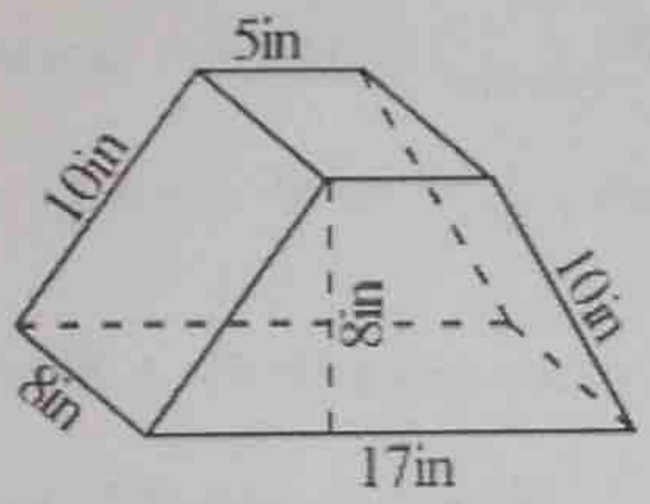
Volume and Surface Area

1. What is the volume of a square pyramid with side length (x-3) and height of (9x)?

$V = (x-3)(x-3)(9x)/3$ or $V = 3x^3 - 18x^2 + 27x$

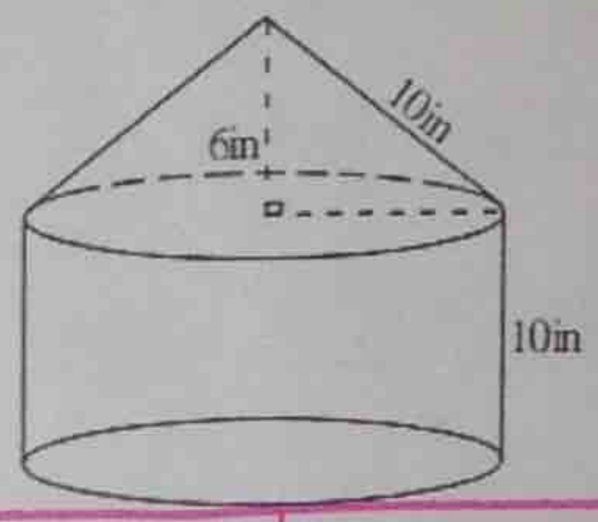
2. Find the volume and surface area: * work on back.

a)



$V = 704\ in^3$	$SA = 512\ in^2$

b)



$V = 2411.52\ in^3$	$SA = 1356.48\ in^2$

3. A cylinder and a cone have the same base and equal volumes. If the cylinder is 15 inches tall, how tall is the cone?

$V_{cone} = \frac{\pi r^2 h}{3}$

$V_{cylinder} = \pi r^2 h$

cone = cylinder

$\frac{\pi r^2 h}{3} = \pi r^2 (15)$

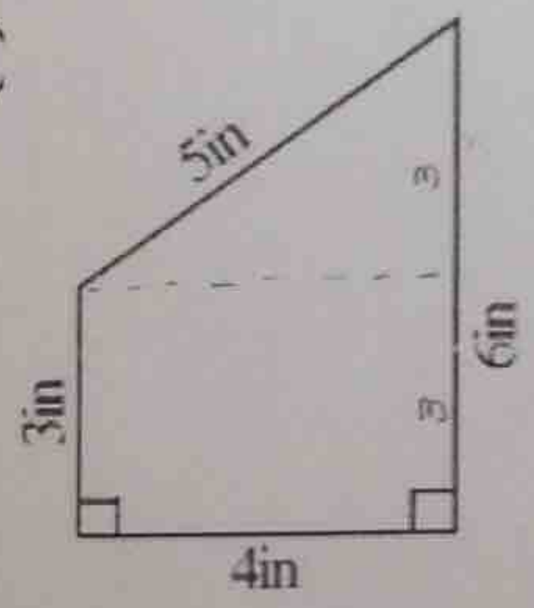
$\pi r^2 h = \pi r^2 (45)$

$h = 45$

height = 45 in

4. Review: Find the area for each of the following.

a)

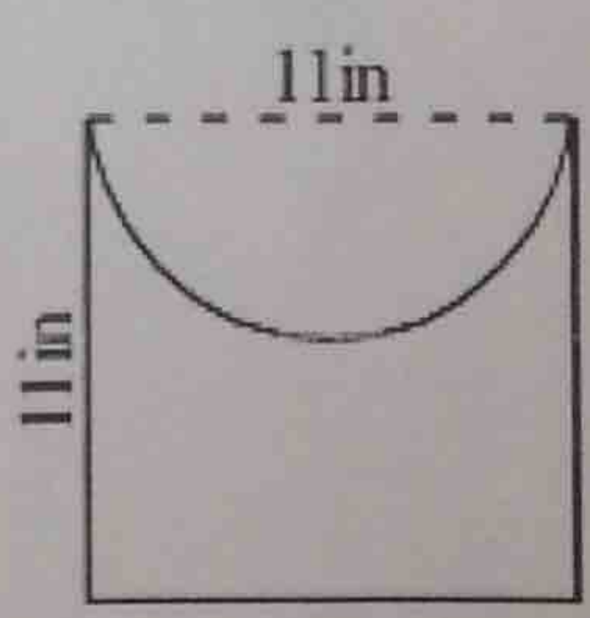


$A_{rec} = (3)(4) = 12$

$A_{\triangle} = \frac{(4)(3)}{2} = 6$

Total Area = $16\ in^2$

b)



$A_{cir} = \frac{(3.14)(5.5)^2}{2} = 47.5$

$A_{square} = (11)(11) = 121$

Total area = 121 - 47.5

TA = $73.5\ in^2$