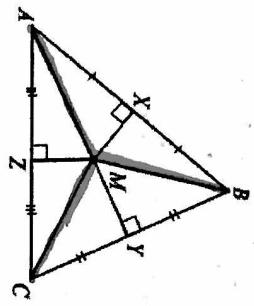


GUIDED NOTES: Centers of Triangles

Circumcenter



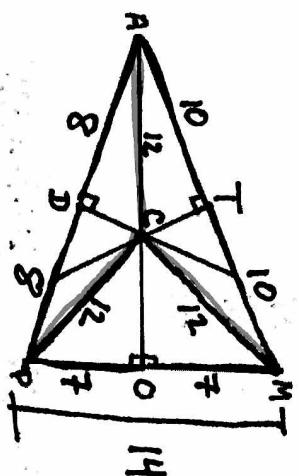
$$AM = BM = CM$$

Important Fact:
The **Circumcenter**
is equidistant from each
vertex of the triangle.

- Ex 1
Given:
C is a circumcenter.
AT = 10
AC = 12
CM = 12
NP = 14
TM = 10
AD = 8

Find:

$$DP = \underline{8}$$



Ex 2) In the diagram, the perpendicular bisectors (shown with dashed segments) of $\triangle ABC$ meet at point G —the **circumcenter**, and are shown dashed. Find the indicated measure.

$$AG = \frac{25}{2}, BD = 20$$

$$CF = \frac{24}{2}, AB = 40$$

$$CE = \frac{15}{2}, AC = 48$$

$$m\angle ADG = \frac{90^\circ}{2}$$

(If $BG = (2x - 15)$, find x .

$$85 = 2x - 15$$

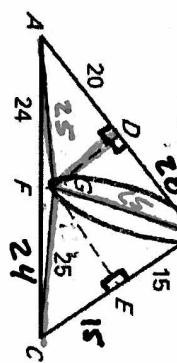
$$D6 = ? \quad a^2 + b^2 = c^2$$

$$a^2 + 20^2 = 25^2$$

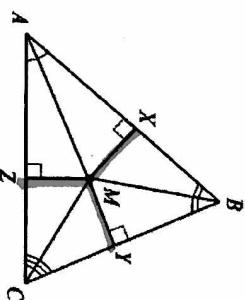
$$a^2 + 400 = 625$$

$$a^2 = 225$$

$$a = 15$$



Incenter



$$XM = YM = ZM$$

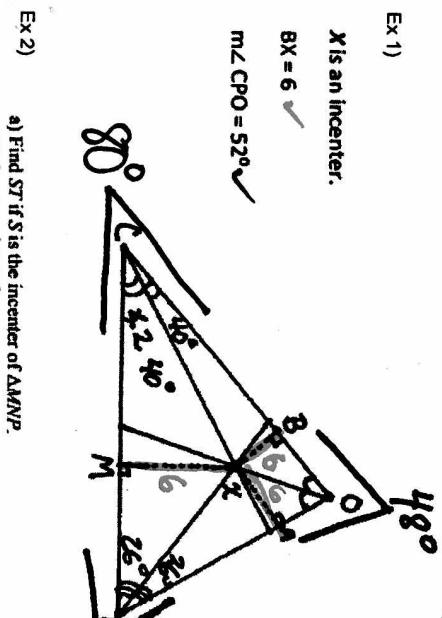
Important Fact:
The **Incenter**
is equidistant from each
side of the triangle.

Ex 1)

X is an incenter.

$$BX = 6$$

$$m\angle CPO = 52^\circ$$



Ex 2)

a) Find ST if S is the incenter of $\triangle MNP$.
 $ST \cong SU$ so use Pythagorean Thm to find SU : $10^2 = 8^2 + b^2$

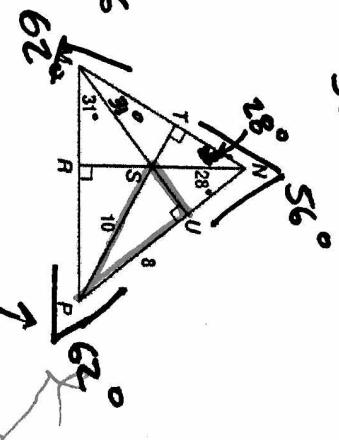
$$100 = 64 + b^2$$

$$b^2 = 36 \quad b = 6$$

$$ST = 6$$

b) Find $m\angle SPV$ if S is the incenter of $\triangle MNP$.

$$131^\circ$$



Find:

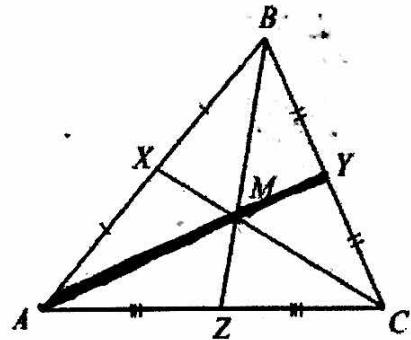
$$XM = \frac{6}{2}$$

$$m\angle Z = \frac{40^\circ}{2}$$

$$m\angle BOX = 24^\circ$$

Angle Bisectors

Centroid



Created by:

Medians

Important Facts:

A median is created by a vertex connected to the midpoint of the opposite side.

$$AM = \frac{2}{3}AY$$

$$MY = \frac{1}{3}AY$$

$$AM = 2MY$$

$$MY = \frac{1}{2}AM$$

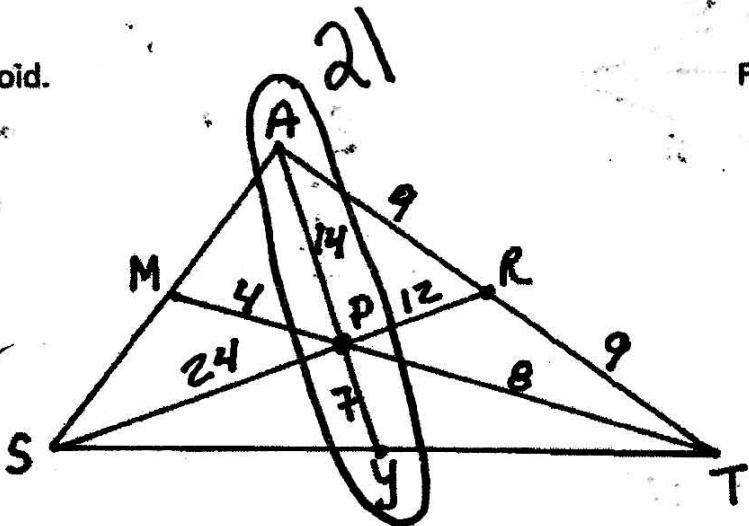
Ex 1) P is a centroid.

$$PR = 12 \checkmark$$

$$PT = 8 \checkmark$$

$$AR = 9 \checkmark$$

$$AY = 21 \checkmark$$



Find:

$$SP = \underline{\quad 24 \quad}$$

$$TM = \underline{\quad 12 \quad}$$

$$AT = \underline{\quad 18 \quad}$$

$$PY = \underline{\quad 7 \quad}$$

Ex 2) Solve for x, y, and z if N is the centroid.

$$6z = \frac{1}{2}(24)$$

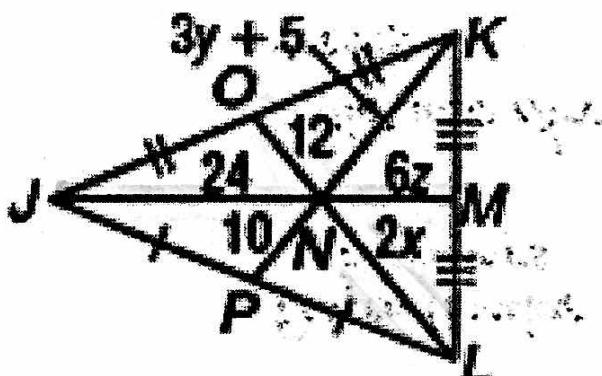
$$6z = 12$$

$$\boxed{z = 2} \checkmark$$

$$2x = 2(12)$$

$$2x = 24$$

$$\boxed{x = 12} \checkmark$$



$$3y + 5 = 2(10)$$

$$3y + 5 = 20$$

$$\boxed{y = 5} \checkmark$$