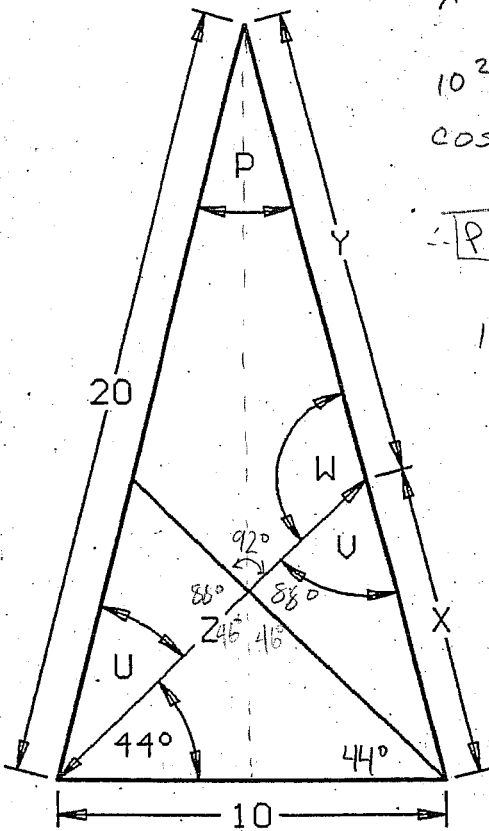


## Quiz 7

### Question 1. (10 marks)

The following is a diagram of a symmetric scissortruss. Find X, Y, Z, U, V, W, and P.



$$X + Y = 20$$

$$10^2 = 20^2 + 20^2 - 2(20)(20)\cos P$$

$$\cos P = \frac{10^2 - 20^2 - 20^2}{-2(20)(20)} = 0.875$$

$$\therefore P = 28.95502437^\circ$$

$$180^\circ = P + 2(u + 44^\circ) \Rightarrow 2u = 180 - P - 88$$

$$\therefore u = 31.52248781^\circ$$

$$\therefore v = 180 - u - 88 = 60.47751219^\circ$$

$$\therefore w = 180 - v = 119.5224878$$

$$\frac{10}{\sin v} = \frac{x}{\sin 44^\circ} \Rightarrow x = \frac{10 \sin 44^\circ}{\sin 60.47751219^\circ}$$

$$x = 7.983089167 \text{ m}$$

$$Y = 20 - x = 12.01691083 \text{ m}$$

$$\frac{z}{\sin(44^\circ + u)} = \frac{x}{\sin 44^\circ} \Rightarrow z = \frac{x \sin(44^\circ + u)}{\sin 44^\circ} = 11.12718593$$