1. (2 points) Describe the *triangle rule* and use it in a sketch to illustrate
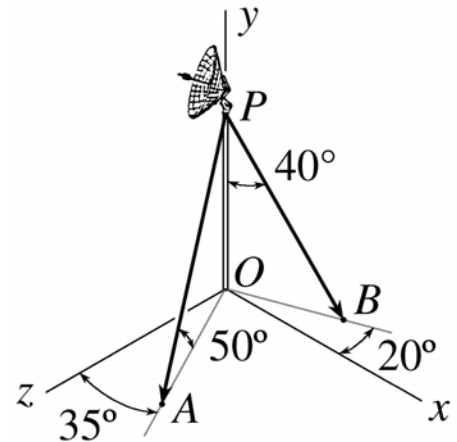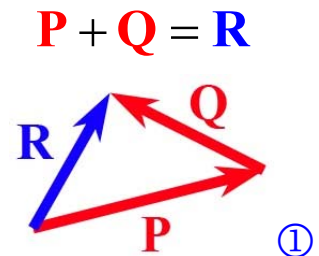
$$\mathbf{P} + \mathbf{Q} = \mathbf{R}$$

2. (8 points) If the tensions in the guy wires *PA* and *PB*, as shown, are T_{PA} = 500 N and T_{PB} = 300 N, determine their resultant force **R** at *P*.

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1. The triangle rule states that when two vectors are drawn to scale and in tip-to-tail fashion, the vector connecting, and directed from, the tail of the first vector to the tip of the second vector gives the resultant of those two vectors. ①

$$\mathbf{P} + \mathbf{Q} = \mathbf{R}$$

①

2.

$\boldsymbol{\lambda}_{PA} = -\sin 50°\mathbf{j} + \cos 50°(\sin 35°\mathbf{i} + \cos 35°\mathbf{k})$ ②

$\boldsymbol{\lambda}_{PB} = -\cos 40°\mathbf{j} + \sin 40°(\cos 20°\mathbf{i} - \sin 20°\mathbf{k})$ ②

$\mathbf{R} = \mathbf{T}_{PA} + \mathbf{T}_{PB} = T_{PA}\,\boldsymbol{\lambda}_{PA} + T_{PB}\,\boldsymbol{\lambda}_{PB}$

$\quad = 500\,\boldsymbol{\lambda}_{PA} + 300\,\boldsymbol{\lambda}_{PB}$

$\quad = 365.55\mathbf{i} - 612.84\mathbf{j} + 197.32\mathbf{k}$

$\quad \therefore \quad \boxed{\mathbf{R} = 366\mathbf{i} - 613\mathbf{j} + 197.3\mathbf{k} \text{ N}}$ ②

②