

Mathematics Questions by Topic

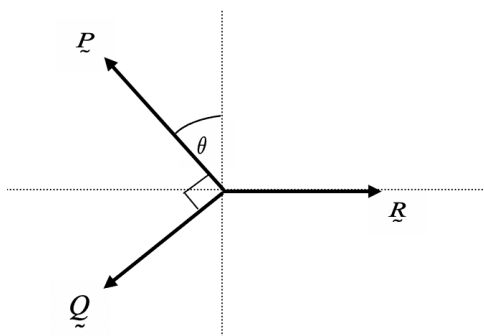
Motion and Force

Answer 47

Source: K7SM2S18

Question 47

The following diagram shows a particle in equilibrium under the action of three concurrent coplanar forces \vec{P} , \vec{Q} and \vec{R} . The forces \vec{P} , \vec{Q} and \vec{R} have magnitudes of P , Q and R respectively.



Which one of the following statements is **not** correct?

- A. $P \operatorname{cosec}(\theta) = Q \sec(\theta)$
- B. $R^2 = P^2 + Q^2$
- C. $R = P \sin(\theta) + Q \cos(\theta)$
- D. $\cot(\theta) = \frac{P}{Q}$
- E. $\vec{P} + \vec{Q} + \vec{R} = \vec{0}$

ANSWER D

- A. resolving vertically
 $P \cos(\theta) - Q \cos(90 - \theta) = 0$

$$P \cos(\theta) = Q \sin(\theta)$$

$$\frac{P}{\sin(\theta)} = \frac{Q}{\cos(\theta)}$$

$$P \operatorname{cosec}(\theta) = Q \sec(\theta) \text{ is true}$$

- B. $R^2 = P^2 + Q^2$ is true

- C. resolving horizontally

$$R - P \sin(\theta) - Q \sin(90 - \theta) = 0$$

$$R = P \sin(\theta) + Q \cos(\theta) \text{ is true}$$

- D. $P \cos(\theta) = Q \sin(\theta) \Rightarrow \frac{P}{Q} = \frac{\sin(\theta)}{\cos(\theta)} = \tan(\theta) \cot(\theta) = \frac{Q}{P}$ D. is false

- E. $\vec{P} + \vec{Q} + \vec{R} = \vec{0}$ is true

