

Solution for the day
Aug 16, 2018

6th Class:

➤ **Mathematics:** Ans :(A)

➤ **Physics:** Sol: (D)

Relative density of liquid

$$= \frac{\text{mass of } V_{\infty} \text{ of liquid}}{\text{mass of } V_{\infty} \text{ of water}} = \frac{160}{200} = 0.8$$

The relative density of kerosene is 0.8

∴ So, that liquid is kerosene

➤ **Chemistry:** Ans: (B)

➤ **Biology:** Ans: (A)

7th Class:

➤ **Mathematics:** Ans: (B)

➤ **Physics:**

Sol: (i) 0 inch to 2 inch =32 division

2 inch to 3 inch = 8 division

(ii) $1\frac{13}{16}$ Inch, 4.60 cm

➤ **Chemistry:** Ans: (C)

➤ **Biology:** Ans: (C)

8th class

➤ **Mathematics:** Ans: (B)

➤ **Physics:** Sol: (A)

➤ **Chemistry:** Ans: (A)

➤ **Biology:** Ans: (B)

9th Class :

➤ Mathematics:

Sol: (A)

$$A+B+C=180^\circ$$

$$\Rightarrow 2A+2B+2C=360^\circ$$

$$\therefore \cos\left(\frac{A+2B+3C}{2}\right) + \cos\left(\frac{A-C}{2}\right)$$

$$= \cos\left(\frac{2A+2B+2C+C-A}{2}\right) + \cos\left(\frac{A-C}{2}\right)$$

$$= \cos\left(180 + \frac{C-A}{2}\right) + \cos\left(\frac{C-A}{2}\right)$$

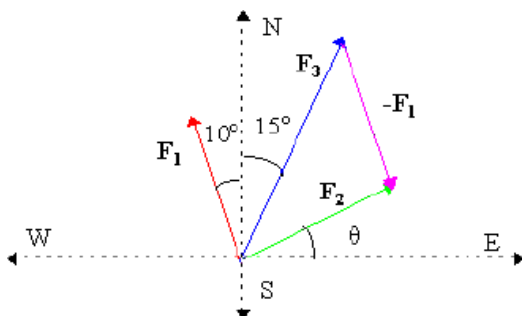
$$[\because \cos(-\theta) = \cos\theta]$$

$$= -\cos\left(\frac{C-A}{2}\right) + \cos\left(\frac{C-A}{2}\right) = 0$$

➤ Physics:

Sol:

We are looking for $F_2 = F_3 - F_1$, a vector subtraction. For vector problems, we first draw a neat sketch of the vectors and the vector operation of interest.



Then to solve the problem numerically, we break the vectors into their components:

$$F_1 = i[150 \sin(50^\circ)] + j[150 \cos(15^\circ)] = i[38.823] + j[144.889]$$

$$F_3 = i[-100 \sin(10^\circ)] + j[100 \cos(10^\circ)] = i[-17.365] + j[98.48]$$

We subtract the components to get the components of vector F_2 .

$$F_2 = i[38.823 - (-17.365)] + j[144.889 - 98.481] = i[56.188] + j[46.408]$$

Then we convert to polar coordinate form Using Pythagoras' Theorem

$$F_2 = [(56.188)^2 + (46.408)^2]^{1/2} = 72.875 N$$

$$\text{The angle } \theta = \arctan t(|F_{2y} / F_{2x}|) = \arctan(46.408 / 56.188) = 39.55^\circ$$

Thus the other force is 72.9N at 39.6° north of east.

➤ Chemistry: (B)

➤ Biology: Ans: (D)

10th class :

➤ Mathematics:

Sol: (B) We have, $\tan \theta = k \tan \phi \Rightarrow \frac{\tan \theta}{\tan \phi} = \frac{k}{1}$

Apply componendo and dividendo, we have

$$\frac{\tan \theta - \tan \phi}{\tan \theta + \tan \phi} = \frac{k-1}{k+1} \Rightarrow \frac{\frac{\sin \theta}{\cos \theta} - \frac{\sin \phi}{\cos \phi}}{\frac{\sin \theta}{\cos \theta} + \frac{\sin \phi}{\cos \phi}} = \frac{k-1}{k+1}$$

$$\Rightarrow \frac{\sin \theta \cos \phi - \cos \theta \sin \phi}{\sin \theta \cos \phi + \cos \theta \sin \phi} = \frac{k-1}{k+1}$$

$$\Rightarrow \frac{\sin(\theta - \phi)}{\sin(\theta + \phi)} = \frac{k-1}{k+1}$$

$$\Rightarrow \frac{\sin(\theta - \phi)}{\sin \alpha} = \frac{k-1}{k+1}$$

[$\because \theta + \phi = \alpha$ (given)]

$$\text{Hence } \sin(\theta - \phi) = \frac{k-1}{k+1} \sin \alpha$$

➤ Physics: Ans:

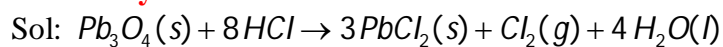
$$Q = ms\Delta\theta$$

$$= (1\text{kg}) \times (1\text{cal/g}^\circ\text{C}) \times 20(^\circ\text{C})$$

$$= (1\text{kg}) \times (1\text{kcal/kg}^\circ\text{C}) \times 20(^\circ\text{C})$$

$$= 20\text{kcal}$$

➤ Chemistry:



➤ Biology:

Ans: (A)

Reasoning:

Ans: (A)