

$$10a \quad \frac{12a}{9} \quad \frac{a}{11}$$

سوال ۲ ✓

$$\frac{\frac{12a}{9}}{\frac{100}{1}} = \frac{a}{110} \Rightarrow \frac{\frac{12a}{9}}{100} = \frac{a}{110} \Rightarrow \frac{12a}{900} = \frac{a}{110} \Rightarrow \frac{12}{900} = \frac{1}{110}$$

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$$\frac{12a \times 110}{9 \times 100} = a = \frac{12a}{9} = a \quad 12/9a = a$$

$$\frac{\frac{a}{11}}{\frac{1}{1}} = \frac{a}{110} \Rightarrow \frac{a}{11} = \frac{a}{110}$$

$$\frac{\frac{12a}{9} \times 110}{11 \times 1} = \frac{12a}{9} = 12/9a = a$$

$$12/9a + 12/9a + 10a = 11$$

$$a(\frac{12}{9} + \frac{12}{9} + 10) = 11 \quad a = \frac{11 \times 9}{24} = \frac{99}{24} = \frac{33}{8} \Rightarrow \boxed{a = \frac{33}{8}}$$

سوال ۳

$$-\sin 30^\circ \cos 40^\circ + \cos 30^\circ \sin 40^\circ = \sin \theta$$

$$\cos 10^\circ = \sin \theta$$

$$-\frac{1}{2} + \frac{\sqrt{3}}{2} = \frac{\sqrt{3}}{2} - \frac{1}{2} \Rightarrow \sin \theta = \frac{\sqrt{3}-1}{2}$$

$$\tan \theta = +1$$

سوال ۴ ✓

$$\tan \theta = a$$

$$\frac{r \sin \theta - \cos \theta}{\sin \theta - r \cos \theta}$$

$$\frac{12a - a}{a - 12a} = \frac{11a(1-12)}{a(1-12)} = \boxed{11}$$

$$\frac{\sin \theta}{\cos \theta} = a \Rightarrow \sin \theta = a \cos \theta \quad \cos \theta = a$$

$$\frac{r \tan 40^\circ (1 - \tan^2 40^\circ)}{(1 - \cot^2 40^\circ)^2}$$

$$= \frac{4 \times \frac{1}{\sqrt{2}} \left(1 - \frac{1}{2}\right)}{\left(1 - \frac{1}{2}\right)^2}$$

$$\left(\frac{4}{\sqrt{2}}\right) \left(1 - \frac{1}{2}\right)$$

$$\left(\frac{4}{\sqrt{2}}\right) \left(\frac{1}{2}\right)$$

✓ = 2√2

$$= \frac{2}{\sqrt{2}}$$

✓

$$\frac{r}{\sqrt{r}} = \tan \theta$$

$$\frac{r}{\sqrt{r}} = \tan \theta \Rightarrow \sqrt{r} = \tan \theta \Rightarrow \theta = 40^\circ$$

$$\frac{40}{110} = \frac{\alpha}{17} \Rightarrow \frac{1}{2} = \frac{\alpha}{17} \Rightarrow \alpha = \frac{17}{2}$$

$$\text{ii) } \underbrace{\cos 40^\circ \cos 70^\circ}_{\frac{1}{2} \times \frac{\sqrt{3}}{2}} - \underbrace{\sin 40^\circ \sin 70^\circ}_{\frac{\sqrt{3}}{2} \times \frac{1}{2}} - \frac{\tan 60^\circ}{1} + \frac{1 \tan 60^\circ}{\sqrt{3}}$$

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$$\frac{\sqrt{3}}{2} - \frac{\sqrt{3}}{2} - 1 + 1 = \boxed{1} \quad \checkmark$$

$$\text{c) } \frac{\tan 70^\circ + \tan 60^\circ + \tan 40^\circ}{\cot 70^\circ - \cot 40^\circ} = \frac{1 + \sqrt{3} + 1}{\sqrt{3}} = \frac{2 + \sqrt{3}}{\sqrt{3}}$$

$$\Rightarrow \left(\frac{1 - \frac{1}{\sqrt{3}}}{\frac{1}{\sqrt{3}} - \frac{1}{2}} \right) = \frac{\sqrt{3}}{2}$$

$$\tan 70^\circ = \frac{1/\sqrt{3}}{1/2} = \frac{2}{\sqrt{3}}$$

$$\tan 40^\circ = \frac{2/\sqrt{3}}{1} = \frac{2}{\sqrt{3}}$$

$$\frac{2/\sqrt{3}}{1} = \boxed{\frac{2}{\sqrt{3}}} = \boxed{\frac{2\sqrt{3}}{3}}$$

السؤال ١٥ <

$$\tan \alpha = \frac{1}{\sqrt{3}}$$

$$= \frac{\sin \alpha}{\cos \alpha}$$

$$\frac{1}{\sqrt{3}} = \frac{\sin \alpha}{\cos \alpha}$$

$$\begin{aligned} \sin \alpha &= a \\ \cos \alpha &= \sqrt{3}a \end{aligned}$$

$$a^2 = 1 - (\sqrt{3}a)^2$$

$$0 = 1 - \sqrt{3}a^2$$

$$\sin \alpha = -\frac{1}{\sqrt{3}}$$

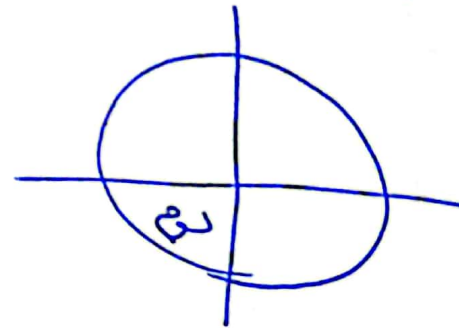
$$0 = (1 - \sqrt{3}a)(1 + \sqrt{3}a)$$

$$a = \frac{1}{\sqrt{3}} \quad \text{or} \quad a = -\frac{1}{\sqrt{3}}$$

$$a = -\frac{1}{\sqrt{3}} <$$

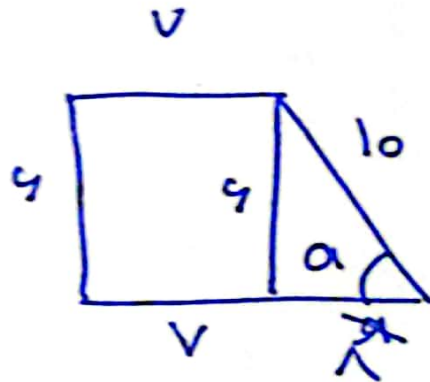
من هنا نحصل على

$$a = -\frac{1}{\sqrt{3}}$$



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سوال ۷ ✓

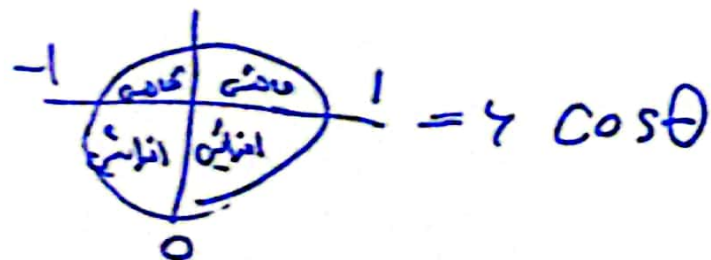
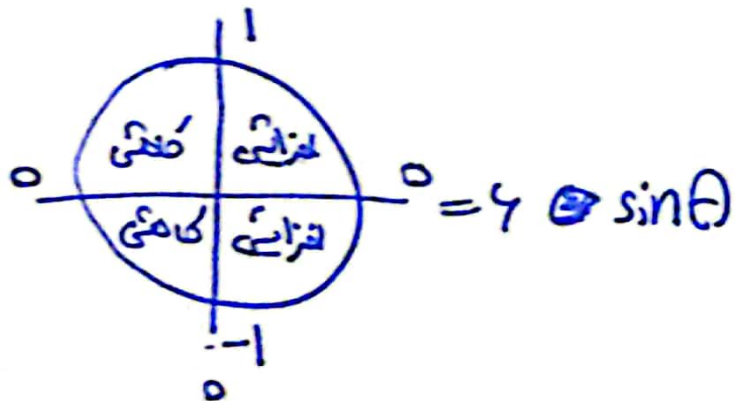


$$\sin a = \frac{4}{5}$$

$$\frac{4}{5} \times 5 = 4$$

$$100 - 34 = 66 = 4 \times 17 = 4 \times 17 = 68 \quad 17 = 17$$

$$4 + 4 + 1 + 10 + 4 = 33$$



سوال ۹ = ۲ ✓

الف) نصف دوم ✓

ب) ~~نصف اول~~ دوم ✓