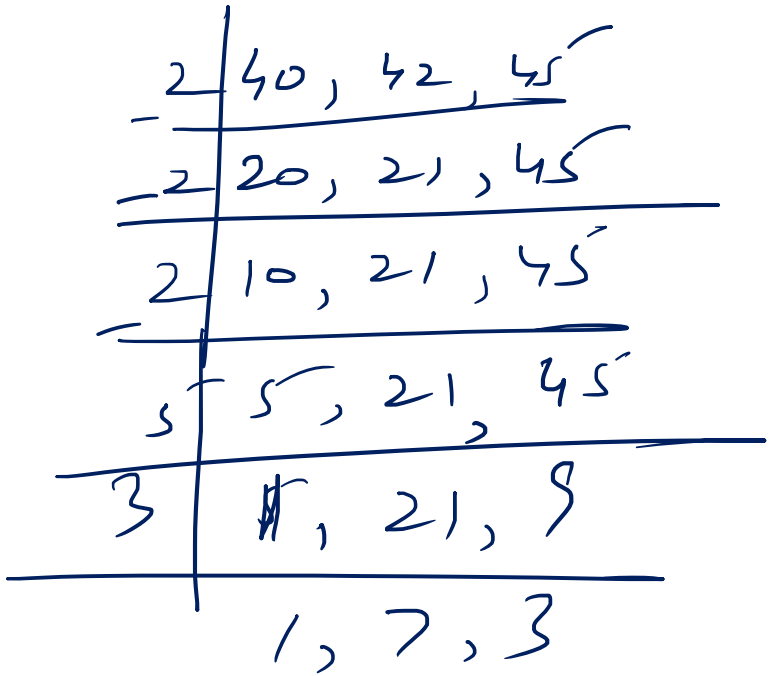
your doubts

On a morning walk, three persons step off together and their steps measure 40 cm, 42 cm and 45 cm, respectively. What is the minimum distance each should walk so that each can cover the same distance in complete steps?

LCM of 40, 42, 45 = 2520 cm

= 25.2 m



120
21
12
24

On dividing polynomial $p(x)$ by x^2+2x-1, the quotient and remainder obtained are x^2+x+1 and $2x+2$ respectively. Find $p(x)$.

$x^2+2x-1 \overline{)\ p(x)\ (\ x^2+x+1}$

$2x+2$

$p(x) = \text{divisor} \times \text{quotient} + \text{remainder}$

$= (x^2+2x-1)(x^2+x+1) + 2x+2$

$= x^4+3x^3+2x^2+3x+1$

$$\frac{m+n}{x+y}+\frac{m-n}{x-y}=2$$

$$\frac{2m}{x+y}+\frac{2n}{x+y}=2$$

$$1\,\frac{m+n}{m+n}+\frac{m-n}{x-y}=2$$

$$\frac{2m+2n}{x+y}=2$$

$$\frac{m-n}{x-y}=1$$

$$2(m+n)=2(x+y)$$

$$m-n=x-y$$

$$x+y=m+n \quad \text{— (1)}$$

$$x-y=m-n \quad \text{— (2)}$$

(1) + (2)

$$2x=2m$$

$$\boxed{x=m}$$

$$\boxed{y=n}$$

The sum of a two-digit number and the number formed by reversing the digits is 88. Determine the number if the difference of the digits is 2.

Let unit digit $= x$

" ten's " $= y$

$\text{no.} = 10y + x$

$\text{Reversed no.} = 10x + y$

$10y + x + 10x + y = 88$

$11(x + y) = 88$

$x + y = 8$

$x - y = 2$ or $y - x = 2$

Case 1

$x - y = 2$

$x + y = 8$

Case 2

$y - x = 2$

$x + y = 8$

$\text{no.s} = 53, 35$

Find k if the following equation has real and equal roots: $(2k+1)x^2 - 2(k-1)x + 1 = 0$

$D = 0$

$b^2 - 4ac = 0$

$[-2(k-1)]^2 - 4(2k+1)(1) = 0$

$4(k^2 - 2k + 1) - 4(2k+1) = 0$

$4k^2 - 8k + 4 - 8k - 4 = 0$

$4k^2 - 16k = 0$

$4k(k-4) = 0$

$4k = 0$ or $k - 4 = 0$

$k = 0$, $k = 4$

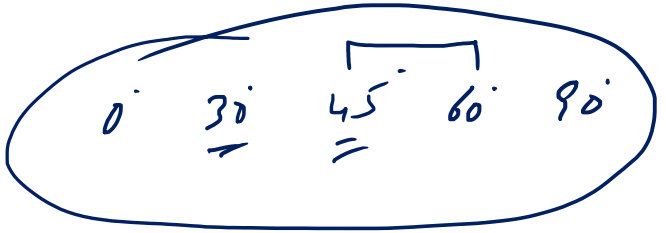
$$\frac{\sin^2 30^\circ + \cos^2 30^\circ + \tan^2 30^\circ}{\sec^2 30^\circ + \operatorname{cosec}^2 30^\circ + \cot^2 30^\circ}$$

$$= \frac{\left(\frac{1}{2}\right)^2 + \left(\frac{\sqrt{3}}{2}\right)^2 + \left(\frac{1}{\sqrt{3}}\right)^2}{\left(\frac{2}{\sqrt{3}}\right)^2 + 2^2 + \left(\sqrt{3}\right)^2}$$

$$= \frac{\frac{1}{4} + \frac{3}{4} + \frac{1}{3}}{\frac{4}{3} + 4 + 3}$$

$$= \frac{\frac{4}{3}}{\frac{25}{3}} = \frac{4}{25}$$

If cos(A – B) = cosA.cosB + sinA.sinB, find the value of cos15°.



Let $A = 60°$, $B = 45°$

$\cos(60° - 45°) = \cos 60 \cos 45 + \sin 60 \sin 45$

$\cos 15° = \frac{1}{2} \times \frac{1}{\sqrt{2}} + \frac{\sqrt{3}}{2} \times \frac{1}{\sqrt{2}}$

$= \frac{1}{2\sqrt{2}} + \frac{\sqrt{3}}{2\sqrt{2}}$

$= \frac{1 + \sqrt{3}}{2\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}}$

$\cos 15° = \frac{\sqrt{2} + \sqrt{6}}{4}$

If $\tan(A+B)=1$, $\sin(2A-B)=1$, find the values of A and B.

$\tan(A+B)=1$

$\tan(A+B)=\tan 45^\circ$

$A+B=45^\circ$ ——— (1)

$\sin(2A-B)=1$

$\sin(2A-B)=\sin 90^\circ$

$2A-B=90^\circ$ ——— (2)

(1) + (2)

$3A=135^\circ$

$A=45^\circ$

$B=0^\circ$

If $\tan A = \frac{1}{2}$, $\tan B = \frac{1}{3}$, $\tan(A+B) = \frac{\tan A + \tan B}{1 - \tan A . \tan B}$, find the value of $(A+B)$.

$$\tan(A+B) = \frac{\tan A + \tan B}{1 - \tan A \cdot \tan B}$$

$$= \frac{\frac{1}{2} + \frac{1}{3}}{1 - \frac{1}{2} \times \frac{1}{3}}$$

$$= \frac{\frac{3+2}{6}}{1 - \frac{1}{6}}$$

$$= \frac{\frac{5}{6}}{\frac{5}{6}} = 1$$

$$\tan(A+B) = \tan 45^\circ$$

$$A + B = 45^\circ$$

$\tan 1^\circ . \tan 2^\circ . \tan 3^\circ \ldots\ldots\ldots\ldots \tan 89^\circ .$

$\tan 1 \quad \tan 89 \quad \tan 2 \quad \tan 88 \quad \ldots\ldots \quad \tan 45$

$\tan 1 \cdot \cot(90-89) \quad \tan 2 \cdot \cot(90-88) \quad \ldots\ldots \quad (1)$

$\tan 1 \cdot \cot 1 \quad \tan 2 \quad \cot 2 \ldots\ldots$

$\tan 1 \cdot \frac{1}{\tan 1} \cdot \tan 2 \cdot \frac{1}{\tan 2} \ldots\ldots$

1 Ans