التاريخ:

$$BC = \sqrt{12.25} \times \frac{10}{21} \times \sqrt{\frac{3}{2}}$$

$$= \sqrt{1225 \times 10^{-2}} \times \frac{10}{21} \times \sqrt{\frac{3}{2}}$$

$$= \sqrt{\frac{7^2 \times 5^2}{10^2}} \times \frac{10}{21} \times \sqrt{\frac{3}{2}}$$

$$= \frac{7}{2} \times \frac{10}{21} \times \sqrt{\frac{3}{2}}$$

$$= \frac{5}{3} \times \frac{\sqrt{3}}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}}$$

$$BC = \frac{5\sqrt{6}}{6} \text{ cm}$$

Thus, BC is an irrational no,
(②; since $\sqrt{6}$ is not an integer)

$$AD = \left(\frac{1}{2} - \frac{1}{3} \times \frac{1}{4}\right)\left(\sqrt{2} \times \sqrt{12}\right)$$

$$= \left(\frac{1}{2} - \frac{1}{12}\right)\sqrt{2^2 \times 6}$$

$$= \left(\frac{6-1}{12}\right)\sqrt{2^2 \times 6}$$

$$= \frac{5}{12} \times 2\sqrt{6}$$

$$AD = \frac{5\sqrt{6}}{6} \text{ cm} \quad (②)$$

$$CD = \sqrt{7.\bar{3} - \frac{61}{12}} \times \left(\frac{5}{3}\right)^2$$

$$= \sqrt{7 + \frac{3}{9} - \frac{61}{12}} \times \left(\frac{5}{3}\right)^2$$

$$= \sqrt{\frac{21+1}{3} - \frac{61}{12}} \times \left(\frac{5}{3}\right)^2$$

$$= \sqrt{\frac{22}{3} - \frac{61}{12}} \times \left(\frac{5}{3}\right)^2$$

$$= \sqrt{\frac{88-61}{12}} \times \left(\frac{5}{3}\right)^2$$

$$= \sqrt{\frac{27}{12}} \times \left(\frac{5}{3}\right)^2$$

$$= \sqrt{\frac{3^2}{4}} \times \left(\frac{5}{3}\right)^2$$

$$CD = \frac{3}{2} \times \left(\frac{5}{3}\right)^2$$

$CD = \frac{25}{6}$ cm is a rational no, (①).

b) In quadrilateral ABCD we have:

$AB = CD = \frac{25}{6}$ (proved)

$AD = BC = \frac{5\sqrt{6}}{6}$ cm (proved)

Thus, ABCD is a parallelogram having two pairs of equal sides.