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$$16. (1). \cos A = \frac{b^2 + c^2 - a^2}{2bc} = \frac{\sqrt{5}}{2}$$

$$\frac{1}{2}c^2 = b^2 - a^2$$

$$c^2 = a^2 + b^2 - 2ab \cos C$$

$$\sin B - \sin^2 A = \pm \sin^2 C$$

$$\sin^2 A \cos^2 C + \pm \sin^2 A \cdot \pm \sin^2 C + \pm \sin^2 C \cdot \pm \sin^2 A + \sin^2 C \cos^2 A$$

$$-\sin^2 A = \pm \sin^2 C$$

$$\frac{1}{2} \cos^2 C + \frac{1}{2} \sin^2 C + \frac{1}{2} \cos^2 C - \frac{1}{2} = \pm \sin^2 C$$

$$\cos^2 C + \sin^2 C + \sin^2 C - 1 = \sin^2 C$$

$$\cos^2 C + 1 - 2\sin^2 C + \sin^2 C - 1 = \sin^2 C$$

$$\cos^2 C = 2\sin^2 C$$

$$\therefore \frac{\sin^2 C}{\cos^2 C} = \frac{1}{2} \quad \therefore \tan^2 C = \frac{1}{2} \quad \therefore \tan C = \frac{\sqrt{2}}{2}$$

$$12) \sin C = \frac{\sqrt{6}}{3} \quad \cos C = \frac{\sqrt{3}}{3}$$

$$\sin B = \sin(A+C) = \sin A \cos C + \cos A \sin C$$

$$= \frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{3} + \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{6}}{3} = \frac{2\sqrt{6} + 3\sqrt{6}}{6}$$

$$S_{\triangle ABC} = \frac{1}{2} bc \sin A = 3$$

$$bc = 6\sqrt{2}$$

$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$\therefore b = 2\sqrt{2}$$

AI Response:

€ • , f „ ... †

‡ ^ % Š &lt; Œ • Ž •

### • ' (i)

1. \*\*' " " † • , \*\*•

- —~ • , ™' " " † š > œ \ ( cos A \ ) • ž Ÿ ™ \ ( j {3/2 \ ) > Φ \ ( A = 30^\circ \ ) ∈ \ ( A = 330^\circ \ ) ∝ ∕ S ∴ ©ª « ¬ - ®¯ \ ( A = 30^\circ \ )° ‡

2. \*\*> ±² \ ( sin² B - sin² A = 1/2 sin² C \ )\*\*•

- ³ ´ « ∕ μ ¶ · ¸ Š ¹ Φ ° ¶² » ∴ ∙ , f „ ...¼ ' ½ ‡

- — ...¼ ∴ ¾ ∫ • , ™ \ ( sin² A cos² C + 1/4 sin² 2C

\ ) » Ä Á Φ ~ Ä Φ Ä ° Ä Å Æ Ÿ ‡

- ...¼ ∴ - • , ™ \ ( 1/2 cos² C + 1/8 sin² 2C + 1/2 cos² C

\ ) » Ä Á Ž š Ç È † É ‡

- — Ê Ë Æ Ĩ \ ( \tan C = j {3/3 \ ) » Ä Á Φ ~ Í Ĩ f „ ...† ‡

### • Î ' (ii)

1. \*\*—" ' " Ĩ \*\*•

- —~ Ð Ĩ ™ \ ( sin C = j {3/3 \ ) \ ( cos C = j {6/3 \ ) ‡

2. \*\*—" " † • , \*\*•

- • , ™—" " † š Ñ Ò \ ( sin B

\ ) » Ñ Ò ∴ ∙ f „ ‡

- Ñ Ò \ ( sin B \ ) Ó - • , ™ \ ( sin A cos C + cos A sin C

\ ) —~ » Ñ Ò Ò Ò \ ( 3j {2 + j {6/6 \ ) Õ × Ø Ù ‡

- — Ñ Ò ∕ S Ú Û Ó ¾ ∫ • , ™ \ ( 1/2 b c sin A = 3 \ ) » Ä Á Ð Ĩ \ ( b c = 6 j {2 \ ) Ü Ý ...¼ ‡

- Ê Ë Ñ Ò \ ( b \ ) Ó - • , ™' " " † » Ä Á Ð Ĩ Š < Ñ Ò Ž ‡

### Þ Ò

1. \*\* ∙ , f „ ...† \*\*• - ∙ , f „ ...† Ö × ß à á â ã Ö × Á Φ ~ š Ç Ž ‡

2. \*\*Ñ Ò \*\*• Ñ Ò ∴ - Ö × ß à < ä å æ ∙ f „ ‡

3. \*\*Ø Ù Ž \*\*• Ÿ Ĩ Ô Õ Æ - Ö × ç è é ê Ø Ù Ž • ß à è ì ‡

Í Î - ∴ ā ĩ × Á Φ ~ š Ç Ž å æ ∙ f „

‡ Ó - Ö × Ñ Ò ∴ ß à < ä å æ Õ × ‡