

1800

1.

$$|B| = (\alpha_2, 2\alpha_1 - \alpha_3, \alpha_1 + \alpha_2) + (2\alpha_3, 2\alpha_1 - \alpha_3, \alpha_1 + \alpha_2)$$

$$= (\alpha_2, -\alpha_3, \alpha_1) + (2\alpha_3, 2\alpha_1, \alpha_2)$$

$$= -(\alpha_1, \alpha_2, \alpha_3) + 4(\alpha_1, \alpha_2, \alpha_3)$$

$$= 3|A|$$

$$= 3 \times 3 = 9$$

2.

$$|(\alpha_1, \alpha_2, \beta_1) + 2(\alpha_1, \alpha_2, \beta_2)|$$

$$= |(3\alpha_1, 3\alpha_2, \beta_1 + 2\beta_2)|$$

$$= 9 |(\alpha_1, \alpha_2, \beta_1 + 2\beta_2)|$$

$$= 9(|\alpha_1, \alpha_2, \beta_1| + |\alpha_1, \alpha_2, 2\beta_2|)$$

$$= 9(|A| + 2|B|)$$

$$= 9(2 + 6)$$

$$= 72$$

$$3. \quad |3A - B| = |(3\alpha_1, 3\alpha_2, 3\beta_1) - (\alpha_1, \alpha_2, \beta_2)|$$

$$= |2\alpha_1, 2\alpha_2, 3\beta_1 - \beta_2|$$

$$= |2\alpha_1, 2\alpha_2, 3\beta_1| - |2\alpha_1, 2\alpha_2, \beta_2|$$

$$= 12|\alpha_1, \alpha_2, \beta_1| - 4|\alpha_1, \alpha_2, \beta_2|$$

$$= 12|A| - 4|B|$$

$$= \{2 \times 2 - 4 \times 3\} = 12$$