

## Q1. (2019)

|    |                                                                                                                                                                                                                                                                                                                       |        |                                                                                                                                                                                                    |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 22 | <b>Alternative method 1</b>                                                                                                                                                                                                                                                                                           |        |                                                                                                                                                                                                    |
|    | $(\sqrt{12} =) 2\sqrt{3}$                                                                                                                                                                                                                                                                                             | M1     |                                                                                                                                                                                                    |
|    | $5\sqrt{3} - 2\sqrt{3} = 3\sqrt{3}$                                                                                                                                                                                                                                                                                   | A1     | implies M1A1                                                                                                                                                                                       |
|    | 27 with M1A1 seen                                                                                                                                                                                                                                                                                                     | A1     |                                                                                                                                                                                                    |
|    | <b>Alternative method 2</b>                                                                                                                                                                                                                                                                                           |        |                                                                                                                                                                                                    |
|    | $5\sqrt{3} 5\sqrt{3} - 5\sqrt{3} \sqrt{12} - 5\sqrt{3} \sqrt{12}$<br>$+ \sqrt{12} \sqrt{12}$<br>or<br>$25\sqrt{3} \sqrt{3} - 10\sqrt{3} \sqrt{12} + \sqrt{12} \sqrt{12}$<br>or $(5\sqrt{3} 5\sqrt{3} =) 75$<br>or $(5\sqrt{3} \sqrt{12} =) 30$<br>or $(10\sqrt{3} \sqrt{12} =) 60$<br>or $(\sqrt{12} \sqrt{12} =) 12$ | M1     | oe expansion<br>eg1 $\sqrt{75} \sqrt{75} - \sqrt{75} \sqrt{12} - \sqrt{75} \sqrt{12}$<br>$+ \sqrt{12} \sqrt{12}$<br>eg2 $\sqrt{75} \sqrt{75} - \sqrt{900} - \sqrt{900}$<br>$+ \sqrt{12} \sqrt{12}$ |
|    | $75 - 30 - 30 + 12$<br>or<br>$75 - 60 + 12$                                                                                                                                                                                                                                                                           | A1     | implies M1A1                                                                                                                                                                                       |
|    | 27 with M1A1 seen                                                                                                                                                                                                                                                                                                     | A1     |                                                                                                                                                                                                    |
|    | <b>Additional Guidance</b>                                                                                                                                                                                                                                                                                            |        |                                                                                                                                                                                                    |
|    | 27 with no working ( $2\sqrt{3}$ not seen)                                                                                                                                                                                                                                                                            | M0A0A0 |                                                                                                                                                                                                    |
|    | Alt 1 $5\sqrt{3} - \sqrt{12} = 3\sqrt{3}$ ( $2\sqrt{3}$ not seen)                                                                                                                                                                                                                                                     | M0A0A0 |                                                                                                                                                                                                    |
|    | Alt 2 $75 - 30 - 30 - 12$                                                                                                                                                                                                                                                                                             | M1A0A0 |                                                                                                                                                                                                    |
|    | Alt 1 $5\sqrt{3} - 2\sqrt{3} = 3\sqrt{3}$ followed by $3\sqrt{3}^2 = 27$<br>(condone missing brackets)                                                                                                                                                                                                                | M1A1A1 |                                                                                                                                                                                                    |
|    | Only converting to decimals                                                                                                                                                                                                                                                                                           | M0A0A0 |                                                                                                                                                                                                    |