

|   |                                                                                                                                          |
|---|------------------------------------------------------------------------------------------------------------------------------------------|
| 8 | Separate variables correctly                                                                                                             |
|   | Obtain term $Ae^{-2y}$                                                                                                                   |
|   | Obtain term $B\ln(x^2 + 1)$                                                                                                              |
|   | Obtain $-\frac{1}{2}e^{-2y} = \frac{k}{2}\ln(x^2 + 1) + C$                                                                               |
|   | Use $y = 0$ when $x = 0$ to evaluate $c$ or as limits in a solution containing terms of the form $e^{-2y}$ and $\ln(x^2 + 1)$            |
|   | Use $y = -\frac{1}{2}$ when $x = 1$ to evaluate $k$ or as limits in a solution containing terms of the form $e^{-2y}$ and $\ln(x^2 + 1)$ |
|   | Obtain $c = -\frac{1}{2}$ and $k = \frac{1-e}{\ln 2}$                                                                                    |
|   | Obtain final answer $y = -\frac{1}{2}\ln(2e - 1)$                                                                                        |

|       |                                                                                                         |
|-------|---------------------------------------------------------------------------------------------------------|
| 10(a) | Divide by $(x^2 - 3)$ to obtain $x + k$ ( $k \neq 0$ )                                                  |
|       | Obtain quotient $x + 5$                                                                                 |
|       | Obtain remainder $x$                                                                                    |
|       |                                                                                                         |
| 10(b) | Separate variables correctly and obtain $\int 6y \, dy = 3y^2$                                          |
|       | Obtain $\frac{1}{2}x^2 + 5x$                                                                            |
|       | Obtain $\frac{1}{2}\ln(x^2 - 3)$                                                                        |
|       | Use $y = 2$ , $x = 2$ to evaluate the constant of integration in an integral containing $k\ln(x^2 - 3)$ |
|       | Obtain $y^2 = \frac{1}{6}x^2 + \frac{5}{3}x + \frac{1}{6}\ln(x^2 - 3)$                                  |
|       |                                                                                                         |

|   |                                                                                                                                                                                                 |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8 | Separate variables correctly                                                                                                                                                                    |
|   | Obtain term $\frac{1}{4} \ln(4x + 3)$                                                                                                                                                           |
|   | Obtain term of the form $A \ln(\sin 2\theta)$                                                                                                                                                   |
|   | Obtain term $\frac{1}{2} \ln(\sin 2\theta)$                                                                                                                                                     |
|   | Use $x = 0$ when $\theta = \frac{1}{12}\pi$ to evaluate a constant or as limits in a solution containing terms of the form $\ln(\sin 2\theta)$ and $\ln(4x + 3)$<br>$c = \dots$ seen or implied |
|   | Obtain correct answer in any form with the trigonometry evaluated                                                                                                                               |
|   | Obtain final answer $x = \frac{12 \sin^2 2\theta - 3}{4}$                                                                                                                                       |
|   |                                                                                                                                                                                                 |