## MARK SCHEME for the October/November 2014 series

## **0606 ADDITIONAL MATHEMATICS**

0606/23

Paper 2, maximum raw mark 80

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the October/November 2014 series for most Cambridge IGCSE<sup>®</sup>, Cambridge International A and AS Level components and some Cambridge O Level components.

® IGCSE is the registered trademark of Cambridge International Examinations.



| Cambridge IGCSE – October/November 2014       0606         1       (i)       f(2)=0 $\rightarrow 3(2)^3+8(2)^2-33(2)+p=0$<br>correct working to $p=10$ AG<br>method for quadratic factor<br>f(x) = (x-2)(3x^2+14x-5)       M1       factorise or solve quadratic         (ii)       f(x) = (x-2)(3x-1)(x+5)       M1       factorise or solve quadratic         f(x)=0 $\rightarrow x=2, -5, \frac{1}{3}$ B1         (iii) $^{2}C_{4}=495$ B1         (iii)       not K and B = $^{6}C_{2}\times^{4}C_{4}=15\times4=60$ B1         K and not B = $^{6}C_{1}\times^{4}C_{2}=6\times6=36$ B1 $96$ M1       A1         OR       K and not B = $^{6}C_{1}\times^{4}C_{2}=15\times6=90$ B1 $210-90-24$ B1       M1 $96$ A1       M1         3       (i)       C is (1, 6)       B1 $210-90-24$ B1       B1       M1 $gendient of CD = \frac{15-6}{13-1} \left(=\frac{3}{-4}\right)$ B1       B1   | Syllabu                      |   |                              |   | Page 2 |
|---|------------------------------|---|------------------------------|---|--------|
| Correct working to $p = 10$ AG       AI         method for quadratic factor       f(x) = (x-2)(3x^2+14x-5)       AI         (ii)       f(x) = (x-2)(3x-1)(x+5)       MI         f(x) = 0 $x = 2, -5, \frac{1}{3}$ AI         2       (i) ${}^{12}C_{4} = 495$ BI         (ii) ${}^{7}C_{2} \times {}^{5}C_{2} = 21 \times 10$ MI $= 210$ AI         (iii)       not K and B = ${}^{6}C_{2} \times {}^{4}C_{1} = 15 \times 4 = 60$ BI         K and not B = ${}^{6}C_{1} \times {}^{4}C_{2} = 6 \times 6 = 36$ BI $60 + 36$ 96       MI         96       AI       AI         OR       K and B = ${}^{6}C_{1} \times {}^{4}C_{2} = 6 \times 6 = 36$ BI         Not K and not B = ${}^{6}C_{2} \times {}^{4}C_{2} = 15 \times 6 = 90$ BI         210 - 90 - 24       MI       AI         96       AI       MI         3       (i) $C$ is $(1, 6) + (12, 9)$ BI $_{11}$ MI       AI       MI         (ii)       gradient of $CD = \frac{15 - 6}{13 - 1} \left( = \frac{3}{4} \right)$ BI         gradient of $AB = \frac{10 - 2}{-2 - 4} \left( = \frac{8}{-6} = -\frac{4}{3} \right)$ BI   | ember 2014 0606              | Cambridge IGCSE – October/November 2014 |                              |   |        |
| method for quadratic factor       M1 $f(x) = (x-2)(3x^2+14x-5)$ M1 $f(x) = (x-2)(3x-1)(x+5)$ M1 $f(x) = 0 \rightarrow x=2, -5, \frac{1}{3}$ M1         2 (i) ${}^{12}C_4 = 495$ B1         (ii) ${}^{7}C_2 \times {}^5C_2 = 21 \times 10$ M1 $= 210$ A1         (iii)       not K and B = ${}^{6}C_2 \times {}^{4}C_1 = 15 \times 4 = 60$ B1         K and not B = ${}^{6}C_1 \times {}^{4}C_2 = 6 \times 6 = 36$ B1 $60 + 36$ M1 $96$ A1         OR       K and not B = ${}^{6}C_2 \times {}^{4}C_2 = 15 \times 6 = 90$ B1 $10 - 90 - 24$ B1 $96$ A1         3 (i) $C \operatorname{is}(1, 6)$ $D \operatorname{is}(1, 6) + (12, 9)$ $= (13, 15)$ A1         (ii)       gradient of $CD = \frac{15 - 6}{13 - 1} \left( = \frac{3}{4} \right)$ B1 ft         gradient of $AB = \frac{10 - 2}{-2 - 4} \left( = \frac{8}{-6} = -\frac{4}{3} \right)$ B1   |                              |   |                              |   | 1 (i)  |
| (ii) $f(x) = (x-2)(3x-1)(x+5)$<br>$f(x)=0 \rightarrow x=2, -5, \frac{1}{3}$<br>2 (i) ${}^{12}C_{4}=495$<br>(ii) ${}^{7}C_{2} {}^{x^{2}}C_{2}=21 \times 10$<br>=210<br>(iii) ${}^{7}C_{2} {}^{x^{2}}C_{2}=21 \times 10$<br>=210<br>(iii) not K and B = ${}^{6}C_{2} {}^{x^{4}}C_{1}=15 \times 4=60$<br>K and not B = ${}^{6}C_{1} {}^{x^{4}}C_{2}=6 \times 6=36$<br>60 + 36<br>96<br>OR<br>K and B = ${}^{6}C_{1} {}^{x^{4}}C_{1}=6 \times 4=24$<br>not K and not B = ${}^{6}C_{2} {}^{x^{4}}C_{2}=15 \times 6=90$<br>210 - 90 - 24<br>96<br>3 (i) $C \text{ is } (1, 6)$<br>D  is  (1, 6) + (12, 9)<br>= (13, 15)<br>(ii) gradient of $CD = \frac{15-6}{13-1} \left(=\frac{3}{4}\right)$<br>gradient of $AB = \frac{10-2}{-2-4} \left(=\frac{8}{-6}=\frac{-4}{3}\right)$<br>B1<br>HI<br>factorise or solve quadratic AB = 10-2 (-2) (-2) (-2) (-2) (-2) (-2) (-2) (-  |                              |   | AG                           | <b>e</b> 1  |        |
| f(x)=0 $\rightarrow x=2, -5, \frac{1}{3}$ A1         2 (i) ${}^{12}C_{4}=495$ B1         (ii) ${}^{7}C_{2}^{5}C_{2}=21\times10$ M1         =210       A1         (iii)       not K and B = ${}^{6}C_{2}^{4}C_{1}=15\times4=60$ B1         K and not B = ${}^{6}C_{1}^{4}C_{2}=6\times6=36$ B1         60 + 36       M1         96       A1         OR       K and B = ${}^{6}C_{1}^{4}C_{2}=6\times4=24$ B1         not K and not B = ${}^{6}C_{2}^{4}C_{2}=15\times6=90$ B1         210 - 90 - 24       M1         96       A1         3 (i)       C is (1, 6)         D is (1, 6)+(12, 9)       B1         = (13, 15)       A1ft         (ii)       gradient of $CD = \frac{15-6}{13-1} \left(=\frac{3}{4}\right)$ B1ft         gradient of $AB = \frac{10-2}{-2-4} \left(=\frac{8}{-6} = -\frac{4}{3}\right)$ B1   | A1                           | A1                                      |                              | $f(x) = (x-2)(3x^2 + 14x - 5)$  |        |
| 2 (i) ${}^{12}C_4 = 495$<br>(ii) ${}^{7}C_2 \times {}^{5}C_2 = 21 \times 10$<br>= 210<br>N11<br>(iii) not K and B = ${}^{6}C_2 \times {}^{4}C_1 = 15 \times 4 = 60$<br>K and not B = ${}^{6}C_1 \times {}^{4}C_2 = 6 \times 6 = 36$<br>60 + 36<br>96<br>OR<br>K and B = ${}^{6}C_1 \times {}^{4}C_1 = 6 \times 4 = 24$<br>not K and not B = ${}^{6}C_2 \times {}^{4}C_2 = 15 \times 6 = 90$<br>210 - 90 - 24<br>96<br>3 (i) C is (1, 6)<br>D is (1, 6) + (12, 9)<br>= (13, 15)<br>(ii) gradient of $CD = \frac{15 - 6}{13 - 1} \left( = \frac{3}{4} \right)$<br>gradient of $AB = \frac{10 - 2}{-2 - 4} \left( = \frac{8}{-6} = \frac{-4}{3} \right)$<br>B1<br>B1<br>B1<br>B1<br>B1<br>B1<br>B1<br>B1<br>B1<br>B1   | M1 factorise or solve quadra | M1                                      |                              |   | (ii)   |
| (ii) ${}^{7}C_{2} \times {}^{5}C_{2} = 21 \times 10$<br>$= 210$ (iii) not K and B = ${}^{6}C_{2} \times {}^{4}C_{1} = 15 \times 4 = 60$ K and not B = ${}^{6}C_{1} \times {}^{4}C_{2} = 6 \times 6 = 36$ (i) K and not B = ${}^{6}C_{1} \times {}^{4}C_{2} = 6 \times 6 = 36$ (i) N1 (ii) OR K and B = ${}^{6}C_{1} \times {}^{4}C_{1} = 6 \times 4 = 24$ not K and not B = ${}^{6}C_{2} \times {}^{4}C_{2} = 15 \times 6 = 90$ (ii) C is (1, 6) D is (1, 6) + (12, 9) = (13, 15) (ii) gradient of $CD = \frac{15 - 6}{13 - 1} \left( = \frac{3}{4} \right)$ (iii) gradient of $AB = \frac{10 - 2}{-2 - 4} \left( = \frac{8}{-6} = \frac{-4}{3} \right)$ B1 (iv) C is (1, 6) (iv) C is (1, | A1                           | A1                                      |                              | $f(x)=0  \rightarrow  x=2, \ -5, \ \frac{1}{3}$                                   |        |
| $\begin{array}{c ccccc}                                $  | B1                           | B1                                      |                              | $^{12}C_{4} = 495$  | 2 (i)  |
| (iii) not K and B = ${}^{6}C_{2} \times {}^{4}C_{1} = 15 \times 4 = 60$<br>K and not B = ${}^{6}C_{1} \times {}^{4}C_{2} = 6 \times 6 = 36$<br>60 + 36<br>96<br>OR<br>K and B = ${}^{6}C_{1} \times {}^{4}C_{2} = 6 \times 6 = 36$<br>M1<br>A1<br>OR<br>K and B = ${}^{6}C_{1} \times {}^{4}C_{1} = 6 \times 4 = 24$<br>not K and not B = ${}^{6}C_{2} \times {}^{4}C_{2} = 15 \times 6 = 90$<br>210 - 90 - 24<br>96<br>Since (1, 6)<br>D is (1, 6) + (12, 9)<br>= (13, 15)<br>(ii) gradient of $CD = \frac{15 - 6}{13 - 1} \left( = \frac{3}{4} \right)$<br>gradient of $AB = \frac{10 - 2}{-2 - 4} \left( = \frac{8}{-6} = \frac{-4}{3} \right)$<br>B1<br>B1  | M1                           | M1                                      |                              |   | (ii)   |
| K and not $B = {}^{6}C_{1} \times {}^{4}C_{2} = 6 \times 6 = 36$ B1 $60 + 36$ 96 $96$ A1         OR       K and $B = {}^{6}C_{1} \times {}^{4}C_{1} = 6 \times 4 = 24$ B1         not K and not $B = {}^{6}C_{2} \times {}^{4}C_{2} = 15 \times 6 = 90$ B1 $210 - 90 - 24$ M1 $96$ A1         3 (i) $C \text{ is } (1, 6)$ B1 $p_{6}$ A1         (ii)       gradient of $CD = \frac{15 - 6}{13 - 1} \left( = \frac{3}{4} \right)$ B1ft         gradient of $AB = \frac{10 - 2}{-2 - 4} \left( = \frac{8}{-6} = \frac{-4}{3} \right)$ B1   | A1                           | A1                                      |                              | =210  |        |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$   |                              |   |                              |   | (iii)  |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$   |                              |   | = 36                         | 1 2   |        |
| K and B = ${}^{6}C_{1} \times {}^{4}C_{1} = 6 \times 4 = 24$ B1         not K and not B = ${}^{6}C_{2} \times {}^{4}C_{2} = 15 \times 6 = 90$ B1         210 - 90 - 24       M1         96       A1         3 (i)       C is (1, 6)         D is (1, 6)+(12, 9)       B1         = (13, 15)       M1         (ii)       gradient of $CD = \frac{15 - 6}{13 - 1} \left( = \frac{3}{4} \right)$ B1ft         gradient of $AB = \frac{10 - 2}{-2 - 4} \left( = \frac{8}{-6} = \frac{-4}{3} \right)$ B1   |                              |   |                              |   |        |
| not K and not B = ${}^{6}C_{2} \times {}^{4}C_{2} = 15 \times 6 = 90$ B1 $210 - 90 - 24$ M1 $96$ A1         3 (i)       C is (1, 6)         D is (1, 6)+(12, 9)       B1 $= (13, 15)$ M1         (ii)       gradient of $CD = \frac{15-6}{13-1} \left(=\frac{3}{4}\right)$ B1ft         gradient of $AB = \frac{10-2}{-2-4} \left(=\frac{8}{-6} = \frac{-4}{3}\right)$ B1   | B1                           | B1                                      |                              |   |        |
| 96       A1         3 (i) $C \text{ is } (1, 6)$ $B1$ $D \text{ is } (1, 6) + (12, 9)$ $M1$ $= (13, 15)$ A1ft         (ii)       gradient of $CD = \frac{15-6}{13-1} \left(=\frac{3}{4}\right)$ B1ft         gradient of $AB = \frac{10-2}{-2-4} \left(=\frac{8}{-6} = \frac{-4}{3}\right)$ B1  | B1                           | B1                                      | $5 \times 6 = 90$            |   |        |
| 3 (i) $C \text{ is } (1, 6)$<br>D  is  (1, 6) + (12, 9)<br>$= (13, 15)$ (ii) gradient of $CD = \frac{15-6}{13-1} \left(=\frac{3}{4}\right)$ gradient of $AB = \frac{10-2}{-2-4} \left(=\frac{8}{-6} = \frac{-4}{3}\right)$ B1   |                              |   |                              | 210-90-24   |        |
| (ii) $D \text{ is } (1, 6) + (12, 9) = (13, 15)$<br>(ii) $P \text{ gradient of } CD = \frac{15-6}{13-1} \left( = \frac{3}{4} \right)$<br>$P \text{ gradient of } CD = \frac{15-6}{13-1} \left( = \frac{3}{4} \right)$<br>$P \text{ gradient of } AB = \frac{10-2}{-2-4} \left( = \frac{8}{-6} = \frac{-4}{3} \right)$<br>B1   | A1                           | A1                                      |                              | 96  |        |
| (ii) $ \begin{array}{c} = (13, 15) \\ \text{gradient of } CD = \frac{15-6}{13-1} \left( = \frac{3}{4} \right) \\ \text{gradient of } AB = \frac{10-2}{-2-4} \left( = \frac{8}{-6} = \frac{-4}{3} \right) \\ \end{array} $   |                              |   |                              |   | 3 (i)  |
| gradient of $AB = \frac{10-2}{-2-4} \left( = \frac{8}{-6} = \frac{-4}{3} \right)$ B1  |                              |   |                              |   |        |
|   | B1ft                         | B1ft                                    | )                            | gradient of $CD = \frac{15-6}{13-1} \left(=\frac{3}{4}\right)$                    | (ii)   |
|   | B1                           | B1                                      | $\frac{1}{6} = \frac{-4}{3}$ | gradient of $AB = \frac{10-2}{-2-4} \left( = \frac{8}{-6} = \frac{-4}{3} \right)$ |        |
| $\frac{3}{4} \times \frac{-4}{3} = -1$ lines are perpendicular <b>B1</b> correct completion wy  | B1 correct completion        | B1                                      | licular                      | $\frac{3}{4} \times \frac{-4}{3} = -1$ lines are perpendicular                    |        |
| (iii) area = $\frac{1}{2} \times AB \times CD = \frac{1}{2} \times 10 \times 15$ M1 good attempt at two relevant for $\frac{1}{2}$ base × height method   | E I                          | M1                                      | 5                            | area = $\frac{1}{2} \times AB \times CD = \frac{1}{2} \times 10 \times 15$        | (iii)  |
| =75<br>or array method  | -                            | A1                                      |                              |   |        |

| Page 3 | Mark Scheme  |                  |                                       |                                 | Paper |
|--------|--|------------------|---------------------------------------|---------------------------------|-------|
|        | Cambridge IGCSE – October/November 2014  |                  |                                       | 0606                            | 23    |
| 4 (i)  | $2000 = 1000e^{a+b}  \rightarrow  a+b = \ln 2$   | B1               |                                       |                                 |       |
| (ii)   | $3297 = 1000e^{2a-b} \rightarrow 2a+b$ $= \ln 3.297  \text{oe}$  | M1<br>A1         | substitution of 2, 3297 and rearrange |                                 |       |
| (iii)  | Solve for one value $a = 0.5$ and $b = 0.193$ or 0.19  | M1<br>A1         |                                       |                                 |       |
| (iv)   | $n = 10  P = 1000e^{5.193} = \$180000.$  | M1<br>A1         |                                       |                                 |       |
| 5 (i)  | $\overrightarrow{OX} = \mu \big( a + b \big)$  | <b>B</b> 1       |                                       |                                 |       |
| (ii)   | $\overrightarrow{RP} = b - 3a$ or $\overrightarrow{RX} = \lambda(b - 3a)$ oe<br>$\overrightarrow{OX} = 3a + \lambda(b - 3a)$   | B1<br>B1         |                                       |                                 |       |
| (iii)  | $\overrightarrow{OX} = \overrightarrow{OX} \text{ and equate both coefficients}$<br>$\mu = 3 - 3\lambda \qquad \mu = \lambda$<br>$\mu = \lambda = 0.75$<br>$\frac{RX}{XP} = 3 \text{ or } 3:1$ | M1<br>A1<br>A1ft | $\frac{\lambda}{1-\lambda}$           |                                 |       |
| 6 (i)  | m = 4<br>equation of line is $\frac{\ln y - 39}{3^x - 9} = \frac{39 - 19}{9 - 4}$<br>$\ln y = 4(3^x) + 3$  | B1<br>M1<br>A1ft |                                       | nation of line<br>their gradier | nt    |
| (ii)   | $x = 0.5 \rightarrow \ln y = 4\sqrt{3} + 3 = 9.928$<br>y = 20500   | M1<br>A1         | correct ex                            | pression for                    | lny   |
| (iii)  | Substitutes y and rearrange for $3^x$<br>Solve $3^x = 1.150$<br>x = 0.127  | M1<br>M1<br>A1   |                                       |                                 |       |

| Page 4 | Mark Scheme  |                  |                                 |      | Paper |  |
|--------|--|------------------|---------------------------------|------|-------|--|
|        | Cambridge IGCSE – October/November 2014  |                  |                                 | 0606 | 23    |  |
|        |  |                  |                                 |      |       |  |
| 7 (i)  | $x = \frac{2}{y} + 1  \rightarrow  y = \frac{2}{x - 1}$ $f^{-1}(x) = \frac{2}{x - 1}$        | M1<br>A1         | any valid method                |      |       |  |
|        | $gf(x) = \left(\frac{2}{x} + 1\right)^2 + 2$   | B2/1/0           | -1 each error                   |      |       |  |
| (iii)  | $\operatorname{fg}(x) = \frac{2}{x^2 + 2} + 1$   | <b>B2/1/0</b>    | -1 each error                   |      |       |  |
| (iv)   | $\mathrm{ff}(x) = \frac{2}{\frac{2}{x}+1} + 1 = \frac{2x}{x+2} + 1$                          | M1               | correct starting expression     |      |       |  |
|        | $=\frac{3x+2}{x+2}$  | A1               | correct algebra to given answer |      |       |  |
|        | $\frac{3x+2}{x+2} = x  \rightarrow  x^2 - x - 2 = 0$   | M1               | form and solve 3 term quadratic |      |       |  |
|        | (x-2)(x+1) = 0<br>x = 2 only   | A1               |                                 |      |       |  |
| . ,    | $v = C + K \sin 2t \qquad C \neq 0$<br>$v = 5 + 6 \sin 2t \qquad a = 12 \cos 2t$             | M1<br>A1<br>A1ft |                                 |      |       |  |
| (ii)   | $a=0 \rightarrow \cos 2t = 0$ and solve  | M1               | set $a = 0$ and solve for $t$   |      |       |  |
|        | $t = \frac{\pi}{4}$ or 0.785 or 0.79   | A1               |                                 |      |       |  |
|        | $v = 5 + 6\sin\frac{\pi}{2} = 11$  | A1ft             | ft only or                      | n K  |       |  |
| (iii)  | $v = 2 \rightarrow \sin 2t = -\frac{1}{2}$ and solve   | M1               | set $v = 2$ and solve for $t$   |      |       |  |
|        | $t = \frac{7\pi}{12}$ or $1.83 - 1.84$<br>$a = 12\cos\frac{7\pi}{6} = -6\sqrt{3}$ or $-10.4$ | A1               |                                 |      |       |  |
|        | $a = 12\cos\frac{7\pi}{6} = -6\sqrt{3}$ or $-10.4$   | A1               |                                 |      |       |  |

| Ра | ge 5 | Mark Scheme   |            |   | Syllabus               | Paper    |  |  |
|----|------|---|------------|---|------------------------|----------|--|--|
|    |      | Cambridge IGCSE – October/November 2014                                   |            |   | 0606                   | 23       |  |  |
|    |      |   |            |   |                        |          |  |  |
| 9  | (i)  | $\frac{\mathrm{d}y}{\mathrm{d}x} = 4 - \frac{1}{\left(x-2\right)^2}$      | B1         |   |                        |          |  |  |
|    |      | $\frac{\mathrm{d}y}{\mathrm{d}x} = 0  \rightarrow  (x-2)^2 = \frac{1}{4}$ | M1         | solve 3 term quadratic from                                       |                        |          |  |  |
|    |      | $(4x^2 - 16x + 15 = 0)$   |            | $\frac{\mathrm{d}y}{\mathrm{d}x} = 0$                             |                        |          |  |  |
|    |      | x = 2.5  or  1.5<br>y = 12  or  4   | A1<br>A1   | x values or 1 pair<br>y values or 1 pair                          |                        |          |  |  |
|    |      | $\frac{\mathrm{d}^2 y}{\mathrm{d}x^2} = 2\left(x-2\right)^{-3}$           | M1         | use $\frac{d^2 y}{dx^2}$ with solution from                       |                        |          |  |  |
|    |      | $x = 2.5 \rightarrow \frac{d^2 y}{dx^2} > 0 \rightarrow \text{minimum}$   | A1         | $\frac{dy}{dx} = 0$<br>both identified www                        |                        |          |  |  |
|    |      | $x = 1.5 \rightarrow \frac{d^2 y}{dx^2} < 0 \rightarrow \text{maximum}$   |            |   |                        | WWW      |  |  |
|    | (ii) | $x=3 \rightarrow \frac{\mathrm{d}y}{\mathrm{d}x}=3$                       | <b>B</b> 1 |   |                        |          |  |  |
|    |      | Use $m_1m_2 = -1$ for gradient normal from gradient tangent               | M1         | must use numerical values   |                        |          |  |  |
|    |      | Eqn of normal : $\frac{y-13}{x-3} = -\frac{1}{3}$                         | A1ft       |   |                        |          |  |  |
|    |      | Intersection of norm and curve $x = 1$                                    |            | equation and attempt to simplify attempt to solve 3 term quadrati |                        |          |  |  |
|    |      | $14 - \frac{x}{3} = 4x + \frac{1}{x - 2}$ $13x^2 - 68x + 87 = 0$          | M1<br>DM1  |   |                        |          |  |  |
|    |      | $x = \frac{29}{13} \text{ or } 2.23$                                      | A1         | uttempt to  |                        | quudiule |  |  |
| 10 | (i)  | LHS = $\frac{1 + \cos x + 1 - \cos x}{(1 - \cos x)(1 + \cos x)}$          | B1         | correct fra   | action                 |          |  |  |
|    |      | $=\frac{2}{1-\cos^2 x}$   | <b>B</b> 1 | correct ev  | aluation               |          |  |  |
|    |      | $=\frac{2}{\sin^2 x} = \text{RHS}$  | <b>B</b> 1 |   | $-\cos^2 x = \sin^2 x$ |          |  |  |
|    | (ii) | $2\csc^2 x = 8$   | M1         | identity u  | sed                    |          |  |  |
|    |      | $\sin^2 x = \frac{1}{4}$ $\sin x = \pm \frac{1}{2}$                       | A1         |   |                        |          |  |  |
|    |      | $\sin x = \pm \frac{1}{2}$  | A1         |   |                        |          |  |  |
|    |      | $x = 30^{\circ}, 150^{\circ}, 210^{\circ}, 330^{\circ}$                   | A1         |   |                        |          |  |  |