

1. $\int x^2 \ln x dx$

- (a) $\frac{1}{4}x^4 \ln(x) - \frac{x^4}{16} + C$
 (b) $\frac{1}{3}x^3 \ln(x) - \frac{1}{9}x^3 + C$
 (c) $\frac{1}{4}x^2 \ln(x) - \frac{x^2}{16} + C$
 (d) $\frac{1}{3}x^3 \ln(x) - \frac{1}{3}x^3 + C$
 (e) All other answers are not correct

2. $\int e^x \cos(2x) dx$

- (a) $\frac{1}{5}e^{2x}(\sin(x) + 2 \cos(x)) + C$
 (b) $\frac{1}{5}e^x(2 \sin(2x) + \cos(2x)) + C$
 (c) $\frac{1}{5}e^x(2 \sin(x) + \cos(x)) + C$
 (d) $\frac{1}{5}e^{2x}(\sin(x) - 2 \cos(x)) + C$
 (e) All other answers are not correct

3. $\int e^{-3x} (x^2 - 1) dx =$

- (a) $e^{-3x} (x^2 + 1) + C$
 (b) $\frac{1}{27}e^{-3x} (9x^2 + 6x + 11) + C$
 (c) $e^{-3x} (x^2 - 1) + C$
 (d) $\frac{1}{27}e^{-3x} (9x^2 - 6x + 11) + C$
 (e) All other answers are not correct

4. $\int x \cot^{-1}(x) dx =$

- (a) $\frac{1}{2}x^2 \cot^{-1}(x) + \frac{x}{2} - \frac{1}{2} \tan^{-1}(x) + C$
 (b) $\frac{1}{2}x^2 \cot^{-1}(x) + \frac{x}{2} + C$
 (c) $\frac{1}{2}x^2 \cot^{-1}(x) - \frac{x}{2} - \frac{1}{2} \tan^{-1}(x) + C$
 (d) $\frac{1}{2}x^3 \cot^{-1}(x) + \frac{x}{2} - \frac{1}{2} \tan^{-1}(x) + C$
 (e) All other answers are not correct

5. $\int \sin^3 x dx =$

- (a) $\frac{1}{12} \cos(3x) - \frac{3 \cos(x)}{4} + C$
 (b) $\frac{3 \sin(x)}{4} + \frac{1}{12} \sin(3x) + C$
 (c) $\frac{3 \sin(x)}{4} - \frac{1}{12} \sin(3x) + C$
 (d) $\frac{1}{12} \cos(3x) + \frac{3 \cos(x)}{4} + C$
 (e) All other answers are not correct

6. $\int \tan^2(x) \sec^2(x) dx =$

- (a) $\tan^2(x) \sec^2(x) + C$
 (b) $\frac{\tan^4(x)}{4} + C$
 (c) $\tan^4(x) \sec^2(x) + C$
 (d) $\frac{\tan^2(x)}{4} + C$
 (e) All other answers are not correct

7. $\int \sin(2x) \cos(5x) dx =$

- (a) $-\frac{1}{6} \cos(3x) - \frac{1}{14} \cos(7x) + C$
 (b) $\frac{1}{6} \cos(3x) - \frac{1}{14} \cos(7x) + C$
 (c) $-\frac{1}{6} \cos(3x) + \frac{1}{14} \cos(7x) + C$
 (d) $-\frac{1}{6} \cos(3x) - \frac{1}{12} \cos(7x) + C$
 (e) All other answers are not correct

8. $\int \cos^3 x \csc^2 x dx =$

- (a) $\sin(x) - \frac{1}{2} \tan\left(\frac{x}{2}\right) - \frac{1}{2} \cot\left(\frac{x}{2}\right) + C$
 (b) $\sin(x) - \frac{1}{3} \tan\left(\frac{x}{2}\right) - \frac{1}{2} \cot\left(\frac{x}{2}\right) + C$
 (c) $\sin(x) + \frac{1}{2} \tan\left(\frac{x}{2}\right) - \frac{1}{2} \cot\left(\frac{x}{2}\right) + C$
 (d) $\sin(x) - \frac{1}{2} \tan\left(\frac{x}{2}\right) - \frac{1}{4} \cot\left(\frac{x}{2}\right) + C$
 (e) All other answers are not correct_M

9.
$$\int \frac{dx}{(9-x^2)^{3/2}} =$$

- (a) $\frac{x}{9\sqrt{9-x^2}} + C$
 (b) $\frac{x}{3\sqrt{9-x^2}} + C$
 (c) $\frac{x}{9\sqrt{9+x^2}} + C$
 (d) $\frac{x}{81\sqrt{9-x^2}} + C$
 (e) All other answers are not correct

10. If $\frac{3x}{(x+1)(x^2+2)} = \frac{A}{x+1} + \frac{Bx+C}{x^2+2}$,
then $3A + 4B + 2C =$

- (a) 5
 (b) 7
 (c) 9
 (d) 3
 (e) All other answers are not correct

11.
$$\int \frac{4(x^2 - x + 6)}{x(x^2 + 4)} dx =$$

- (a) $-\ln(x^2 + 4) + 6\ln(x) - 2\tan^{-1}\left(\frac{x}{2}\right) + C$
 (b) $-\ln(x^2 + 4) + 6\ln(x) + 2\tan^{-1}\left(\frac{x}{2}\right) + C$
 (c) $-\ln(x^2 + 4) + 6\ln(x) - 3\tan^{-1}\left(\frac{x}{2}\right) + C$
 (d) $-\ln(x^2 + 4) + 6\ln(x) - 2\tan^{-1}\left(\frac{x}{3}\right) + C$
 (e) All other answers are not correct

12.
$$\int \frac{dx}{1 - \cos x} =$$

- (a) $-\cot\left(\frac{x}{2}\right) + C$
 (b) $-\tan\left(\frac{x}{2}\right) + C$
 (c) $\cot\left(\frac{x}{2}\right) + C$
 (d) $-\tan\left(\frac{x}{2}\right) + C$
 (e) All other answers are not correct

13.
$$\int_2^\infty \frac{dx}{x^2 + x} =$$

- (a) $\ln\left(\frac{3}{2}\right)$
 (b) $\ln 2$
 (c) $\ln\left(\frac{2}{3}\right)$
 (d) $-\ln 2$
 (e) All other answers are not correct

14. The improper integral $\int_3^{-2} \frac{dx}{x^4}$

- (a) divergent
 (b) convergent and its value is 1
 (c) convergent and its value is 2
 (d) convergent and its value is 4
 (e) All other answers are not correct

15. The improper integral $\int_\infty^e \frac{(\ln x)^p}{x} dx$ is **convergent** if

- (a) $p < -1$
 (b) $p \leq -1$
 (c) $p > 1$
 (d) $p < 1$
 (e) All other answers are not correct

16. The length of the curve $y = \frac{4}{3}(x-3)^{3/2}$ from $x = 3$ to $x = 5$ is

- (a) $\frac{13}{3}$
 (b) $\frac{5}{3}$
 (c) $\frac{3}{5}$
 (d) $\frac{3}{13}$
 (e) All other answers are not correct

1. $\int x \cot^{-1}(x) dx =$

- (a) $\frac{1}{2}x^2 \cot^{-1}(x) + \frac{x}{2} - \frac{1}{2} \tan^{-1}(x) + C$
 (b) $\frac{1}{2}x^2 \cot^{-1}(x) - \frac{x}{2} - \frac{1}{2} \tan^{-1}(x) + C$
 (c) $\frac{1}{2}x^3 \cot^{-1}(x) + \frac{x}{2} - \frac{1}{2} \tan^{-1}(x) + C$
 (d) $\frac{1}{2}x^2 \cot^{-1}(x) + \frac{x}{2} + C$
 (e) All other answers are not correct

2. $\int x^2 \ln x dx$

- (a) $\frac{1}{3}x^3 \ln(x) - \frac{1}{3}x^3 + C$
 (b) $\frac{1}{4}x^4 \ln(x) - \frac{x^4}{16} + C$
 (c) $\frac{1}{3}x^3 \ln(x) - \frac{1}{9}x^3 + C$
 (d) $\frac{1}{4}x^2 \ln(x) - \frac{x^2}{16} + C$
 (e) All other answers are not correct

3. $\int \frac{4(x^2 - x + 6)}{x(x^2 + 4)} dx =$

- (a) $-\ln(x^2 + 4) + 6 \ln(x) + 2 \tan^{-1}\left(\frac{x}{2}\right) + C$
 (b) $-\ln(x^2 + 4) + 6 \ln(x) - 2 \tan^{-1}\left(\frac{x}{2}\right) + C$
 (c) $-\ln(x^2 + 4) + 6 \ln(x) - 2 \tan^{-1}\left(\frac{x}{3}\right) + C$
 (d) $-\ln(x^2 + 4) + 6 \ln(x) - 3 \tan^{-1}\left(\frac{x}{2}\right) + C$
 (e) All other answers are not correct

4. $\int \sin(2x) \cos(5x) dx =$

- (a) $-\frac{1}{6} \cos(3x) - \frac{1}{14} \cos(7x) + C$
 (b) $\frac{1}{6} \cos(3x) - \frac{1}{14} \cos(7x) + C$
 (c) $-\frac{1}{6} \cos(3x) - \frac{1}{12} \cos(7x) + C$
 (d) $-\frac{1}{6} \cos(3x) + \frac{1}{14} \cos(7x) + C$
 (e) All other answers are not correct

5. $\int_2^{\infty} \frac{dx}{x^2 + x} =$

- (a) $\ln 2$
 (b) $-\ln 2$
 (c) $\ln\left(\frac{3}{2}\right)$
 (d) $\ln\left(\frac{2}{3}\right)$
 (e) All other answers are not correct

6. If $\frac{3x}{(x+1)(x^2+2)} = \frac{A}{x+1} + \frac{Bx+C}{x^2+2}$,
then $3A + 4B + 2C =$

- (a) 7
 (b) 9
 (c) All other answers are not correct
 (d) 5
 (e) 3

7. $\int \tan^2(x) \sec^2(x) dx =$

- (a) $\tan^2(x) \sec^2(x) + C$
 (b) $\tan^4(x) \sec^2(x) + C$
 (c) $\frac{\tan^4(x)}{4} + C$
 (d) $\frac{\tan^2(x)}{4} + C$
 (e) All other answers are not correct

8. The improper integral $\int_{\infty}^e \frac{(\ln x)^p}{x} dx$ is **con-**
vergent if

- (a) $p > 1$
 (b) $p \leq -1$
 (c) $p < 1$
 (d) $p < -1$
 (e) All other answers are not correct_{1b}

9. The length of the curve $y = \frac{4}{3}(x - 3)^{3/2}$ from $x = 3$ to $x = 5$ is

- (a) $\frac{13}{3}$
- (b) $\frac{3}{13}$
- (c) $\frac{3}{5}$
- (d) $\frac{5}{3}$
- (e) All other answers are not correct

10. $\int \frac{dx}{1 - \cos x} =$

- (a) $\cot\left(\frac{x}{2}\right) + C$
- (b) $-\tan\left(\frac{x}{2}\right) + C$
- (c) $-\cot\left(\frac{x}{2}\right) + C$
- (d) $-\tan\left(\frac{x}{2}\right) + C$
- (e) All other answers are not correct

11. $\int \frac{dx}{(9 - x^2)^{3/2}} =$

- (a) $\frac{x}{9\sqrt{9-x^2}} + C$
- (b) $\frac{x}{9\sqrt{9+x^2}} + C$
- (c) $\frac{x}{3\sqrt{9-x^2}} + C$
- (d) $\frac{x}{81\sqrt{9-x^2}} + C$
- (e) All other answers are not correct

12. $\int e^x \cos(2x) dx$

- (a) $\frac{1}{5}e^{2x}(\sin(x) + 2\cos(x)) + C$
- (b) $\frac{1}{5}e^{2x}(\sin(x) - 2\cos(x)) + C$
- (c) $\frac{1}{5}e^x(2\sin(2x) + \cos(2x)) + C$
- (d) $\frac{1}{5}e^x(2\sin(x) + \cos(x)) + C$
- (e) All other answers are not correct

13. The improper integral $\int_3^{-2} \frac{dx}{x^4}$

- (a) divergent
- (b) convergent and its value is 4
- (c) convergent and its value is 2
- (d) convergent and its value is 1
- (e) All other answers are not correct

14. $\int e^{-3x}(x^2 - 1) dx =$

- (a) $e^{-3x}(x^2 + 1) + C$
- (b) $\frac{1}{27}e^{-3x}(9x^2 - 6x + 11) + C$
- (c) $e^{-3x}(x^2 - 1) + C$
- (d) $\frac{1}{27}e^{-3x}(9x^2 + 6x + 11) + C$
- (e) All other answers are not correct

15. $\int \cos^3 x \csc^2 x dx =$

- (a) $\sin(x) + \frac{1}{2}\tan\left(\frac{x}{2}\right) - \frac{1}{2}\cot\left(\frac{x}{2}\right) + C$
- (b) $\sin(x) - \frac{1}{3}\tan\left(\frac{x}{2}\right) - \frac{1}{2}\cot\left(\frac{x}{2}\right) + C$
- (c) $\sin(x) - \frac{1}{2}\tan\left(\frac{x}{2}\right) - \frac{1}{2}\cot\left(\frac{x}{2}\right) + C$
- (d) $\sin(x) - \frac{1}{2}\tan\left(\frac{x}{2}\right) - \frac{1}{4}\cot\left(\frac{x}{2}\right) + C$
- (e) All other answers are not correct

16. $\int \sin^3 x dx =$

- (a) $\frac{3\sin(x)}{4} + \frac{1}{12}\sin(3x) + C$
- (b) $\frac{3\sin(x)}{4} - \frac{1}{12}\sin(3x) + C$
- (c) $\frac{1}{12}\cos(3x) - \frac{3\cos(x)}{4} + C$
- (d) $\frac{1}{12}\cos(3x) + \frac{3\cos(x)}{4} + C$
- (e) All other answers are not correct

1. $\int e^x \cos(2x) dx$
- (a) $\frac{1}{5}e^{2x}(\sin(x) + 2\cos(x)) + C$
 (b) $\frac{1}{5}e^{2x}(\sin(x) - 2\cos(x)) + C$
 (c) $\frac{1}{5}e^x(2\sin(2x) + \cos(2x)) + C$
 (d) $\frac{1}{5}e^x(2\sin(x) + \cos(x)) + C$
 (e) All other answers are not correct
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2. $\int x^2 \ln x dx$
- (a) $\frac{1}{3}x^3 \ln(x) - \frac{1}{3}x^3 + C$
 (b) $\frac{1}{4}x^2 \ln(x) - \frac{x^2}{16} + C$
 (c) $\frac{1}{3}x^3 \ln(x) - \frac{1}{9}x^3 + C$
 (d) $\frac{1}{4}x^4 \ln(x) - \frac{x^4}{16} + C$
 (e) All other answers are not correct
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3. The improper integral $\int_{\infty}^e \frac{(\ln x)^p}{x} dx$ is **convergent** if
- (a) $p > 1$
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 (c) $p < -1$
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4. $\int x \cot^{-1}(x) dx =$
- (a) $\frac{1}{2}x^2 \cot^{-1}(x) - \frac{x}{2} - \frac{1}{2} \tan^{-1}(x) + C$
 (b) $\frac{1}{2}x^2 \cot^{-1}(x) + \frac{x}{2} - \frac{1}{2} \tan^{-1}(x) + C$
 (c) $\frac{1}{2}x^3 \cot^{-1}(x) + \frac{x}{2} - \frac{1}{2} \tan^{-1}(x) + C$
 (d) $\frac{1}{2}x^2 \cot^{-1}(x) + \frac{x}{2} + C$
 (e) All other answers are not correct
-
5. The length of the curve $y = \frac{4}{3}(x - 3)^{3/2}$ from $x = 3$ to $x = 5$ is
- (a) $\frac{3}{5}$
 (b) $\frac{13}{3}$
 (c) $\frac{5}{3}$
 (d) $\frac{3}{13}$
 (e) All other answers are not correct
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6. If $\frac{3x}{(x+1)(x^2+2)} = \frac{A}{x+1} + \frac{Bx+C}{x^2+2}$, then $3A + 4B + 2C =$
- (a) All other answers are not correct
 (b) 7
 (c) 9
 (d) 3
 (e) 5
-
7. $\int \frac{4(x^2 - x + 6)}{x(x^2 + 4)} dx =$
- (a) $-\ln(x^2 + 4) + 6\ln(x) + 2\tan^{-1}\left(\frac{x}{2}\right) + C$
 (b) $-\ln(x^2 + 4) + 6\ln(x) - 3\tan^{-1}\left(\frac{x}{2}\right) + C$
 (c) $-\ln(x^2 + 4) + 6\ln(x) - 2\tan^{-1}\left(\frac{x}{2}\right) + C$
 (d) $-\ln(x^2 + 4) + 6\ln(x) - 2\tan^{-1}\left(\frac{x}{3}\right) + C$
 (e) All other answers are not correct
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8. The improper integral $\int_3^{-2} \frac{dx}{x^4}$
- (a) convergent and its value is 2
 (b) convergent and its value is 1
 (c) divergent
 (d) convergent and its value is 4
 (e) All other answers are not correct^{2b}

9. $\int e^{-3x} (x^2 - 1) dx =$

- (a) $\frac{1}{27}e^{-3x} (9x^2 + 6x + 11) + C$
 (b) $e^{-3x} (x^2 - 1) + C$
 (c) $\frac{1}{27}e^{-3x} (9x^2 - 6x + 11) + C$
 (d) $e^{-3x} (x^2 + 1) + C$
 (e) All other answers are not correct

10. $\int \frac{dx}{(9 - x^2)^{3/2}} =$

- (a) $\frac{x}{81\sqrt{9-x^2}} + C$
 (b) $\frac{x}{9\sqrt{9+x^2}} + C$
 (c) $\frac{x}{3\sqrt{9-x^2}} + C$
 (d) $\frac{x}{9\sqrt{9-x^2}} + C$
 (e) All other answers are not correct

11. $\int \frac{dx}{1 - \cos x} =$

- (a) $-\cot\left(\frac{x}{2}\right) + C$
 (b) $\cot\left(\frac{x}{2}\right) + C$
 (c) $-\tan\left(\frac{x}{2}\right) + C$
 (d) $-\tan\left(\frac{x}{2}\right) + C$
 (e) All other answers are not correct

12. $\int \sin(2x) \cos(5x) dx =$

- (a) $-\frac{1}{6} \cos(3x) - \frac{1}{12} \cos(7x) + C$
 (b) $-\frac{1}{6} \cos(3x) - \frac{1}{14} \cos(7x) + C$
 (c) $\frac{1}{6} \cos(3x) - \frac{1}{14} \cos(7x) + C$
 (d) $-\frac{1}{6} \cos(3x) + \frac{1}{14} \cos(7x) + C$
 (e) All other answers are not correct

13. $\int_2^{\infty} \frac{dx}{x^2 + x} =$

- (a) $\ln 2$
 (b) $\ln\left(\frac{3}{2}\right)$
 (c) $\ln\left(\frac{2}{3}\right)$
 (d) $-\ln 2$
 (e) All other answers are not correct

14. $\int \cos^3 x \csc^2 x dx =$

- (a) $\sin(x) - \frac{1}{2} \tan\left(\frac{x}{2}\right) - \frac{1}{2} \cot\left(\frac{x}{2}\right) + C$
 (b) $\sin(x) - \frac{1}{2} \tan\left(\frac{x}{2}\right) - \frac{1}{4} \cot\left(\frac{x}{2}\right) + C$
 (c) $\sin(x) - \frac{1}{3} \tan\left(\frac{x}{2}\right) - \frac{1}{2} \cot\left(\frac{x}{2}\right) + C$
 (d) $\sin(x) + \frac{1}{2} \tan\left(\frac{x}{2}\right) - \frac{1}{2} \cot\left(\frac{x}{2}\right) + C$
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15. $\int \sin^3 x dx =$

- (a) $\frac{3\sin(x)}{4} - \frac{1}{12} \sin(3x) + C$
 (b) $\frac{1}{12} \cos(3x) + \frac{3\cos(x)}{4} + C$
 (c) $\frac{3\sin(x)}{4} + \frac{1}{12} \sin(3x) + C$
 (d) $\frac{1}{12} \cos(3x) - \frac{3\cos(x)}{4} + C$
 (e) All other answers are not correct

16. $\int \tan^2(x) \sec^2(x) dx =$

- (a) $\tan^2(x) \sec^2(x) + C$
 (b) $\frac{\tan^2(x)}{4} + C$
 (c) $\frac{\tan^4(x)}{4} + C$
 (d) $\tan^4(x) \sec^2(x) + C$
 (e) All other answers are not correct

1. $\int \cos^3 x \csc^2 x dx =$

- (a) $\sin(x) - \frac{1}{2} \tan\left(\frac{x}{2}\right) - \frac{1}{2} \cot\left(\frac{x}{2}\right) + C$
 (b) $\sin(x) - \frac{1}{2} \tan\left(\frac{x}{2}\right) - \frac{1}{4} \cot\left(\frac{x}{2}\right) + C$
 (c) $\sin(x) + \frac{1}{2} \tan\left(\frac{x}{2}\right) - \frac{1}{2} \cot\left(\frac{x}{2}\right) + C$
 (d) $\sin(x) - \frac{1}{3} \tan\left(\frac{x}{2}\right) - \frac{1}{2} \cot\left(\frac{x}{2}\right) + C$
 (e) All other answers are not correct

2. $\int \frac{dx}{(9-x^2)^{3/2}} =$

- (a) $\frac{x}{81\sqrt{9-x^2}} + C$
 (b) $\frac{x}{9\sqrt{9+x^2}} + C$
 (c) $\frac{x}{3\sqrt{9-x^2}} + C$
 (d) $\frac{x}{9\sqrt{9-x^2}} + C$
 (e) All other answers are not correct

3. The length of the curve $y = \frac{4}{3}(x-3)^{3/2}$ from $x = 3$ to $x = 5$ is

- (a) $\frac{3}{13}$
 (b) $\frac{5}{3}$
 (c) $\frac{3}{5}$
 (d) $\frac{13}{3}$
 (e) All other answers are not correct

4. $\int \frac{dx}{1-\cos x} =$

- (a) $-\tan\left(\frac{x}{2}\right) + C$
 (b) $-\cot\left(\frac{x}{2}\right) + C$
 (c) $\cot\left(\frac{x}{2}\right) + C$
 (d) $-\tan\left(\frac{x}{2}\right) + C$
 (e) All other answers are not correct

5. $\int \sin^3 x dx =$

- (a) $\frac{3\sin(x)}{4} - \frac{1}{12} \sin(3x) + C$
 (b) $\frac{1}{12} \cos(3x) + \frac{3\cos(x)}{4} + C$
 (c) $\frac{1}{12} \cos(3x) - \frac{3\cos(x)}{4} + C$
 (d) $\frac{3\sin(x)}{4} + \frac{1}{12} \sin(3x) + C$
 (e) All other answers are not correct

6. If $\frac{3x}{(x+1)(x^2+2)} = \frac{A}{x+1} + \frac{Bx+C}{x^2+2}$, then $3A + 4B + 2C =$

- (a) 7
 (b) 3
 (c) 9
 (d) 5
 (e) All other answers are not correct

7. $\int \sin(2x) \cos(5x) dx =$

- (a) $-\frac{1}{6} \cos(3x) + \frac{1}{14} \cos(7x) + C$
 (b) $-\frac{1}{6} \cos(3x) - \frac{1}{12} \cos(7x) + C$
 (c) $-\frac{1}{6} \cos(3x) - \frac{1}{14} \cos(7x) + C$
 (d) $\frac{1}{6} \cos(3x) - \frac{1}{14} \cos(7x) + C$
 (e) All other answers are not correct

8. $\int x^2 \ln x dx$

- (a) $\frac{1}{4}x^4 \ln(x) - \frac{x^4}{16} + C$
 (b) $\frac{1}{3}x^3 \ln(x) - \frac{1}{3}x^3 + C$
 (c) $\frac{1}{3}x^3 \ln(x) - \frac{1}{9}x^3 + C$
 (d) $\frac{1}{4}x^2 \ln(x) - \frac{x^2}{16} + C$
 (e) All other answers are not correct₃₅

9.
$$\int_2^{\infty} \frac{dx}{x^2 + x} =$$

- (a) $\ln\left(\frac{2}{3}\right)$
 (b) $\ln 2$
 (c) $\ln\left(\frac{3}{2}\right)$
 (d) $-\ln 2$
 (e) All other answers are not correct

10.
$$\int \tan^2(x) \sec^2(x) dx =$$

- (a) $\tan^4(x) \sec^2(x) + C$
 (b) $\frac{\tan^4(x)}{4} + C$
 (c) $\frac{\tan^2(x)}{4} + C$
 (d) $\tan^2(x) \sec^2(x) + C$
 (e) All other answers are not correct

11.
$$\int x \cot^{-1}(x) dx =$$

- (a) $\frac{1}{2}x^2 \cot^{-1}(x) - \frac{x}{2} - \frac{1}{2} \tan^{-1}(x) + C$
 (b) $\frac{1}{2}x^2 \cot^{-1}(x) + \frac{x}{2} - \frac{1}{2} \tan^{-1}(x) + C$
 (c) $\frac{1}{2}x^2 \cot^{-1}(x) + \frac{x}{2} + C$
 (d) $\frac{1}{2}x^3 \cot^{-1}(x) + \frac{x}{2} - \frac{1}{2} \tan^{-1}(x) + C$
 (e) All other answers are not correct

12.
$$\int e^x \cos(2x) dx$$

- (a) $\frac{1}{5}e^{2x}(\sin(x) + 2 \cos(x)) + C$
 (b) $\frac{1}{5}e^x(2 \sin(2x) + \cos(2x)) + C$
 (c) $\frac{1}{5}e^{2x}(\sin(x) - 2 \cos(x)) + C$
 (d) $\frac{1}{5}e^x(2 \sin(x) + \cos(x)) + C$
 (e) All other answers are not correct

13. The improper integral $\int_3^{-2} \frac{dx}{x^4}$

- (a) convergent and its value is 1
 (b) convergent and its value is 4
 (c) convergent and its value is 2
 (d) divergent
 (e) All other answers are not correct

14. The improper integral $\int_{\infty}^e \frac{(\ln x)^p}{x} dx$ is **convergent** if

- (a) $p < 1$
 (b) $p > 1$
 (c) $p < -1$
 (d) $p \leq -1$
 (e) All other answers are not correct

15.
$$\int e^{-3x} (x^2 - 1) dx =$$

- (a) $\frac{1}{27}e^{-3x} (9x^2 - 6x + 11) + C$
 (b) $e^{-3x} (x^2 - 1) + C$
 (c) $\frac{1}{27}e^{-3x} (9x^2 + 6x + 11) + C$
 (d) $e^{-3x} (x^2 + 1) + C$
 (e) All other answers are not correct

16.
$$\int \frac{4(x^2 - x + 6)}{x(x^2 + 4)} dx =$$

- (a) $-\ln(x^2 + 4) + 6 \ln(x) - 2 \tan^{-1}\left(\frac{x}{2}\right) + C$
 (b) $-\ln(x^2 + 4) + 6 \ln(x) - 2 \tan^{-1}\left(\frac{x}{3}\right) + C$
 (c) $-\ln(x^2 + 4) + 6 \ln(x) - 3 \tan^{-1}\left(\frac{x}{2}\right) + C$
 (d) $-\ln(x^2 + 4) + 6 \ln(x) + 2 \tan^{-1}\left(\frac{x}{2}\right) + C$
 (e) All other answers are not correct

1. $\int \tan^2(x) \sec^2(x) dx =$

- (a) $\frac{\tan^2(x)}{4} + C$
 (b) $\tan^4(x) \sec^2(x) + C$
 (c) $\frac{\tan^4(x)}{4} + C$
 (d) $\tan^2(x) \sec^2(x) + C$
 (e) All other answers are not correct

2. $\int x^2 \ln x dx$

- (a) $\frac{1}{3}x^3 \ln(x) - \frac{1}{3}x^3 + C$
 (b) $\frac{1}{4}x^4 \ln(x) - \frac{x^4}{16} + C$
 (c) $\frac{1}{4}x^2 \ln(x) - \frac{x^2}{16} + C$
 (d) $\frac{1}{3}x^3 \ln(x) - \frac{1}{9}x^3 + C$
 (e) All other answers are not correct

3. The improper integral $\int_{\infty}^e \frac{(\ln x)^p}{x} dx$ is **con-**
vergent if

- (a) $p < -1$
 (b) $p > 1$
 (c) $p < 1$
 (d) $p \leq -1$
 (e) All other answers are not correct

4. $\int_2^{\infty} \frac{dx}{x^2 + x} =$

- (a) $-\ln 2$
 (b) $\ln(\frac{2}{3})$
 (c) $\ln(\frac{3}{2})$
 (d) $\ln 2$
 (e) All other answers are not correct

5. $\int \cos^3 x \csc^2 x dx =$

- (a) $\sin(x) + \frac{1}{2} \tan\left(\frac{x}{2}\right) - \frac{1}{2} \cot\left(\frac{x}{2}\right) + C$
 (b) $\sin(x) - \frac{1}{2} \tan\left(\frac{x}{2}\right) - \frac{1}{4} \cot\left(\frac{x}{2}\right) + C$
 (c) $\sin(x) - \frac{1}{2} \tan\left(\frac{x}{2}\right) - \frac{1}{2} \cot\left(\frac{x}{2}\right) + C$
 (d) $\sin(x) - \frac{1}{3} \tan\left(\frac{x}{2}\right) - \frac{1}{2} \cot\left(\frac{x}{2}\right) + C$
 (e) All other answers are not correct

6. $\int \sin(2x) \cos(5x) dx =$

- (a) $-\frac{1}{6} \cos(3x) - \frac{1}{12} \cos(7x) + C$
 (b) $\frac{1}{6} \cos(3x) - \frac{1}{14} \cos(7x) + C$
 (c) $-\frac{1}{6} \cos(3x) - \frac{1}{14} \cos(7x) + C$
 (d) $-\frac{1}{6} \cos(3x) + \frac{1}{14} \cos(7x) + C$
 (e) All other answers are not correct

7. The improper integral $\int_3^{-2} \frac{dx}{x^4}$

- (a) convergent and its value is 2
 (b) divergent
 (c) convergent and its value is 4
 (d) convergent and its value is 1
 (e) All other answers are not correct

8. $\int x \cot^{-1}(x) dx =$

- (a) $\frac{1}{2}x^3 \cot^{-1}(x) + \frac{x}{2} - \frac{1}{2} \tan^{-1}(x) + C$
 (b) $\frac{1}{2}x^2 \cot^{-1}(x) - \frac{x}{2} - \frac{1}{2} \tan^{-1}(x) + C$
 (c) $\frac{1}{2}x^2 \cot^{-1}(x) + \frac{x}{2} - \frac{1}{2} \tan^{-1}(x) + C$
 (d) $\frac{1}{2}x^2 \cot^{-1}(x) + \frac{x}{2} + C$
 (e) All other answers are not correct_{4b}

9. $\int e^x \cos(2x) dx$
- (a) $\frac{1}{5}e^{2x}(\sin(x) - 2\cos(x)) + C$
 (b) $\frac{1}{5}e^{2x}(\sin(x) + 2\cos(x)) + C$
 (c) $\frac{1}{5}e^x(2\sin(2x) + \cos(2x)) + C$
 (d) $\frac{1}{5}e^x(2\sin(x) + \cos(x)) + C$
 (e) All other answers are not correct
-
10. $\int \sin^3 x dx =$
- (a) $\frac{1}{12} \cos(3x) + \frac{3\cos(x)}{4} + C$
 (b) $\frac{1}{12} \cos(3x) - \frac{3\cos(x)}{4} + C$
 (c) $\frac{3\sin(x)}{4} + \frac{1}{12} \sin(3x) + C$
 (d) $\frac{3\sin(x)}{4} - \frac{1}{12} \sin(3x) + C$
 (e) All other answers are not correct
-
11. $\int \frac{4(x^2 - x + 6)}{x(x^2 + 4)} dx =$
- (a) $-\ln(x^2 + 4) + 6\ln(x) + 2\tan^{-1}\left(\frac{x}{2}\right) + C$
 (b) $-\ln(x^2 + 4) + 6\ln(x) - 2\tan^{-1}\left(\frac{x}{3}\right) + C$
 (c) $-\ln(x^2 + 4) + 6\ln(x) - 3\tan^{-1}\left(\frac{x}{2}\right) + C$
 (d) $-\ln(x^2 + 4) + 6\ln(x) - 2\tan^{-1}\left(\frac{x}{2}\right) + C$
 (e) All other answers are not correct
-
12. $\int \frac{dx}{1 - \cos x} =$
- (a) $-\tan\left(\frac{x}{2}\right) + C$
 (b) $\cot\left(\frac{x}{2}\right) + C$
 (c) $-\tan\left(\frac{x}{2}\right) + C$
 (d) $-\cot\left(\frac{x}{2}\right) + C$
 (e) All other answers are not correct
13. If $\frac{3x}{(x+1)(x^2+2)} = \frac{A}{x+1} + \frac{Bx+C}{x^2+2}$,
 then $3A + 4B + 2C =$
- (a) 7
 (b) 3
 (c) All other answers are not correct
 (d) 5
 (e) 9
-
14. $\int e^{-3x}(x^2 - 1) dx =$
- (a) $e^{-3x}(x^2 - 1) + C$
 (b) $\frac{1}{27}e^{-3x}(9x^2 - 6x + 11) + C$
 (c) $e^{-3x}(x^2 + 1) + C$
 (d) $\frac{1}{27}e^{-3x}(9x^2 + 6x + 11) + C$
 (e) All other answers are not correct
-
15. The length of the curve $y = \frac{4}{3}(x - 3)^{3/2}$
 from $x = 3$ to $x = 5$ is
- (a) $\frac{3}{13}$
 (b) $\frac{5}{3}$
 (c) $\frac{13}{3}$
 (d) $\frac{3}{5}$
 (e) All other answers are not correct
-
16. $\int \frac{dx}{(9 - x^2)^{3/2}} =$
- (a) $\frac{x}{81\sqrt{9-x^2}} + C$
 (b) $\frac{x}{9\sqrt{9+x^2}} + C$
 (c) $\frac{x}{3\sqrt{9-x^2}} + C$
 (d) $\frac{x}{9\sqrt{9-x^2}} + C$
 (e) All other answers are not correct

| Q | MASTER | CODE01 | CODE02 | CODE03 | CODE04 |
|----|--------|--------|--------|--------|--------|
| 1 | A | A | A | A | D |
| 2 | A | B | D | D | B |
| 3 | A | B | C | D | A |
| 4 | A | A | B | B | C |
| 5 | A | C | B | C | C |
| 6 | A | D | E | D | C |
| 7 | A | A | C | C | B |
| 8 | A | D | C | A | C |
| 9 | A | A | D | C | B |
| 10 | A | C | D | D | B |
| 11 | A | A | A | B | D |
| 12 | A | A | B | A | D |
| 13 | A | A | B | D | D |
| 14 | A | A | A | C | C |
| 15 | A | C | D | D | C |
| 16 | A | C | A | A | D |

Answer Counts

| V | A | B | C | D | E |
|---|---|---|---|---|---|
| 1 | 8 | 2 | 4 | 2 | 0 |
| 2 | 4 | 4 | 3 | 4 | 1 |
| 3 | 4 | 2 | 4 | 6 | 0 |
| 4 | 1 | 4 | 6 | 5 | 0 |