

Final Test Review

Test Form A

Chapter 5

1. Evaluate $\int \frac{1}{x^4} dx$.
- (a) $-\frac{1}{3x^3}$ (b) $\frac{5}{x^5}$ (c) $\frac{1}{5x^5} + C$
 (d) $-\frac{1}{3x^3} + C$ (e) None of these
2. Evaluate $\int \sqrt[3]{t} dt$.
- (a) $\frac{3}{4}t^{4/3} + C$ (b) $\sqrt[3]{\frac{1}{2}t^2} + C$ (c) $\frac{3}{2}t^{2/3} + C$
 (d) $\frac{1}{3t^{2/3}} + C$ (e) None of these
3. Evaluate $\int x(x^3 + 3) dx$.
- (a) $3x^5 + 15x^2 + C$ (b) $\frac{1}{6}(x^3 + 3)^2 + C$
 (c) $\frac{1}{5}x^5 + \frac{3}{2}x^2 + C$ (d) $\frac{1}{4}x^2(x^3 + 3)^2 + C$
 (e) None of these
4. Evaluate $\int (3x^3 - 2x^2 + 5) dx$.
- (a) $9x^2 - 4x + C$ (b) $\frac{3}{4}x^4 - \frac{2}{3}x^3 + 5x + C$ (c) $\frac{3}{4}x^4 - \frac{2}{3}x^3 + C$
 (d) $9x^4 - 8x^3 + 60x + C$ (e) None of these
5. Evaluate $\int \frac{x^3 + x}{x} dx$.
- (a) $x^3 + 3x + C$ (b) $2x + C$ (c) $\frac{x^3}{3} + x + C$
 (d) $\frac{2x^3 + x - 1}{x^2}$ (e) None of these
6. Determine the new upper and lower limits of integration if the integral $\int_1^4 \frac{1}{\sqrt{5-x}} dx$ is to be solved by letting $u = \sqrt{5-x}$.
- (a) Upper limit: 4; Lower limit: 1 (b) Upper limit: 2; Lower limit: 1
 (c) Upper limit: 1; Lower limit: 2 (d) Upper limit: 2; Lower limit: -2
 (e) None of these

Skip # 7-12

13. Use the Fundamental Theorem of Calculus to evaluate $\int_{-1}^2 (2x - 1) dx$.
- (a) 4 (b) 2 (c) -2
 (d) -4 (e) None of these
14. Find the average value of $f(x) = 2x^2 + 3$ on the interval $[0, 2]$.
- (a) $\frac{22}{3}$ (b) $\frac{17}{3}$ (c) 4
 (d) 27 (e) None of these
15. Evaluate $\int x^2(x^3 + 5)^6 dx$.
- (a) $\frac{1}{21}(x^3 + 5)^7 + C$ (b) $\frac{1}{7}(x^3 + 5)^7 + C$ (c) $\frac{x^3(x^3 + 5)^7}{21} + C$
 (d) $\frac{x^3}{3} \left(\frac{x^4}{4} + 5x\right)^6 + C$ (e) None of these
16. Evaluate $\int \frac{1}{\sqrt{2x+1}} dx$.
- (a) $\sqrt{x^2+x} + C$ (b) $\frac{1}{\sqrt{x^2+x}} + C$ (c) $\sqrt{2x+1} + C$
 (d) $\frac{1}{2}\sqrt{2x+1} + C$ (e) None of these
17. Evaluate $\int_0^2 |x - 1| dx$.
- (a) 0 (b) 1 (c) $\frac{1}{2}$
 (d) 2 (e) None of these
18. Evaluate $\int 4(3x + 1)^4 dx$.
- (a) $\frac{4}{15}(3x + 1)^5 + C$ (b) $\frac{4}{5}(3x + 1)^5 + C$ (c) $\frac{1}{20}(3x + 1)^5 + C$
 (d) $\frac{1}{60}(3x + 1)^5 + C$ (e) None of these
19. Evaluate $\int x\sqrt{1-x} dx$.
- (a) $-\frac{x^2}{3}(1-x)^{3/2} + C$ (b) $\frac{2-3x}{2\sqrt{1-x}} + C$
 (c) $\frac{x^2}{3}(1-x)^{3/2} + C$ (d) $-\frac{2}{15}(2+3x)(1-x)^{3/2} + C$
 (e) None of these

end of Ch 5

1. Determine the area of the region bounded by $y = x^2 - 4x$ and $y = x - 4$.

(a) $-\frac{9}{2}$

(b) $\frac{23}{6}$

(c) $\frac{9}{2}$

(d) $\frac{8}{3}$

(e) None of these

2. Find the volume of the solid formed by revolving the region bounded by $y = x^3$, $y = 1$ and $x = 2$ about the x axis.

(a) $\frac{127}{7}\pi$

(b) $\frac{120}{7}\pi$

(c) $\frac{240}{7}\pi$

(d) $\frac{1013}{10}\pi$

(e) None of these

Shell

3. Which of the following integrals represents the volume of the solid formed by revolving the region bounded by $y = x^3$, $y = 1$ and $x = 2$ about the line $x = 2$?

(a) $2\pi \int_1^8 (2-y)(\sqrt[3]{y}-1) dy$

(b) $\pi \int_1^2 [(x^3-1)^2 - 1^2] dx$

(c) $\pi \int_1^8 [(\sqrt[3]{y})^2 - 1^2] dy$

(d) $2\pi \int_1^2 (2-x)(x^3-1) dx$

(e) None of these

Shell

4. Find the volume of the solid formed by revolving the region bounded by $y = 2x^2 + 4x$ and $y = 0$ about the y axis.

(a) $\frac{544\pi}{15}$

(b) $\frac{12\pi}{3}$

(c) $\frac{16\pi}{3}$

(d) $\frac{16}{3}$

(e) None of these

Test Form B

1. Determine the area of the region bounded by $y = -x^2 + 2x + 3$ and $y = 3$.

(a) $\frac{4}{3}$

(b) $\frac{9}{2}$

(c) $\frac{22}{3}$

(d) $-\frac{4}{3}$

(e) None of these

Chapter 6

2. Find the volume of the solid formed by revolving the region bounded by $y = x^3$, $x = 2$ and $y = 1$ about the y axis.

(a) $\frac{93}{5}\pi$

(b) $\frac{120}{7}\pi$

(c) $\frac{47}{5}\pi$

(d) $\frac{62}{5}\pi$

(e) None of these

3. Which of the following integrals represents the volume of the solid formed by revolving the region bounded by $y = x^3$, $y = 1$ and $x = 2$ about the line $y = 10$?

(a) $\pi \int_1^8 (10-y)(2-\sqrt[3]{y}) dy$

(b) $\pi \int_1^2 [81 - (10-x^3)^2] dx$

(c) $2\pi \int_1^8 y(2-\sqrt[3]{y}) dy$

(d) $\pi \int_1^2 [1 - (10-x^3)^2] dx$

(e) None of these

4. Find the volume of the solid formed by revolving the region bounded by $y = \frac{1}{2}(x-2)^2$ and $y = 2$ about the y axis.

(a) $\frac{128\pi}{15}$

(b) $\frac{64\pi}{3}$

(c) $\frac{32\pi}{3}$

(d) $\frac{20\pi}{3}$

(e) None of these

Chapter 7

1. Find y' if $y = e^{2x^2+1}$.

(a) $(2x^2 + 1)e^{2x^2}$

(b) $\frac{1}{4x}e^{2x^2+1} + C$

(c) $4xe^{2x^2+1}$

(d) e^{4x}

(e) None of these

2. Find $f'(x)$ for $f(x) = \sqrt{4 + e^{2x}}$.

(a) $\frac{e^{2x}}{\sqrt{4 + e^{2x}}}$

(b) $\frac{1}{2\sqrt{2}e^{2x}}$

(c) $\frac{xe^{2x-1}}{\sqrt{4 + e^{2x}}}$

(d) e^x

(e) None of these

3. Find y' if $xe^y + 1 = xy$.

(a) 0

(b) $\frac{y - e^y}{xe^y - x}$

(c) $\frac{y}{e^y - x}$

(d) $\frac{e^y}{xe^y - 1}$

(e) None of these

4. Find $\frac{dy}{dx}$ if $y = \frac{x^3}{3^x}$.

(a) $\frac{x}{3^{x-2}}$

(b) $\frac{3x^2}{3^x(\ln 3)}$

(c) $\frac{x^2(9 - x^2)}{3^{x+1}}$

(d) $\frac{x^2[3 - x(\ln 3)]}{3^x}$

(e) None of these

5. Differentiate: $y = x^{1-x}$.

(a) $(1 - x)x^{-x}$

(b) $x^{1-x} \left[\frac{1-x}{x} - \ln x \right]$

(c) $(x - 1)x^{-x}$

(d) $x^{1-x} \left(-\frac{1}{x} \right)$

(e) None of these

6. Write as a logarithm of a single quantity: $\frac{1}{2} \ln(x^2 - 1) - 3 \ln x - \ln(x^2 + 1)$.

(a) $\ln \left(\frac{\sqrt{x^2 + 1}}{x^3(x^2 + 1)} \right)$

(b) $\ln \left(\frac{\sqrt{x^2 - 1}(x^2 + 1)}{x^3} \right)$

(c) $\ln \left[\frac{x^2 - 1}{6x(x^2 + 1)} \right]$

(d) $\ln \left[x^3(x^2 + 1)\sqrt{x^2 - 1} \right]$

(e) None of these

7. Find dy/dx for $y = \ln \sqrt{x^2 + 4}$.

(a) $\frac{x}{\sqrt{x^2 + 4}}$

(b) $\frac{2x}{\sqrt{x^2 + 4}}$

(c) $\frac{x}{x^2 + 4}$

(d) $\frac{1}{x}$

(e) None of these

8. Take the derivative: $f(x) = \ln \frac{\sqrt{x^2 + 1}}{x(2x^3 - 1)^2}$.

(a) $\frac{x}{x^2 + 1} - \frac{1}{x} + \frac{12x^2}{2x^3 - 1}$

(b) $\frac{x}{x^2 + 1} - \frac{1}{x} + \frac{6x^2}{2x^3 - 1}$

(c) $\frac{1}{(x^2 + 1)^{1/2}(4x^2)(2x^3 - 1)}$

(d) $\frac{x}{x^2 + 1} - \frac{1}{x} - \frac{12x^2}{2x^3 - 1}$

(e) None of these

9. Evaluate $\int x^2 e^{x^3} dx$.

(a) $\frac{x^3 e^{x^3} + 1}{3(x^3 + 1)} + C$

(b) $\frac{e^{x^3}}{3} + C$

(c) $x(3x^3 + 2)e^{x^3} + C$

(d) $3e^{x^3} + C$

(e) None of these

10. Evaluate $\int \frac{e^{1/(x+1)}}{(x+1)^2} dx$.

(a) $\frac{e^{1/(x+1)}}{2(x+1)} + C$

(b) $\frac{e^{-x/(x+1)}}{(x+1)^2} + C$

(c) $-e^{1/(x+1)} + C$

(d) $\frac{e^{-x/(x+1)}}{(x+1)^2}$

(e) None of these

11. Evaluate $\int_1^{5e} \frac{1}{x} dx$.

(a) $\frac{1}{5e} - 1$

(b) 0

(c) ∞

(d) $1 + \ln 5$

(e) None of these

12. Evaluate $\int \frac{x+2}{x+1} dx$.

(a) $\frac{x^2 + 4x}{x^2 + 2x} + C$

(b) $2x + C$

(c) $x + C$

(d) $x + \ln|x+1| + C$

(e) None of these

13. Evaluate $\int \frac{x^2 + 1}{x^3 + 3x} dx$.

(a) $\frac{5x^4 + 12x^2 + 3}{(x^3 + 3x)^2} + C$

(b) $\frac{4x^3 + 12}{3x^4 + 18x^2} + C$

(c) $\frac{1}{3} \ln|x^3 + 3x| + C$

(d) 0

(e) None of these

Skip # 1-7

8. Differentiate: $y = \frac{1 + \cos x}{1 - \cos x}$.

- (a) -1 (b) $-2 \csc x$ (c) $2 \csc x$
 (d) $\frac{-2 \sin x}{(1 - \cos x)^2}$ (e) None of these

9. Find $\frac{dy}{dx}$ if $y = \sin(x + y)$.

- (a) 0 (b) $\frac{\cos(x + y)}{1 - \cos(x + y)}$ (c) $\cos(x + y)$
 (d) 1 (e) None of these

10. Differentiate: $y = \sec^2 x + \tan^2 x$.

- (a) 0 (b) $\tan x + \sec^4 x$ (c) $\sec^2 x(\sec^2 x + \tan^2 x)$
 (d) $4 \sec^2 x \tan x$ (e) None of these

11. Find the derivative: $s(t) = \csc \frac{t}{2}$.

- (a) $-\csc \frac{t}{2} \cot \frac{t}{2}$ (b) $-\frac{1}{2} \cot^2 \frac{t}{2}$ (c) $\frac{1}{2} \csc \frac{t}{2} \cot \frac{t}{2}$
 (d) $\frac{1}{2} \cot^2 \frac{t}{2}$ (e) None of these

For # 12-18 (See Next Page)

19. Evaluate $\int \frac{\sin^2 x - \cos^2 x}{\sin x} dx$.

- (a) $-2 \cos x + \ln |\csc x + \cot x| + C$ (b) $-\ln |\csc x + \cot x| + C$
 (c) $-\sec x + C$ (d) $\cos x + \ln |\csc x + \cot x| + C$
 (e) None of these

20. Evaluate $\int \frac{dx}{\sqrt{8 + 2x - x^2}}$.

- (a) $\ln \sqrt{8 + 2x - x^2}$ (b) $\arcsin \frac{x-1}{3} + C$ (c) $\sqrt{8 + 2x - x^2} + C$
 (d) $\frac{1}{3} \operatorname{arcsec} \frac{x-1}{3} + C$ (e) None of these

Chapter 8 Form A

12. Find y' if $y = \arcsin \sqrt{3x}$.

(a) $\frac{3}{\sqrt{1-3x}}$

(b) $\frac{3}{1+3x}$

(c) $\frac{\sqrt{3}}{\sqrt{1-3x}}$

(d) $\frac{\sqrt{3}}{2\sqrt{x}\sqrt{1-3x}}$

(e) None of these

13. Find y' if $y = e^{\cot x^2}$.

(a) $e^{-2x \csc^2 x^2}$

(b) $-\csc^2 x^2 e^{\cot x^2}$

(c) $-2x \csc^2 x^2 e^{\cot x^2}$

(d) $(\cot x^2) e^{\cot x^2 - 1}$

(e) None of these

14. Find all extrema in the interval $[0, 2\pi]$ if $y = x + \sin x$.

(a) $\left(-1, -1 + \frac{3\pi}{2}\right), (0, 0)$

(b) $(2\pi, 2\pi), (0, 0)$

(c) $(2\pi, 2\pi), (\pi, \pi)$

(d) $(\pi, \pi), (0, 0)$

(e) None of these

15. Evaluate $\int \cos 3x \, dx$.

(a) $\sin 3x + C$

(b) $-\sin 3x + C$

(c) $-\sin \frac{3}{2} x^2 + C$

(d) $\frac{1}{3} \sin 3x + C$

(e) None of these

16. Evaluate $\int \frac{\sin^3 \theta}{1 - \cos^2 \theta} \, d\theta$.

(a) $-\cos \theta + C$

(b) $\cos \theta + C$

(c) $\frac{\cos \theta [3 - 3 \cos^2 \theta - 2 \sin^2 \theta]}{1 - \cos^2 \theta}$

(d) $\frac{1}{2} \sin^2 \theta + C$

(e) None of these

17. Evaluate $\int \tan 3x \, dx$.

(a) $\frac{1}{3} \ln |\sec 3x| + C$

(b) $3 \sec^2 3x + C$

(c) $\frac{1}{3} \sec^2 3x$

(d) $\ln |\cos 3x| + C$

(e) None of these

18. Evaluate $\int \frac{x+3}{x^2+9} \, dx$.

(a) $\ln |x-3| + C$

(b) $\frac{1}{3} \arctan \frac{x}{3} + C$

(c) $\frac{1}{2} \ln(x^2+9) + \arctan \frac{x}{3} + C$

(d) $\ln(x^2+9) + \frac{1}{3} \arctan \frac{x}{3} + C$

(e) None of these

Answers to CHAPTER 5 Tests



TEST FORM A

- | | | | | |
|-------|-------|-------|-------|-------|
| 1. d | 2. a | 3. c | 4. b | 5. c |
| 6. c | 7. b | 8. d | 9. c | 10. c |
| 11. b | 12. d | 13. e | 14. b | 15. a |
| 16. c | 17. b | 18. a | 19. d | 20. a |

Answers to CHAPTER 6 Tests

TEST FORM A

- | | | | | |
|------|------|------------|------------|------|
| 1. c | 2. b | 3. d Shell | 4. c Shell | 5. a |
| 6. b | 7. d | 8. a | | |

TEST FORM B

- | | | | | |
|------|------|------|------|------|
| 1. a | 2. c | 3. b | 4. b | 5. c |
| 6. a | 7. a | 8. d | | |

Answers to CHAPTER 7 Tests

TEST FORM A

- | | | | | |
|-------|-------|-------|-------|-------|
| 1. c | 2. a | 3. b | 4. d | 5. b |
| 6. a | 7. c | 8. d | 9. b | 10. c |
| 11. d | 12. d | 13. c | 14. c | 15. b |
| 16. b | 17. b | 18. b | 19. c | 20. d |

Answers to CHAPTER 8 Tests

TEST FORM A

- | | | | | |
|-------|-------|-------|-------|-------|
| 1. d | 2. c | 3. a | 4. b | 5. a |
| 6. a | 7. c | 8. d | 9. b | 10. d |
| 11. e | 12. d | 13. c | 14. b | 15. d |
| 16. a | 17. a | 18. c | 19. a | 20. b |