

Math 2413
Unit 3 Review

1. Integrate: $\int 8 dx$
a) $0 + C$ b) $8x + C$ c) $x + 8 + C$ d) $8 + C$ e) $4x^2 + C$
2. Integrate: $\int (4x^3 - 2x + 3) dx$
a) $16x^3 - 2 + C$ b) $\frac{1}{4}x^4 - \frac{1}{2}x^2 + 3x + C$ c) $4x^3 - 2x^2 + 3x + C$
d) $x^4 - x^2 + 3x + C$ e) $x^4 - 2x^2 + C$
3. Integrate: $\int \frac{1}{x^3} dx$
a) $-\frac{1}{2x^2} + C$ b) $\frac{3}{x^2} + C$ c) $-\frac{3}{2x^3} + C$ d) $-\frac{1}{2x} + C$ e) $\frac{3}{x^4} + C$
4. $\int (3x^2 + 2x) dx =$
a) $3x^3 + 2x^2$ b) $\frac{x}{3} + 2$ c) $x^2 + 2x$ d) $\frac{x^3}{3} + \frac{x^2}{2} + C$ e) $x^3 + x^2 + C$
5. Integrate: $\int \sqrt[3]{x^2} dx$
a) $\sqrt[3]{\frac{x}{3}} + C$ b) $\frac{3x^{5/3}}{5} + C$ c) $-\frac{1}{5x^6} + C$ d) $-\frac{1}{4x^2} + C$ e) $\frac{x^{3/5}}{3} + C$
6. Integrate: $\int \frac{x^3 - x^2}{x^2} dx$
a) $\frac{1}{2}x^2 - x + C$ b) $\frac{3}{4}x - 1 + C$ c) $\frac{1}{2}x^2 - \frac{1}{3}x^3 + C$ d) $\frac{3}{2}x - 1 + C$ e) $\frac{1}{4}x^3 - \frac{1}{2}x^2 + C$
7. Use the Fundamental Theorem of Calculus to evaluate $\int_2^4 x^2 dx$.
a) -12 b) 3 c) $-\frac{56}{3}$ d) 12 e) $\frac{56}{3}$
8. Use the Fundamental Theorem of Calculus to evaluate $\int_1^4 \sqrt{x} dx$.
a) 1 b) $-\frac{14}{3}$ c) 7 d) $\frac{14}{3}$ e) -1
9. Choose the correct statement given that $\int_0^5 f(x) dx = 7$ and $\int_2^5 f(x) dx = -1$.
a) $\int_0^2 f(x) dx = 6$ b) $\int_5^2 f(x) dx = -1$ c) $\int_2^0 f(x) dx = 8$
d) $\int_0^2 f(x) dx = 8$ e) $\int_2^0 f(x) dx = -6$

10. Choose the correct statement given that $\int_0^9 f(x) dx = 5$ and $\int_3^9 f(x) dx = -1$.

a) $\int_3^0 f(x) dx = 6$

b) $\int_9^3 f(x) dx = -1$

c) $\int_0^3 f(x) dx = 4$

d) $\int_0^3 f(x) dx = 6$

e) $\int_0^3 f(x) dx = -6$

11. $\int x^2(x^3 + 5)^6 dx =$

a) $\frac{1}{21}(x^3 + 5)^7 + C$

b) $\frac{1}{7}(x^3 + 5)^7 + C$

c) $\frac{x^3(x^3 + 5)^7}{27} + C$

d) $\frac{x^3}{3} \left(\frac{x^4}{4} + 5x \right)^6 + C$

e) $\frac{1}{3}(x^3 + 5)^7 + C$

12. $\int x\sqrt{9 - 5x^2} dx =$

a) $-\frac{1}{10}(9 - 5x^2)^{3/2} + C$

b) $-\frac{1}{15}(9 - 5x^2)^{3/2} + C$

c) $\frac{3}{2}(9 - 5x^2)^{3/2} + C$

d) $-\frac{4}{15}(9 - 5x^2)^{3/2} + C$

e) $\frac{3}{20}(9 - 5x^2)^{3/2} + C$

13. $\int \frac{1}{6\sqrt{3x - 5}} dx =$

a) $6\sqrt{3x - 5} + C$

b) $\frac{1}{\sqrt{3x - 5}} + C$

c) $\frac{\sqrt{3x - 5}}{9} + C$

d) $\frac{1}{4}\sqrt{3x - 5} + C$

e) $\frac{1}{4\sqrt{3x^2 - 5x}} + C$

14. $\int \cos \frac{x}{3} dx =$

a) $\sin \frac{x}{3} + C$

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

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

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

e) $-\frac{1}{3} \sin \frac{x}{3} + C$

15. $\int \cot 4x dx =$

a) $-\frac{1}{4} \ln |\sin 4x| + C$

b) $\frac{1}{4} \ln |\sin 4x| + C$

c) $\frac{1}{4} \csc^2 4x$

d) $\ln |\sin 4x| + C$

e) $4 \ln |\sin 4x| + C$

16. $\int \sin^3(3x) \cos(3x) dx =$

a) $\frac{1}{8} \sin^4(3x) \cos^2(3x) + C$

b) $\frac{1}{4} \sin^4(3x) + C$

c) $3 \sin^2(3x) (3 \cos^2(3x) - \sin^2(3x)) + C$

d) $\frac{1}{12} \sin^4(3x) + C$

e) $\frac{1}{48} \sin^4(3x) \cos^2(3x) + C$

17. $\int x\sqrt{x+1} dx =$

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

b) $\frac{3x+2}{2\sqrt{x+1}} + C$

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

d) $\frac{2}{3}(x+1)^{3/2} - \frac{2}{5}(x+1)^{5/2} + C$

e) $-\frac{2}{3}(x+1)^{3/2} + \frac{2}{5}(x+1)^{5/2} + C$

18. $\int \frac{6x+5}{3x^2+5x-2} dx =$

a) $\frac{1}{3} \ln |3x^2+5x-2| + C$

b) $\ln |3x^2+5x-2| + C$

c) $\arctan(3x^2+5x-2) + C$

d) $\arcsin(3x^2+5x-2) + C$

e) $6x \ln(3x^2+5x-2) + C$

19. $\int 7^x dx =$

a) $7^x + C$

b) $\ln 7 + C$

c) $\frac{7^x}{\ln 7} + C$

d) $\frac{e^x}{\ln 7} + C$

e) $7 \frac{7^x}{\ln 7} + C$

20. $\int e^{-5x} dx =$

a) $-5e^{-\frac{1}{5}x} + C$

b) $-\frac{1}{5}e^{-\frac{1}{5}x} + C$

c) $-\frac{1}{5}e^{-5x} + C$

d) $-5e^{-5x} + C$

e) $e^{-5x} + C$

21. $\int 2^{3x} dx =$

a) $\frac{3^{2x}}{2 \ln 3} + C$

b) $\frac{1}{5}e^{3x} + C$

c) $\frac{2^{3x}}{3 \ln 2} + C$

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

e) $\frac{3^{\frac{1}{3}x}}{2 \ln 3} + C$

22. Evaluate: $\int \frac{7e^x}{e^x+5} dx$

a) $\frac{1}{7}e^{\ln(x+5)} + C$

b) $7e^{\ln(x+5)} + C$

c) $5 \ln(e^x+7) + C$

d) $7 \ln(e^x+5) + C$

e) $\ln(e^x+5) + C$

23. $\int \frac{2x}{\sqrt{5x^2+4}} dx =$

a) $3\sqrt{5x^2+4} + C$

b) $\frac{2}{5}\sqrt{5x^2+4} + C$

c) $\frac{\sqrt[3]{5x^2+4}}{5} + C$

d) $\frac{2}{5}\sqrt{5x^2+4} + C$

e) $\frac{1}{5}\sqrt{5x^2+4} + C$

24. Integrate: $\int \sin 3x dx$

a) $-3 \sin 3x + C$

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

c) $-\frac{1}{3} \cos 3x + C$

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

e) $\frac{1}{3} \sin 3x \cos 3x + C$

25. Integrate: $\int 3 \csc x \cot x dx$

a) $-3 \csc x + C$

b) $-3 \csc^2 x + C$

c) $\frac{3}{2} \csc^2 x \cot x + C$

d) $-\frac{3}{4} \csc^2 x \cot^2 x + C$

e) $3 \sin x \tan x + C$

26. $\int \frac{dx}{16+x^2} =$

a) $\frac{1}{4} \tan^{-1} \left(\frac{x}{4} \right) + C$

b) $\frac{1}{16} \tan^{-1} \left(\frac{x}{16} \right) + C$

c) $4 \tan^{-1} \left(\frac{x}{16} \right) + C$

d) $\frac{1}{4} \sec^2 \left(\frac{x}{4} \right) + C$

e) $\frac{1}{4} \tan^{-1} (4x) + C$

27. Find the indefinite integral: $\int \frac{x}{25+x^4} dx.$

a) $\frac{1}{30} \arcsin \frac{x^2}{5} + C$

b) $\frac{1}{2} \arcsin \frac{x^2}{5} + C$

c) $\frac{1}{5} \arctan \frac{x^2}{5} + C$

d) $\frac{1}{10} \operatorname{arcsec} \frac{x^2}{5} + C$

e) $\frac{1}{10} \arctan \frac{x^2}{5} + C$

28. $\int \frac{9 dx}{\sqrt{4-x^2}} =$

a) $\sin^{-1} \frac{x}{2} + C$

b) $4 \sin^{-1} \frac{x}{2} + C$

c) $4 \tan^{-1} \frac{x}{2} + C$

d) $9 \sin^{-1} \frac{x}{2} + C$

e) $9 \cos^{-1} \frac{x}{2} + C$

29. $\int \frac{dx}{\sqrt{36-49x^2}} =$

a) $\arcsin \frac{7x}{6} + C$

b) $\frac{1}{7} \arcsin \frac{7x}{6} + C$

c) $\frac{1}{7} \arctan \frac{7x}{6} + C$

d) $\frac{1}{7} \arctan \frac{x}{6} + C$

e) $\frac{1}{6} \arcsin \frac{7x}{6} + C$

30. $\int \frac{dx}{81+x^2} =$

a) $\frac{1}{9} \tan^{-1} \left(\frac{x}{9} \right) + C$

b) $\frac{1}{18} \tan^{-1} \left(\frac{x}{81} \right) + C$

c) $9 \tan^{-1} \left(\frac{x}{18} \right) + C$

d) $\frac{1}{9} \sec^2 \left(\frac{x}{9} \right) + C$

e) $\frac{1}{18} \tan^{-1} (9x) + C$

Answer List

1. b

4. e

7. e

10. d

13. c

16. d

19. c

22. d

25. a

28. d

2. d

5. b

8. d

11. a

14. d

17. e

20. c

23. d

26. a

29. b

3. a

6. a

9. d

12. b

15. b

18. b

21. c

24. c

27. e

30. a