

Calculus 1 Worksheet #22

Basic Integration

Examples:

1. $\int (x^7 - 6x + 8)dx = \frac{x^8}{8} - 6\frac{x^2}{2} + 8x + c = \boxed{\frac{1}{8}x^8 + 3x^2 + 8x + C}$
2. $\int (x^3 - \frac{1}{x^3})dx = \int (x^3 - x^{-3})dx \Rightarrow \frac{x^4}{4} - \frac{x^{-2}}{-2} + C = \boxed{\frac{1}{4}x^4 + \frac{1}{2x^2} + C}$
3. $\int (\frac{1}{5} - \frac{2}{x^3} + 2x)dx = \int (\frac{1}{5} - 2x^{-3} + 2x)dx \Rightarrow \frac{1}{5} \frac{x^1}{1} - \frac{2x^{-2}}{-2} + \frac{2x^2}{2} + C = \boxed{\frac{1}{5}x + \frac{1}{x^2} + x^2 + C}$
4. $\int \frac{1}{\sqrt[4]{z^5}} dz = \int z^{-\frac{5}{4}} dz = \frac{z^{-\frac{1}{4}}}{-\frac{1}{4}} + C = -4\sqrt[4]{z} + C$
5. $\int (x-2)^3 dx = \int (x^3 - 6x^2 + 12x - 8)dx \Rightarrow \frac{x^4}{4} - \frac{6x^3}{3} + \frac{12x^2}{2} - \frac{8x^1}{1} + C = \boxed{\frac{1}{4}x^4 - 2x^3 + 6x^2 - 8x + C}$
6. $\int x^{-1} dx \Rightarrow \ln(x) + C$

Integrate problems 1-15

1. $\int 6x^2 dx$	2. $\int 6t dt$	3. $\int (2x-3) dx$
4. $\int (1-4x) dx$	5. $\int (x^2 - 2x - 3) dx$	6. $\int (3z^2 - 3z + 1) dz$
7. $\int (1-x^2) dx$	8. $\int (2x+1)^2 dx$	9. $\int \frac{dx}{x^2}$
10. $\int \frac{dt}{t}$	11. $\int \frac{2du}{u}$	12. $\int x^{-9} dx$
13. $\int \frac{x^2 + 4}{x} dx$	14. $\int \sqrt[3]{x^4} dx$	15. $\int (x^{-1} + 2)^2 dx$

Review 16-18

16. Find the domain and range of the function $f(x) = \sqrt{16 - x^2}$	17. $\lim_{h \rightarrow 0} \frac{3(x+h)^2 - 3x^2}{h}$	18. If $f(x) = (x)^2 - 3$, then is f(x) even, odd, or neither?
---	--	---

Answers:

1. $2x^3 + C$	2. $3t^2 + C$	3. $x^2 - 3x + C$	4. $x - 2x^2 + C$
5. $\frac{x^3}{3} - x^2 - 3x + C$	6. $z^3 - \frac{3}{2}z^2 + z + C$	7. $x - \frac{x^3}{3} + C$	8. $\frac{4x^3}{3} + 2x^2 + x + C$ or $\frac{1}{6}(2x+1)^3 + C$
9. $\frac{-1}{x} + C$	10. $\ln t + C$	11. $2\ln u + C$	12. $-\frac{x^{-8}}{8} + C$
13. $\frac{x^2}{2} + 4\ln x + C$	14. $\frac{3}{7}x^{\frac{7}{3}} + C$	15. $-x^{-1} + 4\ln x + 4x + C$	16. Domain = [-4,4] Range = [0,4]
17. $6x$	18. even		