

**Calc 1 Worksheet #25**  
**Definite Integrals**

**Learn: Definite Integrals**

**Examples:**

$1. \int_1^4 -x^{-2} dx \Rightarrow \frac{-x^{-1}}{-1} + c \Rightarrow \frac{1}{x} + c \Big _1^4 \Rightarrow \left(\frac{1}{4} + c\right) - \left(\frac{1}{1} + c\right) = \frac{1}{4} + c - 1 - c = \frac{1}{4} - 1 = \boxed{\frac{-3}{4}}$
$2. \int_{\pi}^{2\pi} \sin x dx \Rightarrow -\cos x + c \Big _{\pi}^{2\pi} \Rightarrow (-\cos 2\pi + c) - (-\cos \pi + c) \Rightarrow -\cos 2\pi + c + \cos \pi - c \Rightarrow$ $-\cos 2\pi + \cos \pi = -(1) + (-1) = \boxed{-2}$
$3. \int_1^e \frac{1}{x} dx \Rightarrow \ln x  + c \Big _1^e \Rightarrow (\ln e  + c) - (\ln 1  + c) = \ln(e) + c - \ln(1) - c = \ln(e) - \ln(1) = 1 - 0 = \boxed{1}$

**Problems:**

1. $\int_0^3 (2x-1) dx$	2. $\int_0^2 (4-x) dx$	3. $\int_1^2 (4t-5) dt$
4. $\int_1^3 (2x+3) dx$	5. $\int_{-3}^0 (x^2+2x-2) dx$	6. $\int_{-2}^2 (s^3-3s^2+2) ds$
7. $\int_1^2 \frac{dx}{x}$	8. $\int_1^e \frac{dx}{x}$	9. $\int_e^{e^2} \frac{du}{u}$
10. $\int_{1/e}^e \frac{dt}{t}$	11. $\int_0^1 e^x dx$	12. $\int_0^{\ln 2} e^u du$
13. $\int_{-\pi/2}^{\pi/2} \cos \theta d\theta$	14. $\int_0^{\pi} \sin \alpha d\alpha$	15. $\int_0^{\ln 2} e^{-t} dt$
16. $\int_0^2 \frac{dx}{4-x}$	17. $\int_{-2}^0 \frac{dx}{1-x}$	18. $\int_0^{\pi/4} \cos 2\theta d\theta$
19. $\int_0^{\pi/6} \sin 2\theta d\theta$	20. $\int_0^{\pi/4} \tan t dt$	21. $\int_0^{\pi/2} \frac{\cos \theta}{1+\sin \theta} d\theta$

**Answers:**

1. 6	2. 6	3. 1	4. 14	5. -6	6. -8	7. ln 2
8. 1	9. 1	10. 2	11. e-1	12. 1	13. 2	14. 2
15. $\frac{1}{2}$	16. ln 2	17. ln 3	18. $\frac{1}{2}$	19. $\frac{1}{4}$	20. $\ln \sqrt{2}$	21. ln 2