

Calculus Practice: First Fundamental Theorem of Calculus 3b

Evaluate each definite integral.

1) $\int_0^{\frac{\pi}{6}} 2\sec x \tan x \, dx$

2) $\int_{-\frac{\pi}{4}}^{\frac{\pi}{3}} -2\cos x \, dx$

3) $\int_{-\frac{\pi}{6}}^{\frac{\pi}{6}} \sin x \, dx$

4) $\int_{-\frac{3\pi}{4}}^{-\frac{\pi}{2}} -2\csc x \cot x \, dx$

5) $\int_{\frac{\pi}{3}}^{\frac{2\pi}{3}} 2\csc^2 x \, dx$

6) $\int_{-\frac{3\pi}{4}}^{-\frac{\pi}{2}} -\csc x \cot x \, dx$

7) $\int_{-\frac{\pi}{4}}^{\pi} -2\sin x \, dx$

8) $\int_{-\frac{\pi}{4}}^{\frac{\pi}{6}} \sec^2 x \, dx$

9) $\int_{\frac{\pi}{2}}^{\frac{3\pi}{4}} -\csc x \cot x \, dx$

10) $\int_{-\frac{\pi}{6}}^0 -\sec^2 x \, dx$

$$11) \int_{\sqrt{3}}^{3\sqrt{3}} \frac{1}{9+x^2} dx$$

$$12) \int_{\frac{2\sqrt{3}}{3}}^2 \frac{1}{4+x^2} dx$$

$$13) \int_{2\sqrt{3}}^6 \frac{1}{x\sqrt{x^2-9}} dx$$

$$14) \int_2^{2\sqrt{3}} \frac{1}{4+x^2} dx$$

$$15) \int_{\frac{3}{2}}^{\frac{3\sqrt{3}}{2}} \frac{1}{\sqrt{9-x^2}} dx$$

$$16) \int_{\frac{4\sqrt{3}}{3}}^4 \frac{1}{x\sqrt{x^2-4}} dx$$

$$17) \int_{\frac{1}{2}}^{\frac{\sqrt{3}}{2}} \frac{1}{\sqrt{1-x^2}} dx$$

$$18) \int_{2\sqrt{3}}^{3\sqrt{2}} \frac{1}{x\sqrt{x^2-9}} dx$$

$$19) \int_{\sqrt{3}}^3 \frac{1}{9+x^2} dx$$

$$20) \int_{\sqrt{2}}^{\sqrt{3}} \frac{1}{\sqrt{4-x^2}} dx$$

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Evaluate each definite integral.

1) $\int_0^{\frac{\pi}{6}} 2\sec x \tan x \, dx$

$$\frac{-6 + 4\sqrt{3}}{3} \approx 0.309$$

2) $\int_{-\frac{\pi}{4}}^{\frac{\pi}{3}} -2\cos x \, dx$

$$-\sqrt{3} - \sqrt{2} \approx -3.146$$

3) $\int_{-\frac{\pi}{6}}^{\frac{\pi}{6}} \sin x \, dx$

$$0$$

4) $\int_{-\frac{3\pi}{4}}^{-\frac{\pi}{2}} -2\csc x \cot x \, dx$

$$-2 + 2\sqrt{2} \approx 0.828$$

5) $\int_{\frac{\pi}{3}}^{\frac{2\pi}{3}} 2\csc^2 x \, dx$

$$\frac{4\sqrt{3}}{3} \approx 2.309$$

6) $\int_{-\frac{3\pi}{4}}^{-\frac{\pi}{2}} -\csc x \cot x \, dx$

$$-1 + \sqrt{2} \approx 0.414$$

7) $\int_{-\frac{\pi}{4}}^{\pi} -2\sin x \, dx$

$$-2 - \sqrt{2} \approx -3.414$$

8) $\int_{-\frac{\pi}{4}}^{\frac{\pi}{6}} \sec^2 x \, dx$

$$\frac{3 + \sqrt{3}}{3} \approx 1.577$$

9) $\int_{\frac{\pi}{2}}^{\frac{3\pi}{4}} -\csc x \cot x \, dx$

$$\sqrt{2} - 1 \approx 0.414$$

10) $\int_{-\frac{\pi}{6}}^0 -\sec^2 x \, dx$

$$-\frac{\sqrt{3}}{3} \approx -0.577$$

$$11) \int_{\sqrt{3}}^{3\sqrt{3}} \frac{1}{9+x^2} dx$$

$$\frac{\pi}{18} \approx 0.175$$

$$12) \int_{\frac{2\sqrt{3}}{3}}^2 \frac{1}{4+x^2} dx$$

$$\frac{\pi}{24} \approx 0.131$$

$$13) \int_{2\sqrt{3}}^6 \frac{1}{x\sqrt{x^2-9}} dx$$

$$\frac{\pi}{18} \approx 0.175$$

$$14) \int_2^{2\sqrt{3}} \frac{1}{4+x^2} dx$$

$$\frac{\pi}{24} \approx 0.131$$

$$15) \int_{\frac{3}{2}}^{\frac{3\sqrt{3}}{2}} \frac{1}{\sqrt{9-x^2}} dx$$

$$\frac{\pi}{6} \approx 0.524$$

$$16) \int_{\frac{4\sqrt{3}}{3}}^4 \frac{1}{x\sqrt{x^2-4}} dx$$

$$\frac{\pi}{12} \approx 0.262$$

$$17) \int_{\frac{1}{2}}^{\frac{\sqrt{3}}{2}} \frac{1}{\sqrt{1-x^2}} dx$$

$$\frac{\pi}{6} \approx 0.524$$

$$18) \int_{2\sqrt{3}}^{3\sqrt{2}} \frac{1}{x\sqrt{x^2-9}} dx$$

$$\frac{\pi}{36} \approx 0.087$$

$$19) \int_{\sqrt{3}}^3 \frac{1}{9+x^2} dx$$

$$\frac{\pi}{36} \approx 0.087$$

$$20) \int_{\sqrt{2}}^{\sqrt{3}} \frac{1}{\sqrt{4-x^2}} dx$$

$$\frac{\pi}{12} \approx 0.262$$