FUNDAMENTAL THEOREM OF CALCULUS

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Use the following theorem to evaluate the given definite integral.

Fundamental Theorem of Calculus, Part II. If $F'(x) = f(x)$ on the interval (a, b), then

$$\int_a^b f(x)\,\mathrm{d}x = F(b) - F(a)$$

1. $\displaystyle\int_1^3 \left(x^2 + 2x - 4\right)\mathrm{d}x$

2. $\displaystyle\int_0^1 \left(1 - 8v^3 + 16v^7\right)\mathrm{d}v$

3. $\displaystyle\int_1^8 x^{-2/3}\,\mathrm{d}x$

4. $\displaystyle\int_{\pi/6}^{\pi/2} \csc(t)\cot(t)\,\mathrm{d}t$

5. $\displaystyle\int_{\pi/4}^{\pi/3} \csc^2(\theta)\,\mathrm{d}\theta$

6. $\displaystyle\int_{0}^{\pi/4} \sec(\theta)\tan(\theta)\,\mathrm{d}\theta$