$f(x) = \sqrt[5]{33}$

$f(x) = \sqrt[5]{x} = x^{1/5}$; $f'(x) = \frac{1}{5}x^{-4/5} = \frac{1}{5(\sqrt[5]{x})^4}$

$c = 32$; $\Delta x = 1$

$\sqrt[5]{33} = \sqrt[5]{32+\Delta x}$

$\approx \sqrt[5]{32} + \frac{1}{80}\cdot 1$

$= 2 + \frac{1}{80} = \boxed{\frac{161}{80}}$

$f'(32) = \frac{1}{5(2)^4} = \frac{1}{80}$

$F(x) = \int_{g(x)}^{h(x)} q(t)\,dt = \int_{g(x)}^{a} + \int_{a}^{h(x)}$

$F(x) = \int_{c}^{h(x)} q(t)\,dt$ $\qquad = -\int_{a}^{g(x)} + \int_{a}^{h(x)}$

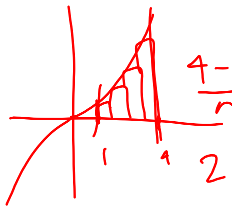
$F'(x) = q(h(x))\cdot h'(x)$

$F(x) = \int_{2x-5}^{3x^2} \sin t\,dt = -\int_{a}^{2x-5} \sin t\,dt + \int_{a}^{3x^2} \sin t\,dt$

$= -\sin(2x-5)\cdot 2 + \sin(3x^2)\cdot 6x$

$f(x) = 2x^3 \ , [1, 4]$

$$\int_1^4 2x^3\,dx = \lim_{n\to\infty} \sum_{i=1}^{n} 2\left(1+\frac{3}{n}i\right)^3 \cdot \frac{3}{n}$$



$\frac{4-1}{n} = \Delta x$

$2\left(1+\frac{3}{n}\right)^3 \ , 2\left(1+2\cdot\frac{3}{n}\right)^3$

1st height

$(a+b)^3$

$1a^3+3a^2b+3ab^2+b^3$

$$\int_1^4 2x^3\,dx = \lim_{n\to\infty} \sum_{i=1}^{n} 2\left(1+\frac{3}{n}i\right)^3 \cdot \frac{3}{n}$$

$$= \lim_{n\to\infty} \sum_{i=1}^{n} \frac{6}{n}\left(1+3\cdot\frac{3}{n}i+3\cdot\frac{9i^2}{n^2}+\frac{27i^3}{n^3}\right)$$

$$= \lim_{n\to\infty} \frac{6}{n} \sum_{i=1}^{n} \left(1+\frac{9}{n}i+\frac{27}{n^2}i^2+\frac{27}{n^3}i^3\right)$$

$$= \lim_{n\to\infty} \left[\frac{6}{n}\underbrace{\sum_{i=1}^{n} 1} + \frac{54}{n^2}\underbrace{\sum_{i=1}^{n} i} + \frac{6\cdot 27}{n^3}\underbrace{\sum_{i=1}^{n} i^2} + \frac{6\cdot 27}{n^4}\underbrace{\sum i^3}\right]$$

$$= \lim_{n\to\infty} \left[\frac{6}{n}\cdot n + \frac{54}{n^2}\cdot\frac{n(n+1)}{2} + \frac{6\cdot 27}{n^3}\cdot\frac{n(n+1)(2n+1)}{6} + \frac{6\cdot 27}{n^4}\cdot\frac{n^2(n+1)^2}{4}\right]$$

$$= 6 + 27 + 54 + \frac{81}{2} = \ldots$$

$$\int \frac{2x+1}{(x-3)^2x^2}\,dx$$

$$\frac{2x+1}{(x-3)^2x^2} = \frac{A}{(x-3)^2} + \frac{B}{x-3} + \frac{C}{x^2} + \frac{D}{x}$$

$$\frac{2x^2-3}{(2x^2-3)(x-2)^2x} = \frac{A}{x} + \frac{B}{x-2} + \frac{C}{(x-2)^2} + \frac{Dx+E}{2x^2-3}$$