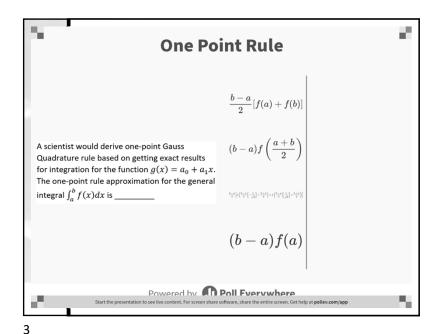
Integration

$$I = 4 \int_{0}^{1} \sqrt{1 - x^{2}} dx$$

As difficult a problem as thou finding quadrature of a circle

http://nm.mathforcollege.com

1



Two-Point Gauss Quadrature Rule

$$\int_{a}^{b} f(x)dx \approx c_{1} f(x_{1}) + c_{2} f(x_{2})$$

Let it be exact for $a_0 + a_1x + a_2x^2 + a_3x^3$

$$\int_{a}^{b} f(x)dx \approx c_{1} f(x_{1}) + c_{2} f(x_{2})$$

$$= \frac{b-a}{2} f\left(\frac{b-a}{2}\left(-\frac{1}{\sqrt{3}}\right) + \frac{b+a}{2}\right) + \frac{b-a}{2} f\left(\frac{b-a}{2}\left(\frac{1}{\sqrt{3}}\right) + \frac{b+a}{2}\right)$$

4

One-Point Gauss Quadrature Rule

$$\int_a^b f(x)dx \approx c_1 f(x_1)$$

Let it be exact for $a_0 + a_1 x$

$$\int_{a}^{b} f(x)dx \approx c_{1}f(x_{1})$$

$$= (b-a)f\left(\frac{b+a}{2}\right)$$

Could Gauss have derived the formula by letting it be exact for $a_0 + a_1x + a_2x^2$?

Could Gauss have derived the formula by letting it be exact for $a_1x + a_2x^2$?

5

7

Which of these represents a single application of the trapezoidal rule of integration? Choose all that apply.

Powered by Poll Fverywhere

A 2-point Gauss quad rule will give the exact definite integral value of the following integrands. Choose all that apply.

Powered by Poll Fverywhere

$$6x^4 \ 2x \ 2 + 3x + 3x^2 + 5x^3 + 6x^4 \ 2 + 3x + 3x^2 + 5x^3 \ 2 + 5x^2 \ 5x^3$$

(

In Gauss quadrature rule, the number of function evaluations for the 8-point rule is

8

9

17

Powered by Poll Everywhere

Start the presentation to see live content. For screen share software, share the entire screen. Get help at polley.com/app

For integrating any third order polynomial, the two-point Gauss quadrature rule will give you the same results as

1-segment trapezoidal rule

2-segment trapezoidal rule

3-segment trapezoidal rule

none of the above

In Gauss quadrature rule, the number of function evaluations for the 8-point rule is

8

9

17

Powered by Poll Everywhere

Start the presentation to see live content. For screen share software, share the entire screen. Get help at pollev.com/app

10

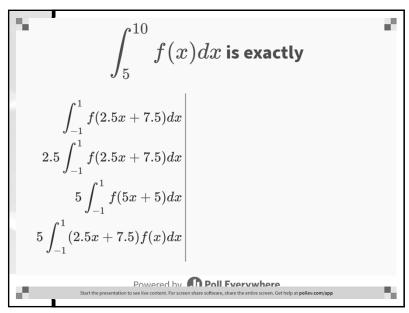
What is the highest order of polynomial that can be integrated exactly by a 5-point Gauss quadrature rule?

Powered hv. Poll Fverywhere

Start the presentation to see live content. For screen share software, share the entire screen. Get help at pollex.com/app

A function is being integrated from a lower limit of 2 to an upper limit of 10. A person is willing to only give you the value of the function at only two points. Which two points would you choose? Separate the answers with a comma

11 12





13