EXAM 2 CRIB

For all topics and methods, you must know: how to use them, their properties and characteristics, etc. — that is, you must also know concepts. You should know all the names of the methods. You are also responsible for knowing anything we covered that does not appear on this crib. The absence of a topic on this crib does not mean that you are not responsible for knowing it.

Richardson extrapolation:

$$F^* \approx F_h + \frac{F_h - F_H}{\left(\frac{H}{h}\right)^p - 1}$$

Trapezoidal rule template on Section 1:

$$\int f(x) \, dx \; \approx \; \frac{h}{2} \Big(f_0 + f_1 \Big)$$

Simpson's-1/3 rule template on Section 1:

$$\int f(x) dx \approx \frac{h}{3} \left(f_0 + 4f_1 + f_2 \right)$$

Simpson's-3/8 rule template on Section 1:

$$\int f(x) \, dx \; \approx \; \frac{3}{8} \, h \left(f_0 + 3f_1 + 3f_2 + f_3 \right)$$

You must know how to apply each of the above template formulas to each section to obtain the composite formula.

Newton–Gregory interpolating polynomial:

You must know how to build the Newton-Gregory polynomial through prescribed points and use it to interpolate. You must also know the "next term rule" and its uses.

Transformation to use Gauss Quadrature:

$$\int_{a}^{b} f(x) \, dx = m \int_{-1}^{1} F(t) \, dt \,, \qquad x = mt + p.$$

I would give you the weights and the abscissas. However, you need to know how to use Gauss Quadrature to approximate the integral. You also must know the formulas for m and p.