TECHNICAL CALCULUS II
Spring 1998
Final Exam

Name ______________________________

1. Prove: $2\sin x + \sin 2x = \dfrac{2\sin^3 x}{1-\cos x}$

2. Find f': $f = 2tg^2(x^2)$

3. Write the equation of the tangent line to $y = 2\,ctg(3x)$ at $x = \dfrac{\pi}{12}$.

4. Find the area of the largest rectangle that can be inscribed in the first quadrant under the curve $y = e^{-x}$.

5. Find the equation of the curve for which $y' = e^x(2-e^x)^2$ if the curve passes through (0,4).

6. Integrate: $\displaystyle\int \frac{x^3}{x^2+3x+2}\,dx =$

7. $\displaystyle\int \frac{dx}{x^2\sqrt{x^2+9}}$

8. Calculate using the series (without calculator) with accuracy 0.1: $\sin(61^\circ)$

9. Write the full Taylor's series for $\cos x$ about $x = \dfrac{\pi}{4}$

10. Find the Fourier series for 2π-periodic function: $f(x) = \begin{cases} 0, & -\pi < x \le 0, \\ x^2, & 0 \le x \le \pi \\ . \end{cases}$