10.1 Taylor Polynomials

Name: Date:

P 5. Find the Taylor polynomials of degree 2, 3, and 4 approximating $\cos x$ near 0.

P 6. Find the Taylor polynomials of degree 5, 7, and 9 approximating $\ln(1+x)$ near 0.

P 12. Find the Taylor polynomial of degree 4 near $x = 2$ of e^x.

P 18. The function $f(x)$ is approximated near $x = 0$ by the third-degree Taylor polynomial

$$P_3(x) = 2 - x - x^2/3 + 2x^3.$$

Find the value of

(a) $f(0)$

(b) $f'(0)$

(c) $f''(0)$

(d) $f'''(0)$

P 30. Use the fourth-degree Taylor approximation for x near 0,

$$\cos x \approx 1 - \frac{x^2}{2!} + \frac{x^4}{4!},$$

to explain why $\lim_{x \to 0} \dfrac{1 - \cos x}{x^2} = \dfrac{1}{2}$.

P 31. Use a fourth-degree Taylor approximation for e^h, for h near 0, to evaluate the following limits. Would your answer be different if you used a Taylor polynomial of higher degree?

(a) $\lim_{h \to 0} \dfrac{e^h - 1 - h}{h^2}$

(b) $\lim_{h \to 0} \dfrac{e^h - 1 - h - \frac{h^2}{2}}{h^3}$