

11.10 6.

$$f(x) = \frac{1}{1+x} \quad a=2$$

$$\sum_{n=0}^{\infty} \frac{x^n}{n!} = f^{(n)}(0)$$

$$f(2) = \frac{1}{3}$$

$$f'(2) = -\frac{1}{9}$$

$$P(0) = f(0)$$

$$P'(0) = f'(0)$$

$$P(x) = f(0) + f'(0)x + \frac{1}{2} f''(0)x^2 - \frac{1}{3} f'''(0)x^3$$

$$1 - x$$

$$\frac{1}{1+x} = \frac{1}{3} - \frac{1}{9}x + \frac{1}{27}x^2 - \frac{1}{81}x^3$$

14. $f(x) = e^{-2x}$ $f(0) = 1$ $f'(0) = -2e^{-2x}$ $f''(0) =$
 $e^{-2x} \approx 1 - 2x + 4x^2 - 8x^3 + 16x^4$

$$\sum_{n=0}^{\infty} (-1)^n 2^n x^n \rightarrow \sum_{n=0}^{\infty} (-2x)^n$$

24. $f(x) = \cos x$ $a = \pi/2$ $f(\pi/2) = \frac{\sqrt{2}}{2}$ $f'(\pi/2) = -\sin \frac{\pi}{2} = -\frac{\sqrt{2}}{2}$

$$\cos x \approx \sum_{n=0}^{\infty} (-1)^n \frac{(x - \frac{\pi}{2})^{2n}}{(2n)!}$$

26. $f(x) = \sqrt{x}$ $a = 16$ $f(16) = 4$ $f'(16) = \frac{1}{8}$ $f''(16) = -\frac{1}{64}$
 $x^{1/2} \rightarrow \frac{1}{2}x^{-1/2} \rightarrow -\frac{1}{4}x^{-3/2}$

$$\sqrt{x} \approx \sum_{n=0}^{\infty} \frac{(-1)^n (x-16)^n}{8^n} \rightarrow \left(\frac{1}{8}\right)(x-16)^n$$

40. $f(x) = x^2 \ln(1+x^3)$ $\ln(1+x) = \sum_{n=1}^{\infty} (-1)^{n-1} \frac{x^n}{n}$ $R=1$

$$x^2 \ln(1+x^3) \approx \sum_{n=1}^{\infty} (-1)^{n-1} \frac{x^{3n}}{n}$$