1. F T T F T

2. $6,\ 4^x \ln 4,\ f,\ e^x,\ e^4,\ \pi$

3. $\displaystyle\int_0^{15} |v(t)|dt$

4. With notation as in the book,

$$\Delta x = \frac{b-a}{n} = \frac{3-0}{3} = 1, \quad R_3 = \Delta x\,(f(1)+f(2)+f(3)) = 1(1+4+9) = 14$$

Answer: 14

5. (a) Answer: $\ln|x| + C$

(b) With the substitution $u = x^3$, one gets $\dfrac{du}{dx} = 3x^2$ and

$$\int x^2 e^{x^3} dx = \frac{1}{3}\int e^u du = \frac{1}{3}e^u + C = \frac{e^{x^3}}{3} + C$$

Answer: $\dfrac{e^{x^3}}{3} + C$

(c) Answer: $3\tan^{-1} x + C$

6.

$$\int_{-1}^{\frac{\pi}{2}} f(x)\,dx = \int_{-1}^{0} f(x)\,dx + \int_{0}^{\frac{\pi}{2}} f(x)\,dx =$$
$$\int_{-1}^{0} x^2+1\,dx + \int_{0}^{\frac{\pi}{2}} \cos x\,dx = \left(\frac{x^3}{3}+x\right)\Big|_{-1}^{0} + \sin x\Big|_{0}^{\frac{\pi}{2}} = \frac{4}{3}+1 = \frac{7}{3}$$

Answer: $\dfrac{7}{3}$