

pg. 501 # 23, 29, 33, 35, 14

Stephanie

14. $f(x) = kx$ $[1, 4]$

$$\int_1^4 x dx = \left[\frac{x^2}{2} \right]_1^4$$
$$= \frac{4^2}{2} - \frac{1^2}{2} = \frac{16}{2} - \frac{1}{2} = \frac{15}{2} = 7.5$$

$$f(x) = \frac{2}{15} x$$

23. $f(x) = ke^x$ $[0, 3]$

$$\int_0^3 ke^x dx = \lim_{b \rightarrow 3} \int_0^b ke^x dx = \lim_{b \rightarrow 3} [e^x]_0^b$$

$$= \lim_{b \rightarrow 3} \left(\frac{-1}{e^3} - \frac{-1}{1} \right) = \frac{1}{e^3 - 1}$$

$$= \frac{e^x}{e^3 - 1}$$

$$\frac{e^3 - e^0}{e^3 - 1}$$

29. $k = \frac{1}{100}$

$$= .01$$

$$f(x) = .01 e^{-.01x}$$

$$P(0 \leq x \leq 40) = \int_0^{40} .01 e^{-.01x} dx$$

$$= \left[\frac{-.01}{.01} e^{-.01x} \right]_0^{40}$$

$$= [e^{-.01x}]_0^{40}$$

$$= -e^{-.01(40)} - (-e^{-.01(0)})$$

$$= -e^{-.4} + 1$$

$$= 1 - e^{-.4}$$

$$\approx .3307 \rightarrow .96 \text{ feet/sec}$$

Paul Ruby
 Morte Branco
 Ian Snel

Chapter 5.4 Pg. 500

14. $f(x) = Ke^{-x/2}$ on $[1, 4]$
 $\frac{1}{2} - \frac{1}{2} = \frac{1}{2} - \frac{1}{2} = \frac{1}{2}$

$\int_1^4 K e^{-x/2} dx = \frac{x^2}{2} \Big|_1^4$
 $K = \frac{1}{2}$ $f(x) = \frac{1}{2} e^{-x/2}$

23. $f(x) = Ke^x$ on $[0, 3]$
 $e^x \Big|_0^3 = e^3 - e^0 = 20.08 - 1 = 19.08$

~~scribbled out text~~
 $20.08 - 1 = 19.08$ $K = 19.08$ $f(x) = \frac{1}{19.08} e^x$

29. $f(x) = \frac{1}{100} e^{-x/100}$ on $[0, \infty)$
 $\int_0^{\infty} \frac{1}{100} e^{-x/100} dx = e^{-x/100} \Big|_0^{\infty} = 1 - e^{-\infty} = 1 - 0 = 1$
 $-0.67 + 1 = 0.33$

$P(X < 10) = 1 - e^{-10/100} = 1 - e^{-0.1}$

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Mitch Hohlen

14. $f(x) = kx$ $[1, 4]$

$$\frac{1}{k} \cdot f(x) \quad kx = 1$$

$$\int_1^4 \frac{x^2}{2} dx$$

$$\frac{16}{2} - \frac{1}{2} = \frac{15}{2} = 2/15$$

23. $f(x) = ke^x$

$$e^x - 1$$

$$e^0 = 1$$

$$e^3 = 20.08$$

$$-1$$

$$19.08$$

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19.08 $f(x) = \frac{e^x}{e^3 - 1}$

29. 100 ft $\frac{1}{100}e^{-\frac{1}{100}x}$

$$k = \frac{1}{100}$$

$$\int_0^{100} -e^{-\frac{1}{100}x}$$

$$-.67 + 1 = \boxed{.3297}$$