# fix

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$$\int_0^{15} 5(15-t) f(t)\,dt$$

$$+ \int_{15}^{\infty} 10(t-15) f(t)\,dt$$

$$= 75\int_0^{15} f(t)\,dt - 5\int_0^{15} t f(t)\,dt$$

$$+ 10\int_{15}^{\infty} t f(t)\,dt - 150\int_{15}^{\infty} f(t)\,dt$$

now

$$\int_0^{15} f(t)\,dt = \left[-\exp(-0.1t)\right]_0^{15}$$

$$= 1 - \exp(-1.5)$$

$$\int_{15}^{\infty} f(t)\,dt = \left[-\exp(-0.1t)\right]_{15}^{\infty}$$

$$= \exp(-1.5)$$

$$\int_0^{15} t f(t)\,dt = \int_0^{15} t\, 0.1\exp(-0.1t)\,dt$$

$$= \left[-t\exp(-0.1t)\right]_0^{15} + \int_0^{15} \exp(-0.1t)\,dt$$

$$= -15\exp(-1.5) + \left[\frac{\exp(-0.1t)}{-0.1}\right]_0^{15}$$

$$= -15\exp(-1.5) - 10\exp(-1.5) + 10$$

$$= -25\exp(-1.5) + 10$$

$$\int_{15}^{\infty} t\ 0.1\exp(-0.1t)\,dt$$

$$= \left[-t\exp(-0.1t)\right]_{15}^{\infty} + \int_{15}^{\infty}\exp(-0.1t)\,dt$$

$$= 15\exp(-1.5) + \left[-\frac{\exp(-0.1t)}{0.1}\right]_{15}^{\infty}$$

$$= 15\exp(-1.5) + \frac{\exp(-1.5)}{0.1}$$

$$= 25\exp(-1.5)$$

so

$$75\left[1 - \exp(-1.5)\right] - 5\left[10 - 25\exp(-1.5)\right]$$

$$+ 10\left[25\exp(-1.5)\right] - 150\left[\exp(-1.5)\right]$$

$$= 75 - 50 + \exp(-1.5)\left[-75 + 125\right.$$

$250 - 150]$

$= 25 + \exp(-1.5) \times 150 = 58.4695$