71. **Solution: A**

The distribution function of $Y$ is given by

$$G(y) = \Pr(T^2 \leq y) = \Pr(T \leq \sqrt{y}) = F(\sqrt{y}) = 1 - 4/y$$

for $y > 4$. Differentiate to obtain the density function $g(y) = 4y^{-2}$

Alternate solution:

Differentiate $F(t)$ to obtain $f(t) = 8t^{-3}$ and set $y = t^2$. Then $t = \sqrt{y}$ and

$$g(y) = f(t(y)) \frac{dt}{dy} = f(\sqrt{y}) \frac{d}{dt}(\sqrt{y}) = 8y^{-3/2} \left( \frac{1}{2} y^{-3/2} \right) = 4y^{-2}$$

72. **Solution: E**

We are given that $R$ is uniform on the interval $(0.04, 0.08)$ and $V = 10,000e^R$

Therefore, the distribution function of $V$ is given by

$$F(v) = \Pr[V \leq v] = \Pr\left[10,000e^R \leq v\right] = \Pr\left[R \leq \ln(v) - \ln(10,000)\right]$$

$$= \frac{1}{0.04} \int_{0.04}^{\ln(v) - \ln(10,000)} dr = \frac{1}{0.04} \left[ \ln(v) - \ln(10,000) \right]_{0.04} = 25 \ln(v) - 25 \ln(10,000) - 1$$

$$= 25 \left[ \ln\left(\frac{v}{10,000}\right) - 0.04 \right]$$

73. **Solution: E**

$$F(y) = \Pr[Y \leq y] = \Pr[10X^{0.8} \leq y] = \Pr[X \leq \left(\frac{y}{10}\right)^{10/8}] = 1 - e^{-\left(\frac{y}{10}\right)^{10/8}}$$

Therefore, $f(y) = F'(y) = \frac{1}{8} \left(\frac{y}{10}\right)^{\frac{1}{8}} e^{-\left(\frac{y}{10}\right)^{10/8}}$