38. Solution: A

Let F denote the distribution function of f. Then

$$F(x) = \Pr[X \le x] = \int_1^x 3t^{-4}dt = -t^{-3}\Big|_1^x = 1 - x^{-3}$$

Using this result, we see

$$\Pr[X < 2 \mid X \ge 1.5] = \frac{\Pr[(X < 2) \cap (X \ge 1.5)]}{\Pr[X \ge 1.5]} = \frac{\Pr[X < 2] - \Pr[X \le 1.5]}{\Pr[X \ge 1.5]}$$

$$= \frac{F(2) - F(1.5)}{1 - F(1.5)} = \frac{(1.5)^{-3} - (2)^{-3}}{(1.5)^{-3}} = 1 - \left(\frac{3}{4}\right)^3 = 0.578$$