38. Solution: A
Let \( F \) denote the distribution function of \( f \). Then
\[
F(x) = \Pr[X \leq x] = \int_{-\infty}^{x} 3t^{-4}dt = \left[ -t^{-3} \right]_{1}^{x} = 1 - x^{-3}
\]
Using this result, we see
\[
\Pr[X < 2 \mid X \geq 1.5] = \frac{\Pr[(X < 2) \cap (X \geq 1.5)]}{\Pr[X \geq 1.5]} = \frac{\Pr[X < 2] - \Pr[X \leq 1.5]}{\Pr[X \geq 1.5]}
\]
\[
= \frac{F(2) - F(1.5)}{1 - F(1.5)} = \frac{(1.5)^{-3} - (2)^{-3}}{(1.5)^{-3}} = 1 - \left( \frac{3}{4} \right)^{3} = 0.578
\]

39. Solution: E
Let \( X \) be the number of hurricanes over the 20-year period. The conditions of the problem give \( x \) is a binomial distribution with \( n = 20 \) and \( p = 0.05 \). It follows that
\[
\Pr[X < 2] = (0.95)^{20}(0.05)^{0} + 20(0.95)^{19}(0.05) + 190(0.95)^{18}(0.05)^{2}
\]
\[
= 0.358 + 0.377 + 0.189 = 0.925
\]

40. Solution: B
Denote the insurance payment by the random variable \( Y \). Then
\[
Y = \begin{cases} 
0 & \text{if } 0 < X \leq C \\
X - C & \text{if } C < X < 1 
\end{cases}
\]
Now we are given that
\[
0.64 = \Pr(Y < 0.5) = \Pr(0 < X < 0.5 + C) = \int_{0}^{0.5+C} 2x \, dx = x^{2}\bigg|_{0}^{0.5+C} = (0.5 + C)^{2}
\]
Therefore, solving for \( C \), we find \( C = \pm 0.8 - 0.5 \)
Finally, since \( 0 < C < 1 \), we conclude that \( C = 0.3 \)