59. Solution: B

The distribution function of X is given by

$$F(x)=\int_{200}^{x}\frac{2.5(200)^{2.5}}{t^{3.5}}dt=\left.\frac{-(200)^{2.5}}{t^{2.5}}\right|_{200}^{x}=1-\frac{(200)^{2.5}}{x^{2.5}} \quad , \quad x>200$$

Therefore, the p^{th} percentile x_p of X is given by

$$\frac{p}{100}=F(x_p)=1-\frac{(200)^{2.5}}{x_p^{\ 2.5}}$$

$$1-0.01p=\frac{(200)^{2.5}}{x_p^{\ 2.5}}$$

$$(1-0.01p)^{2/5}=\frac{200}{x_p}$$

$$x_p=\frac{200}{(1-0.01p)^{2/5}}$$

It follows that $x_{70}-x_{30}=\dfrac{200}{(0.30)^{2/5}}-\dfrac{200}{(0.70)^{2/5}}=93.06$

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60. Solution: E

Let X and Y denote the annual cost of maintaining and repairing a car before and after the 20% tax, respectively. Then Y = 1.2X and Var[Y] = Var[1.2X] = $(1.2)^2$ Var[X] = $(1.2)^2(260)$ = 374 .

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61. Solution: A

The first quartile, Q1, is found by ¾ = $\int_{Q1}^{\infty}$ f(x) dx . That is, ¾ = $(200/Q1)^{2.5}$ or Q1 = 200 $(4/3)^{0.4}$ = 224.4 . Similarly, the third quartile, Q3, is given by Q3 = 200 $(4)^{0.4}$ = 348.2 . The interquartile range is the difference Q3 – Q1 .