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2003-10-13
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Question b) We apply the formula on page 263 for a density

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$$P(a \leq X \leq b) = \int_a^b f(x)\mathrm{d}x$$

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$$P(a \leq X \leq b) = \int_a^b f(x)\mathsf{d}x$$

We get

$$P(-1 \leq X \leq 2)$$

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$$P(a \leq X \leq b) = \int_a^b f(x)\mathsf{d}x$$

We get

$$P(-1 \leq X \leq 2) = \int_{-1}^{2} \frac{1}{2(1+|x|)^2}\mathsf{d}x =$$

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Question a)

Question b) We apply the formula on page 263 for a density

$$P(a \leq X \leq b) = \int_a^b f(x) \mathsf{d}x$$

We get

$$P(-1 \leq X \leq 2) = \int_{-1}^{2} \frac{1}{2(1+|x|)^2} \mathsf{d}x = \int_{-1}^{0} \frac{1}{2(1-x)^2} \mathsf{d}x$$

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$$= \left[\frac{1}{2(1-x)}\right]_{x=-1}^{x=0} + \left[-\frac{1}{2(1+x)}\right]_{x=0}^{x=2}$$

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Question c) The distribution is symmetric so

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Question c) The distribution is symmetric so
$P(|X| > 1)$

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Question c) The distribution is symmetric so
$P(|X| > 1) = 2P(X > 1) =$

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Question c) The distribution is symmetric so
$P(|X| > 1) = 2P(X > 1) = 2 \left[-\frac{1}{2(1+x)} \right]_{x=1}^{x=\infty}$

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Question c) The distribution is symmetric so
$P(|X| > 1) = 2P(X > 1) = 2\left[-\frac{1}{2(1+x)}\right]_{x=1}^{x=\infty} = \frac{1}{2}$.

Question d) No.

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Question c) The distribution is symmetric so
$P(|X| > 1) = 2P(X > 1) = 2 \left[-\frac{1}{2(1+x)} \right]_{x=1}^{x=\infty} = \frac{1}{2}$.

Question d) No. (the integral $\int_0^\infty x \frac{1}{2(1+x)^2} \mathsf{d}x$ does not exist).