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02405 Probability
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We note that Y for given $X = x$ is uniformly distributed,

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We note that Y for given $X = x$ is uniformly distributed, on $1 + x$

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We note that Y for given $X = x$ is uniformly distributed, on $1 + x$ for $-1 < x < 0$

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We note that Y for given $X = x$ is uniformly distributed, on $1 + x$ for $-1 < x < 0$ and on $1 - x$

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We note that Y for given $X = x$ is uniformly distributed, on $1 + x$ for $-1 < x < 0$ and on $1 - x$ for $0 < x < 1$.

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We note that Y for given $X = x$ is uniformly distributed, on $1 + x$ for $-1 < x < 0$ and on $1 - x$ for $0 < x < 1$. Thus

$$F(y|x)$$

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We note that Y for given $X = x$ is uniformly distributed, on $1 + x$ for $-1 < x < 0$ and on $1 - x$ for $0 < x < 1$. Thus

$$F(y|x) = P(Y \leq y|X = x)$$

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We note that Y for given $X = x$ is uniformly distributed, on $1 + x$ for $-1 < x < 0$ and on $1 - x$ for $0 < x < 1$. Thus

$$F(y|x) = P(Y \leq y|X = x) = \frac{y}{1 - |x|},$$

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$$F(y|x) = P(Y \leq y|X = x) = \frac{y}{1 - |x|}, 0 < y < 1 - |x|$$

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$$F(y|x) = P(Y \leq y|X = x) = \frac{y}{1 - |x|}, 0 < y < 1 - |x|$$

Question a) We have $P(Y \geq \frac{1}{2}|X = x)$

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Question a) We have $P(Y \geq \frac{1}{2}|X = x) = 1 - F(\frac{1}{2}|x)$

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Question a) We have $P(Y \geq \frac{1}{2}|X = x) = 1 - F(\frac{1}{2}|x)$

Question b) We have $P(Y \leq \frac{1}{2}|X = x)$

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Question c) Since Y for given $X = x$

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Question c) Since Y for given $X = x$ is uniformly distributed we can apply results for the uniform distribution,

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Question c) Since Y for given $X = x$ is uniformly distributed we can apply results for the uniform distribution, see e.g. the distribution summary page 477 or 487.

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Question c) Since Y for given $X = x$ is uniformly distributed we can apply results for the uniform distribution, see e.g. the distribution summary page 477 or 487. We get

$$E(Y|X = x)$$

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Question b) We have $P(Y \leq \frac{1}{2}|X = x) = F(\frac{1}{2}|x)$

Question c) Since Y for given $X = x$ is uniformly distributed we can apply results for the uniform distribution, see e.g. the distribution summary page 477 or 487. We get

$$E(Y|X = x) = \frac{1 - |x|}{2}$$

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Question b) We have $P(Y \leq \frac{1}{2}|X = x) = F(\frac{1}{2}|x)$

Question c) Since Y for given $X = x$ is uniformly distributed we can apply results for the uniform distribution, see e.g. the distribution summary page 477 or 487. We get

$$E(Y|X = x) = \frac{1 - |x|}{2}$$

Question c) Similarly

$$Var(Y|X = x)$$

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Question a) We have $P(Y \geq \frac{1}{2}|X = x) = 1 - F(\frac{1}{2}|x)$

Question b) We have $P(Y \leq \frac{1}{2}|X = x) = F(\frac{1}{2}|x)$

Question c) Since Y for given $X = x$ is uniformly distributed we can apply results for the uniform distribution, see e.g. the distribution summary page 477 or 487. We get

$$E(Y|X = x) = \frac{1 - |x|}{2}$$

Question c) Similarly

$$Var(Y|X = x) = \frac{(1 - |x|)^2}{12}$$