Lecture 3 (5.4)

Math 20E
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1.

If \( R \) is the region between \( y = 1 \) and \( y = x^2 \), we could integrate \( f \) over \( R \) by \( \int_{-1}^{1} \int_{x^2}^{1} f \, dy \, dx \). Which of these is equivalent to that integral?

(a) \( \int_{-1}^{1} \int_{x^2}^{1} f \, dx \, dy \)

(b) \( \int_{0}^{1} \int_{\sqrt{y}}^{1} f \, dx \, dy \)

(c) \( \int_{0}^{1} \int_{-\sqrt{y}}^{\sqrt{y}} f \, dx \, dy \)

(d) \( 2 \int_{0}^{1} \int_{0}^{\sqrt{y}} f \, dx \, dy \)

(e) None of these are correct.
Which of these is equivalent to \( \int_0^2 \int_y^2 e^{x^2} \, dx \, dy \)?

(a) \( \int_0^2 \int_{\ln x}^2 e^{x^2} \, dy \, dx \)

(b) \( \int_0^2 \int_x^2 e^{x^2} \, dy \, dx \)

(c) \( \int_0^2 \int_2^x e^{x^2} \, dy \, dx \)

(d) \( \int_0^2 \int_0^x e^{x^2} \, dy \, dx \)

(e) None of these are correct.
Switch the order of integration for \[ \int_0^1 \int_{-y}^y f \, dx \, dy. \]

(a) \[ \int_{-1}^1 \int_x^1 f \, dy \, dx \]

(b) \[ \int_{-1}^1 \int_{-x}^0 f \, dy \, dx \]

(c) \[ \int_0^1 \int_{|x|}^1 f \, dy \, dx \]

(d) \[ \int_{-1}^0 \int_{-x}^1 f \, dy \, dx + \int_0^1 \int_x^1 f \, dy \, dx \]

(e) None of these are correct.