

TW/AM 20753-242	TUTTOETS 6 / TUT TEST 6	2023
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Studentennummer / Student number:		

[9.10] Double integrals

Bereken U hieronder.

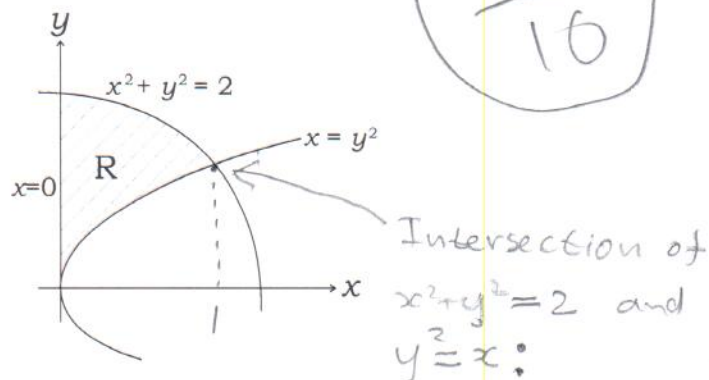
$$U = \iint_R 12x^2y \, dA$$

Calculate U below.

10
10

As type 1

$$U = \int_{x=0}^1 \left[\int_{y=\sqrt{x}}^{\sqrt{2-x^2}} 12x^2y \, dy \right] dx$$



$$\begin{aligned}
 &= \int_0^1 \left[\frac{12x^2y^2}{2} \right]_{y=\sqrt{x}}^{\sqrt{2-x^2}} dx \\
 &= \int_0^1 (6x^2(\sqrt{2-x^2})^2 - 6x^2(\sqrt{x})^2) dx \\
 &= \int_0^1 (6x^2(2-x^2) - 6x^2 \cdot x) dx \\
 &= \int_0^1 (12x^2 - 6x^4 - 6x^3) dx = \left[\frac{12x^3}{3} - \frac{6x^5}{5} - \frac{6x^4}{4} \right]_0^1 \\
 &= \left[\frac{12}{3} - \frac{6}{5} - \frac{6}{4} \right] = 1.3 \text{ or } \frac{13}{10}
 \end{aligned}$$

$$\begin{aligned}
 x^2+x-2 &= 0 \\
 x &= \frac{-1 \pm \sqrt{1-(-8)}}{2} \\
 &= \frac{-1 \pm 3}{2} \\
 &= -2 \text{ or } 1 \\
 x_0 &= 1 \\
 y_0 &= \sqrt{2-x^2} \\
 &= \sqrt{2-1} = 1
 \end{aligned}$$

$$U = \boxed{\frac{13}{10}}$$