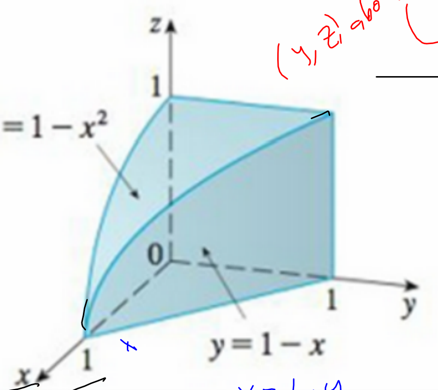
34. The figure shows the region of integration for the integral

$$\int_0^1 \int_0^{1-x^2} \int_0^{1-x} f(x, y, z)\, dy\, dz\, dx$$

Rewrite this integral as an equivalent iterated integral in the five other orders.



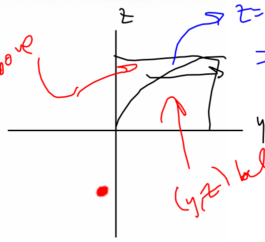
$x^2 = 1 - z$

$x = \pm\sqrt{1-z}$

$= \pm\sqrt{-(z-1)}$

$x = 1 - y$

(y, z) above



$z = 1 - x^2$
$= 1 - (1-y)^2$

(y, z) below

$z = 1 - x^2$

$x^2 = 1 - z$

$x = \pm\sqrt{1-z}$

$x = \sqrt{1-z}$

$z = 1 - (1-y)^2$

$(1-y)^2 = 1 - z$

$1 - y = \pm\sqrt{1-z}$

$-y = -1 \pm \sqrt{1-z}$

$y = 1 \pm \sqrt{1-z}$

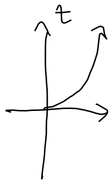
$$\int_0^1 \int_0^{1-\sqrt{1-z}} \int_0^{\sqrt{1-z}} 1\, dx\, dy\, dz$$

$$\int_0^1 \int_{1-\sqrt{1-z}}^{1} \int_0^{1-y} 1\, dx\, dy\, dz$$

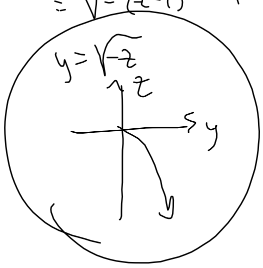
$y = 1 + \sqrt{1-z}$

$= \sqrt{-(z-1)} + 1$

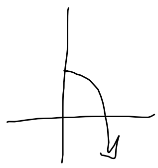
$y = \sqrt{z}$



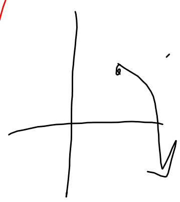
$y = \sqrt{-z}$



$y = \sqrt{-(z-1)}$



$y = \sqrt{-(z-1)} + 1$

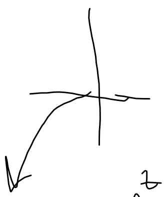


$y = 1 - \sqrt{1-z}$

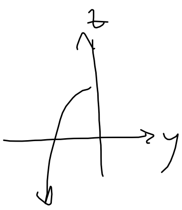
$y = \sqrt{z}$

$y = \sqrt{-z}$

$y = -\sqrt{-z}$

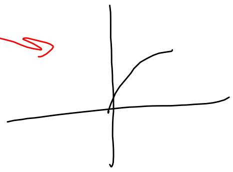


$y = -\sqrt{-(z-1)}$

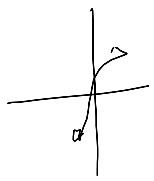


Take the $-\sqrt{1-z}$!

But I WANT:

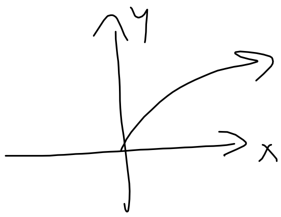


$y = 1 - \sqrt{-(x-1)}$

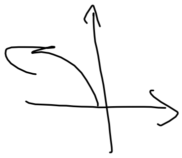


$y = 1 - \sqrt{1-x}$

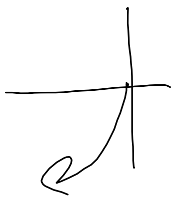
$y = \sqrt{x}$



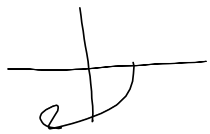
$y = \sqrt{-x}$



$y = -\sqrt{-x}$



$y = -\sqrt{-(x-1)}$

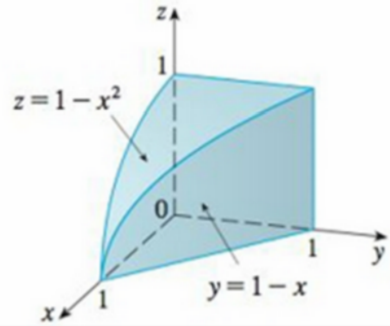


$y = -\sqrt{-(x-1)} + 1$

34. The figure shows the region of integration for the integral

$$\int_0^1\int_0^{1-x^2}\int_0^{1-x} f(x,y,z)\,dy\,dz\,dx$$

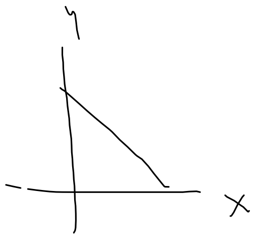
Rewrite this integral as an equivalent iterated integral in the five other orders.

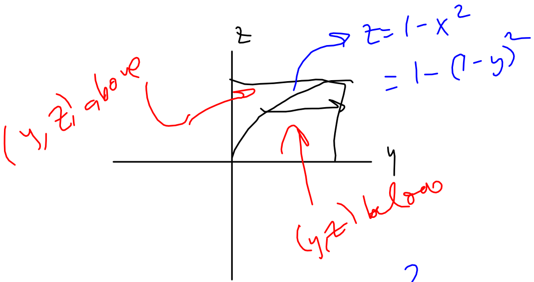


$$\int_0^1\int_0^{1-x}\int_0^{1-x^2} 1\,dz\,dy\,dx$$

$$\int_0^1\int_0^{1-y}\int_0^{1-x^2} dz\,dx\,dy$$

$$\int_0^1\int_0^{\sqrt{1-z}}\int_0^{1-x} dy\,dx\,dz$$





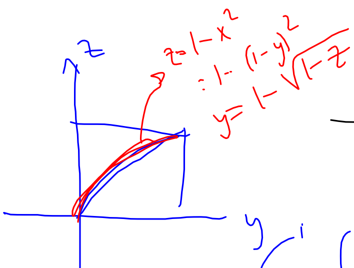
$z = 1 - x^2$

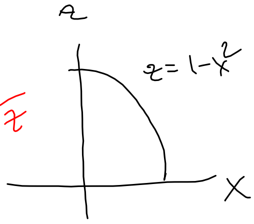
$x^2 = 1 - z$

$x = \pm\sqrt{1-z}$

$\sqrt{1-z}$

$z = 1 - (1-y)^2$





$$\int_0^1\int_{1-(1-y)^2}^1\int_0^{\sqrt{1-z}} dx\,dz\,dy$$

$$\int_0^1\int_0^{1-(1-y)^2}\int_0^{1-y} dx\,dz\,dy$$