$$\int \frac{x-5}{\sqrt{x^2+2x+5}} dx = \begin{vmatrix} u=x+1\\ x=u-1\\ dx=du \end{vmatrix} = \int \frac{u-6}{\sqrt{u^2-2u+1+2u-3}} du = \int \frac{u-6}{\sqrt{u^2+4}} du = \int \frac{u}{\sqrt{u^2+4}} du - 6 \int \frac{du}{\sqrt{u^2+4}} = \frac{u-6}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du = \int \frac{u}{\sqrt{u^2+4}} du - 6 \int \frac{du}{\sqrt{u^2+4}} = \frac{u-6}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{du}{\sqrt{u^2+4}} = \frac{u-6}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{du}{\sqrt{u^2+4}} = \frac{u-6}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{du}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{du}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{du}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{du}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{du}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{du}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{du}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{du}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{du}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{du}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{du}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{du}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{du}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{du}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{du}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{du}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{du}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{du}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{du}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{du}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{du}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{u-6}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{u-6}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{u-6}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{u-6}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{u-6}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{u-6}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{u-6}{\sqrt{u^2+4}} du = \int \frac{u-6}{\sqrt{u^2+4}} du - 6 \int \frac{u-6}{\sqrt$$

1.2

$$\int \sqrt[5]{2+\cos^2 x} \sin 2x dx = 2 \int \sqrt[5]{2+\cos^2 x} \sin x \cos x dx = egin{array}{c} u = 2+\cos^2 x \ du = -2\sin x \cos x dx \ -du/2 = \sin x \cos x \end{array} egin{array}{c} = 2 \int \sqrt[5]{u} \left(rac{-du}{2}
ight) = - \int \sqrt[5]{u} du = - \left(rac{u^{6/5}}{6/5}
ight) + C = -rac{5}{6}u^{6/5} + C = -rac{5}{6}(2+\cos^2 x)^{6/5} + C \end{aligned}$$

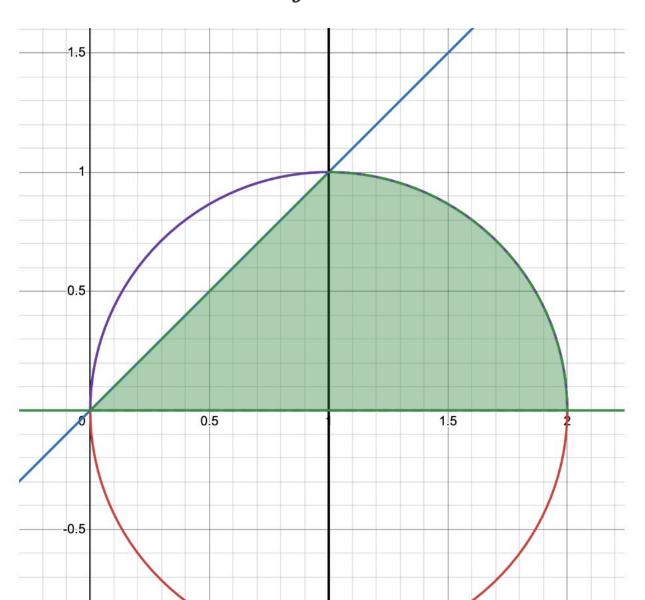
2.1

$$egin{aligned} \int_{rac{\pi}{2}}^{rac{\sqrt{3}}{2}} \sqrt{1-x^2} dx &= igg| egin{aligned} x = \sin u o dx = \cos u du \ x = 1/2 o u = \pi/6 \ x = \sqrt{3}/2 o u = \pi/3 \end{aligned} igg| = \int_{rac{\pi}{6}}^{rac{\pi}{3}} \sqrt{1-\sin^2 u} \cos u du = \int_{rac{\pi}{6}}^{rac{\pi}{3}} \cos^2 u du \end{aligned} = \int_{rac{\pi}{6}}^{rac{\pi}{3}} rac{1+\cos 2u}{2} du = rac{1}{2} \left(u + rac{\sin 2u}{2}
ight) igg|_{rac{\pi}{6}}^{rac{\pi}{3}} = rac{1}{2} \left(\pi/3 + rac{\sin 2\pi/3}{2}
ight) - rac{1}{2} \left(\pi/6 + rac{\sin \pi/3}{2}
ight) \end{aligned} = rac{\pi}{6} + rac{\sqrt{3}}{8} - rac{\pi}{12} - rac{\sqrt{3}}{8} = rac{\pi}{12}$$

$$\int_2^\infty rac{dx}{x\sqrt{x^2-1}} = \left|egin{array}{c} u = \sqrt{x^2-1} \ du = rac{x}{\sqrt{x^2-1}} dx \ dx = rac{\sqrt{x^2-1}}{x} du \ \end{array}
ight| = \int_2^\infty rac{du}{x^2} = \int_2^\infty rac{du}{u^2+1} = \int_2^\infty rctg\, u + C = \int_2^\infty rctg\, \sqrt{x^2-1} + C$$

$$\lim_{b o\infty}\int_2^b rac{dx}{x\sqrt{x^2-1}} = \lim_{b o\infty} \left(rctg\,\sqrt{b^2-1} - rctg\,\sqrt{2^2-1}
ight) = \pi/2 - \pi/3 = \pi/6$$

$$(x+1)^2+y^2=1 \ y=x \ y=0$$



$$S = \int_0^1 x dx + \int_1^2 \sqrt{1 - (x - 1)^2} dx$$

$$\int_0^1 x dx = \frac{1}{2}$$

$$\int \sqrt{1 - (x - 1)^2} dx = \begin{vmatrix} u = x - 1 \\ du = dx \end{vmatrix} = \int \sqrt{1 - u^2} du = \begin{vmatrix} v = \arcsin u \\ u = \sin v \\ \cos^2 v = 1 - u^2 \\ du = \cos v dv \end{vmatrix}$$

$$= \int \cos^2 v dv = \int \frac{1 + \cos 2v}{2} dv = \frac{1}{2} \int dv + \frac{1}{2} \int \cos 2v dv$$

$$= \frac{v}{2} + \frac{\sin 2v}{4} + C = \frac{\arcsin u}{2} + \frac{u\sqrt{1 - u^2}}{4} + C = \frac{\arcsin(x - 1)}{2} + \frac{(x - 1)\sqrt{2x - x^2}}{4} + C$$

$$\int_1^2 \sqrt{1 - (x - 1)^2} dx = \left(\frac{\arcsin(1)}{2} + 0\right) - (0 + 0) = \frac{\pi}{4}$$

$$S = \int_0^1 x dx + \int_1^2 \sqrt{1 - (x - 1)^2} dx = \frac{1}{2} + \frac{\pi}{4}$$

Виконаємо перевірку. Оскільки площа 1 фігури дорівнює половині площі квадрата зі стороною 1, а 2 - четвертині площі круга з радіусом 1:

$$S = rac{1*1}{2} + rac{\pi imes 1^2}{4} = rac{1}{2} + rac{\pi}{4}$$