Integration Test Functions

Function	Definite integral	Plot
$f_1(x) = e^x$	$I_1 = e - \frac{1}{e}$	2.5 2 1.5 1 0.5 0-1 -0.75 -0.5 -0.25 0 0.25 0.5 0.75 1 x
$f_2(x) = \cos(x)$	$I_2 = \sin(1) - \sin(-1)$	0.9 0.8 0.7 0.6 -1 -0.75 -0.5 -0.25 0 0.25 0.5 0.75 1
$f_3(x) = \tan\left(x - \frac{1}{2}\right)$	$I_3(x) = \ln \left \frac{\cos\left(-\frac{3}{2}\right)}{\cos\left(\frac{1}{2}\right)} \right $	y -2 -4 -6 -8 -10 -12 -14 -1 -0.75 -0.5 -0.25 0 0.25 0.5 0.75 1
$f_4(x) = \sqrt{1 - x^2}$	$I_4 = \frac{\pi}{2}$	0.8 0.6 0.4 0.2 0-1 -0.75 -0.5 -0.25 0 0.25 0.5 0.75 1 x
$f_5(x) = \begin{cases} \frac{x}{3}, & \text{if } x < 0.1\\ 1, & \text{otherwise} \end{cases}$	$I_5 = 0.9 - 1.1 \cdot \frac{0.9}{6}$	y 0.8 0.6 0.4 0.2 0 -0.2 -1 -0.75 -0.5 -0.25 0 0.25 0.5 0.75 1
$f_{6}(x) = \begin{cases} f_{4}(x), & \text{if } x < 0 \\ 1, & \text{otherwise} \end{cases}$	$I_6 = \frac{\pi}{4} + 1$	0.8 0.6 0.4 0.2 0-1 -0.75 -0.5 -0.25 0 0.25 0.5 0.75 1 x
$f_7(x) = \frac{1}{\sqrt{x+1}}$	$I_7 = 2 \cdot \sqrt{2}$	y 1 0 -0.75 -0.5 -0.25 0 0.25 0.5 0.75 1

$f_8(x) = \tan\left(\frac{\pi}{4}(x+0.9999)\right)$	$I_8 = -\frac{4}{\pi} \cdot \ln \left \frac{\cos\left(1.9999 \cdot \frac{\pi}{4}\right)}{\cos\left(0.0001 \cdot \frac{\pi}{4}\right)} \right $	y 120 100 80 60 40 20 0 -1 -0.75 -0.5 -0.25 0 0.25 0.5 0.75 1
$f_{9}(x) = \sum_{k=1}^{10} \sin(k \cdot \pi \cdot x) \cdot k$	$I_9 = 0$	40 20 0 -20 -40 -1 -0.75 -0.5 -0.25 0 0.25 0.5 0.75 1
$f_{10}(x) = \begin{cases} if \ x < 0.5 : & 1 - x^2 \\ else : & 0.75 \end{cases}$	$I_{10} = 0.5 - 0.5^{3}/3 + + 1 - 1^{3}/3 + + 0.5 \cdot 0.75 = 1.5$	y 0.8 0.6 0.4 0.2 0-1 -0.75 -0.5 -0.25 0 0.25 0.5 0.75 1

 $x \in [-1, 1]$