TUGAS MAPLE

Nama : Anissa Maulidyah
NIM : 2100015019
Kelas : B

LATIHAN I

1. Menjabarkan $(x-2\,y)^7$

> $expand\left((x-2\,y)^7\right)$

$$x^7-14\,x^6\,y+84\,x^5\,y^2-280\,x^4\,y^3+560\,x^3\,y^4-672\,x^2\,y^5+448\,x\,y^6-128\,y^7 \tag{1}$$

2.Menjabarkan $(x-y)^5(x+y)^4$

> $expand\left((x-y)^5(x+y)^4\right)$

$$x(x+y)^{20}-20\,x(x+y)^{19}\,y(x+y)+190\,x(x+y)^{18}\,y(x+y)^2-1140\,x(x+y)^{17}\,y(x+y)^3+4845\,x(x+y)^{16}\,y(x+y)^4-15504\,x(x+y)^{15}\,y(x+y)^5+38760\,x(x+y)^{14}\,y(x+y)^6-77520\,x(x+y)^{13}\,y(x+y)^7+125970\,x(x+y)^{12}\,y(x+y)^8-167960\,x(x+y)^{11}\,y(x+y)^9+184756\,x(x+y)^{10}\,y(x+y)^{10}-167960\,x(x+y)^9\,y(x+y)^{11}+125970\,x(x+y)^8\,y(x+y)^{12}-77520\,x(x+y)^7\,y(x+y)^{13}+38760\,x(x+y)^6\,y(x+y)^{14}-15504\,x(x+y)^5\,y(x+y)^{15}+4845\,x(x+y)^4\,y(x+y)^{16}-1140\,x(x+y)^3\,y(x+y)^{17}+190\,x(x+y)^2\,y(x+y)^{18}-20\,x(x+y)\,y(x+y)^{19}+y(x+y)^{20} \tag{2}$$

3. Memfaktorkan $\left(x^3-y^3\right)$

> $factor\left(x^3-y^3\right)$

$$(x-y)\,\left(x^2+x\,y+y^2\right) \tag{3}$$

4. Memfaktorkan $\left(x^3-5\,x^2\cdot y+8\,x\cdot y^2-4\,y^3\right)$

> $factor\left(x^3-5\,x^2\cdot y+8\,x\cdot y^2-4\,y^3\right)$

$$(x-y)\,(x-2\,y)^2 \tag{4}$$

LATIHAN II

a. $\frac{153}{102}$

> $normal\left(\frac{153}{102}\right)$

$$\frac{3}{2} \tag{5}$$

b. $\cos^2 x-\sin^2 x$

> $normal\left(\cos^2 x-\sin^2 x\right)$

$$\cos^2 x-\sin^2 x \tag{6}$$

c. $\dfrac{8x^3 - 36x^2 + 54x - 27}{8x^4 - 44x^3 + 90x^2 \cdot 81x + 27}$

> $normal\left(\dfrac{8x^3 - 36x^2 + 54x - 27}{8x^4 - 44x^3 + 90x^2 \cdot 81x + 27}\right)$

$$\frac{8x^3 - 36x^2 + 54x - 27}{8x^4 + 7246x^3 + 27} \qquad (7)$$

LATIHAN III

a. Konversi $\frac{3}{4}\pi$ ke dalam satuan derajat

> $convert\left(\frac{3}{4}\pi, degrees\right)$

$$135\ degrees \qquad (8)$$

b. Konversi $\cos x$ ke dalam bentuk eksponensial

> $convert(\cos(x), \exp)$

$$\frac{1}{2}e^{Ix} + \frac{1}{2}e^{-Ix} \qquad (9)$$

c. Konversi 32 dalam basis 10 ke dalam bentuk basis 2

> $convert(32, base, 10)$

$$[2, 3] \qquad (10)$$

> $convert([2, 3], base, 10, 2)$

$$[0, 0, 0, 0, 0, 1] \qquad (11)$$

d. Konversi 221 dalam basis 3 ke dalam bentuk basis 10

> $convert(221, base, 3)$

$$[2, 1, 0, 2, 2] \qquad (12)$$

> $convert([2, 1, 0, 2, 2], base, 3, 10)$

$$[1, 2, 2] \qquad (13)$$

LATIHAN IV

Definisikann fungsi $f(x) = \dfrac{1}{\sigma\sqrt{\pi}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$

a. nilai f bila $x = 0$

> $f := x \rightarrow \dfrac{1}{\sigma\sqrt{\pi}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$

$$f := x \to \frac{e^{-\frac{1}{2}\frac{(x-\mu)^2}{\sigma^2}}}{\pi^{\frac{1}{\sigma}}} \quad (14)$$

> $f(0)$

$$\frac{e^{-\frac{1}{2}\frac{\mu^2}{\sigma^2}}}{\pi^{\frac{1}{\sigma}}} \quad (15)$$

b. Bila $\alpha = 1$, $\mu = 0$, berapa $f(1)$

> $f := (\sigma, \mu, x) \to \frac{1}{\sigma\sqrt{\pi}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$

$$f := (\sigma, \mu, x) \to \frac{e^{-\frac{1}{2}\frac{(x-\mu)^2}{\sigma^2}}}{\pi^{\frac{1}{\sigma}}} \quad (16)$$

> $f(1, 0, 1)$

$$\frac{e^{-\frac{1}{2}}}{\pi} \quad (17)$$

LATIHAN V

(a) $x - \cos(x) = 0$

> $eqn := x - \cos(x) = 0$

$$eqn := x - \cos(x) = 0 \quad (18)$$

> $solve(eqn, \{x\})$

$$\{x = RootOf(\_Z - \cos(\_Z))\} \quad (19)$$

(b) $x^2 \cdot y^2 = 0, x - y = 1$

> $eqn1 := x^2 \cdot y^2 = 0$

$$eqn1 := x^2 y^2 = 0 \quad (20)$$

> $eqn2 := x - y = 1$

$$eqn2 := x - y = 1 \quad (21)$$

> $solve(\{eqn1, eqn2\}, \{x, y\})$

$$\{x = 0, y = -1\}, \{x = 1, y = 0\} \quad (22)$$

(c) $x^2 = 2^x$

> $eqn := x^2 = 2^x$

$$eqn := x^2 = 2^x \quad (23)$$

> $solve(eqn, \{x\})$

$$\{x = 2\}, \{x = 4\}, \left\{x = -\frac{2\,\mathrm{LambertW}\left(\frac{1}{2}\ln(2)\right)}{\ln(2)}\right\} \quad (24)$$

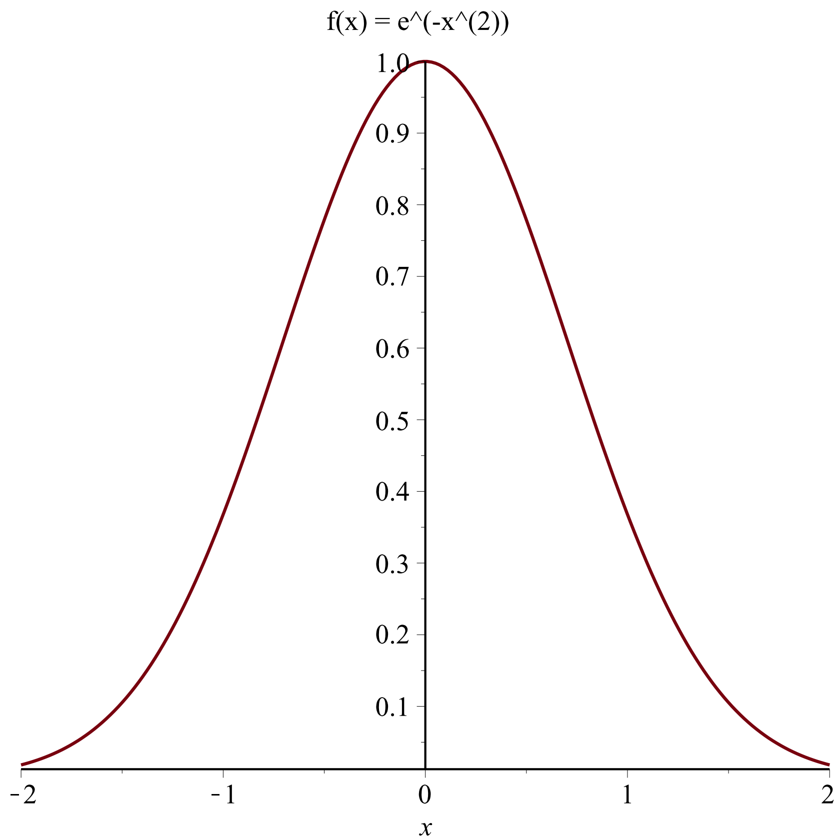
LATIHAN VI

> $with(plots)$

[animate, animate3d, animatecurve, arrow, changecoords, complexplot, complexplot3d, conformal, conformal3d, contourplot, contourplot3d, coordplot, coordplot3d, densityplot, display, dualaxisplot, fieldplot, fieldplot3d, gradplot, gradplot3d, implicitplot, implicitplot3d, inequal, interactive, interactiveparams, intersectplot, listcontplot, listcontplot3d, listdensityplot, listplot, listplot3d, loglogplot, logplot, matrixplot, multiple, odeplot, pareto, plotcompare, pointplot, pointplot3d, polarplot, polygonplot, polygonplot3d, polyhedra_supported, polyhedraplot, rootlocus, semilogplot, setcolors, setoptions, setoptions3d, spacecurve, sparsematrixplot, surfdata, textplot, textplot3d, tubeplot] **(25)**

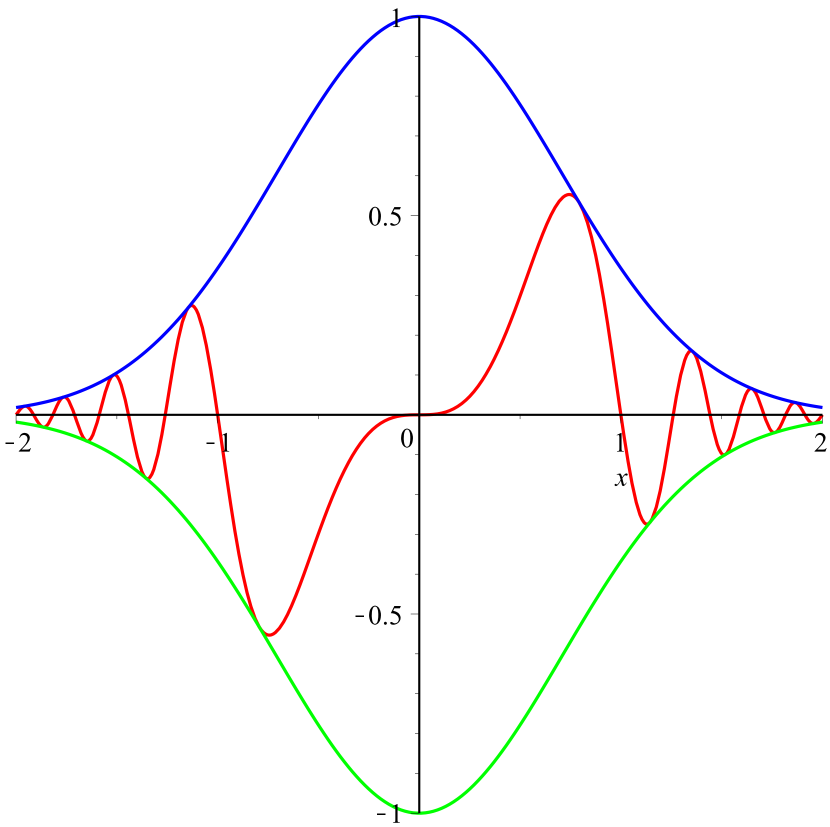
1. $f(x) = \mathrm{e}^{-x^2}$ pada domain $x \in [-2, 2]$

> $plot\left(\mathrm{e}^{-x^2},\ x = -2 \,..\, 2,\ title = \text{"f}(x) = \mathrm{e}^{-x^2}\text{"}\right)$



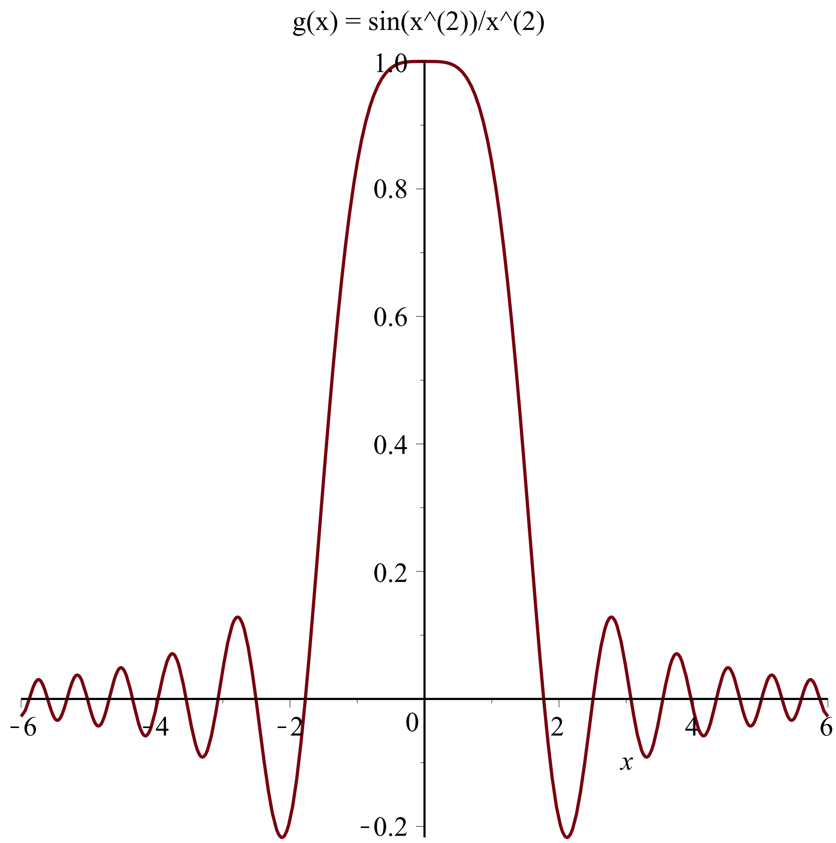
2. Tiga fungsi $g_1(x) = e^{-x^2}\sin(\pi x^3)$, $g_2(x) = e^{-x^2}$ dan $g_3(x) = -e^{-x^2}$ pada dominan $x \in [-2, 2]$

> $plot\left(\left[e^{-x^2}\sin(\pi\cdot x^3),\ e^{-x^2},\ -e^{-x^2}\right], x=-2\,..\,2, color=[red, blue, green]\right)$



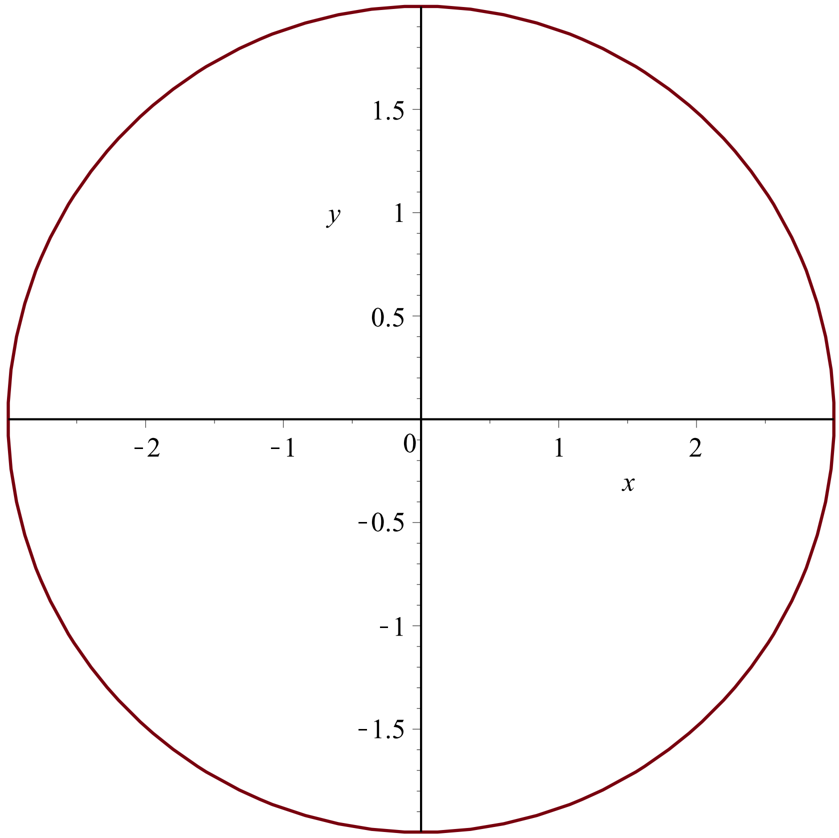
3. $g(x) = \dfrac{\sin(x^2)}{x^2}$ pada domain $x \in [-6, 6]$

> $plot\left(\dfrac{\sin(x^2)}{x^2},\ x = -6 .. 6, title = \text{"g(x)} = \dfrac{\sin(x^2)}{x^2}\text{ "}\right)$



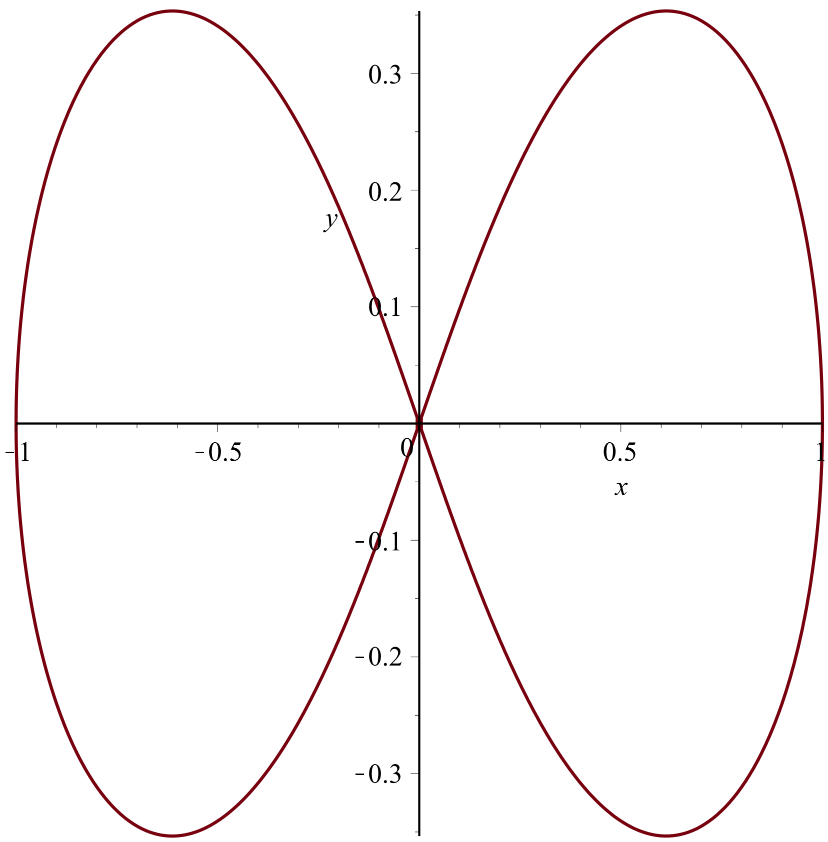
4. $\frac{x^2}{9} + \frac{y^2}{4} = 1$ pada daerah $[-3, 3] \times [2, 2]$

> $implicitplot\left(\frac{x^2}{9} + \frac{y^2}{4} = 1, x = -3\ ..\ 3, y = -2\ ..2\right)$



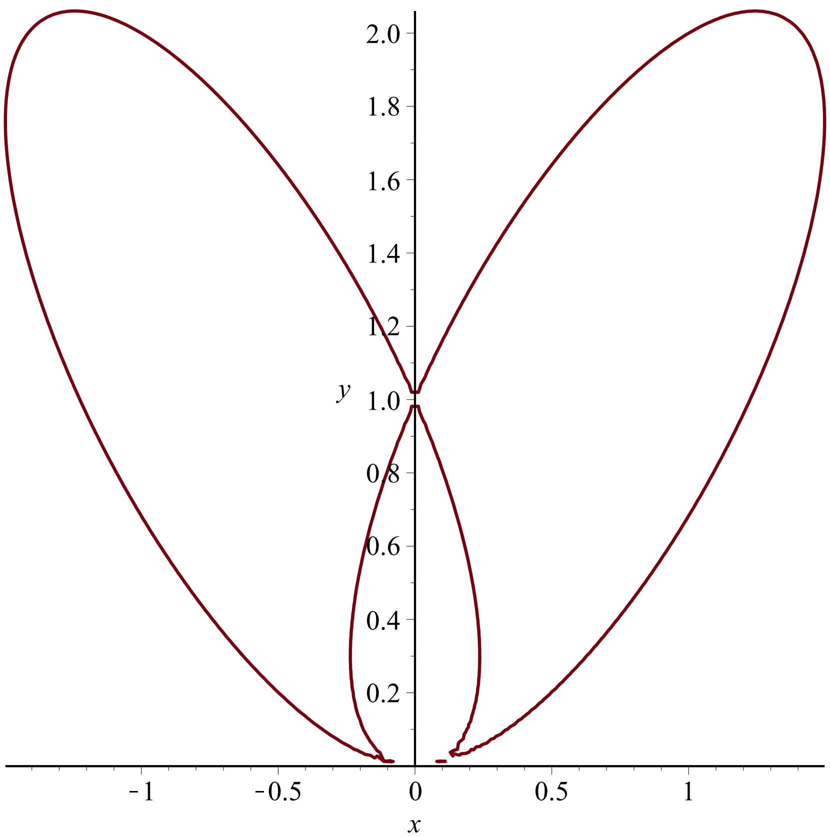
5. $\left(x^2+y^2\right)^2=\left(x^2-y^2\right)$ pada $[-1,1]\times[-1,1]$

> $implicitplot\left(\left(x^2+y^2\right)^2=\left(x^2-y^2\right), x=-1..1, y=-1..1, grid=[200,200]\right)$



6. $2\,x^4 + y^4 - 3\,x^2 \cdot y - 2\,y^3 + y^2 = 0$ pada $\left[\frac{-5}{2}, \frac{5}{2}\right] \times \left[\frac{-5}{2}, \frac{5}{2}\right]$

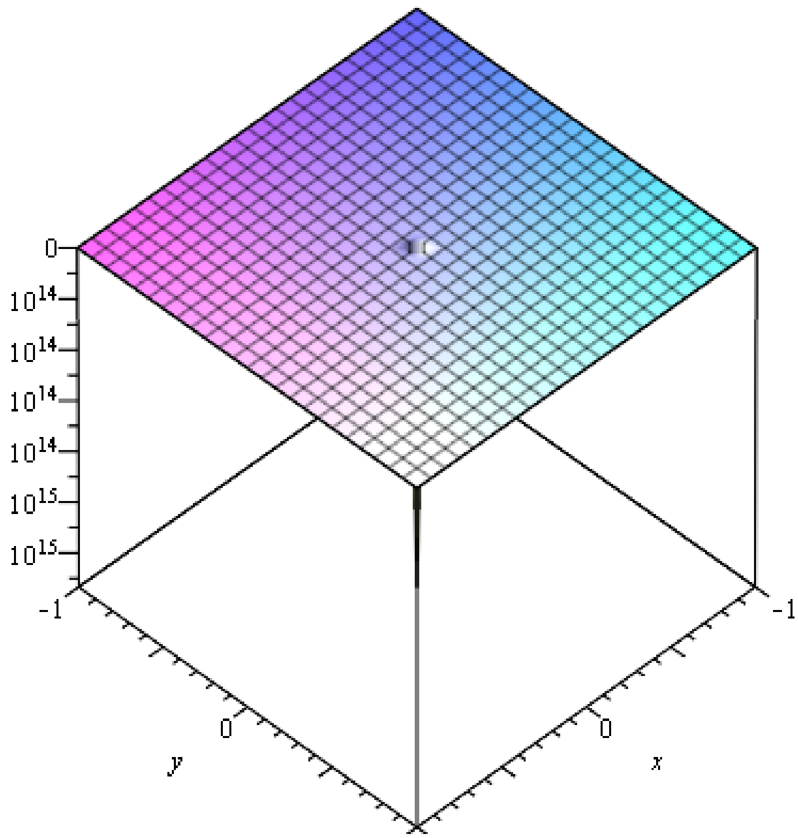
> $implicitplot\left(2\,x^4 + y^4 - 3\,x^2 \cdot y - 2\,y^3 + y^2 = 0, x = \frac{-5}{2} \,..\, \frac{5}{2}, y = \frac{-5}{2} \,..\, \frac{5}{2}, grid = [200, 200]\right)$



LATIHAN VII

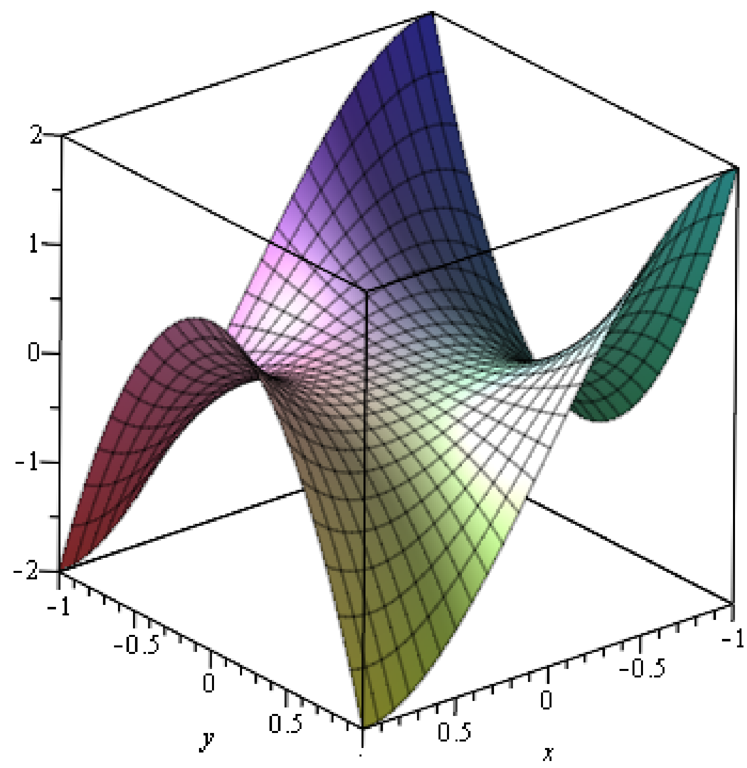
1. $f(x, y) = \dfrac{x}{x^2 + y^2}$ untuk x dan y pada rentang dari -1 sampai 1

> $plot3d\left(\dfrac{x}{(x^2 + y^2)}, x = -1 .. 1, y = -1 .. 1 \right)$



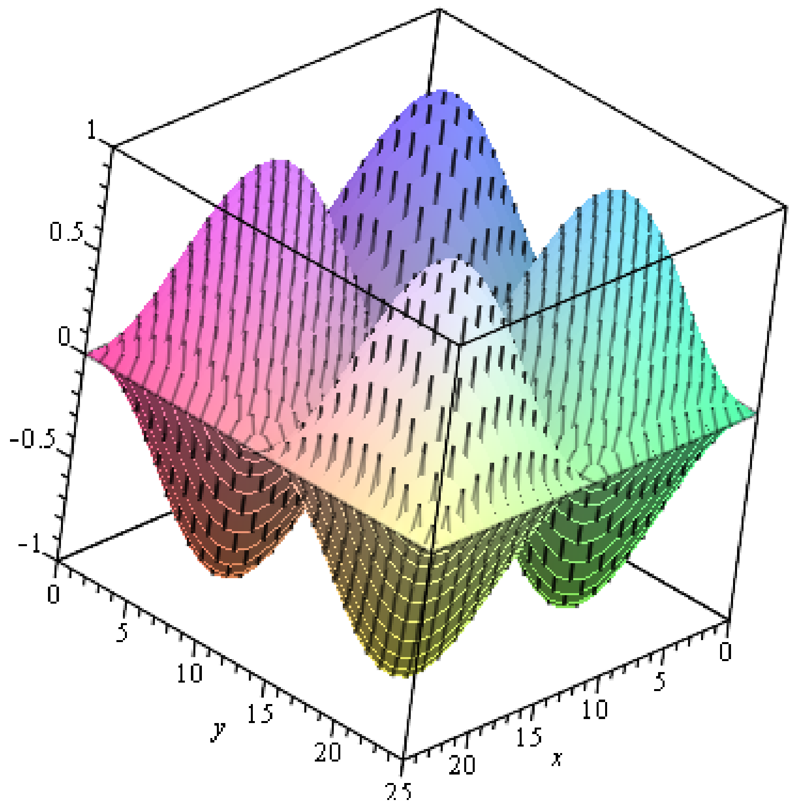
2. $f(x, y) = x(x^2 - 3y^2)$ dengan x dan y diatur sedemikian rupa sehingga grafiknya terlihat utuh

> $plot3d(\ x\ (x^2 - 3\ \cdot y^2), x = -1\ ..\ 1, y = -1\ ..\ 1)$



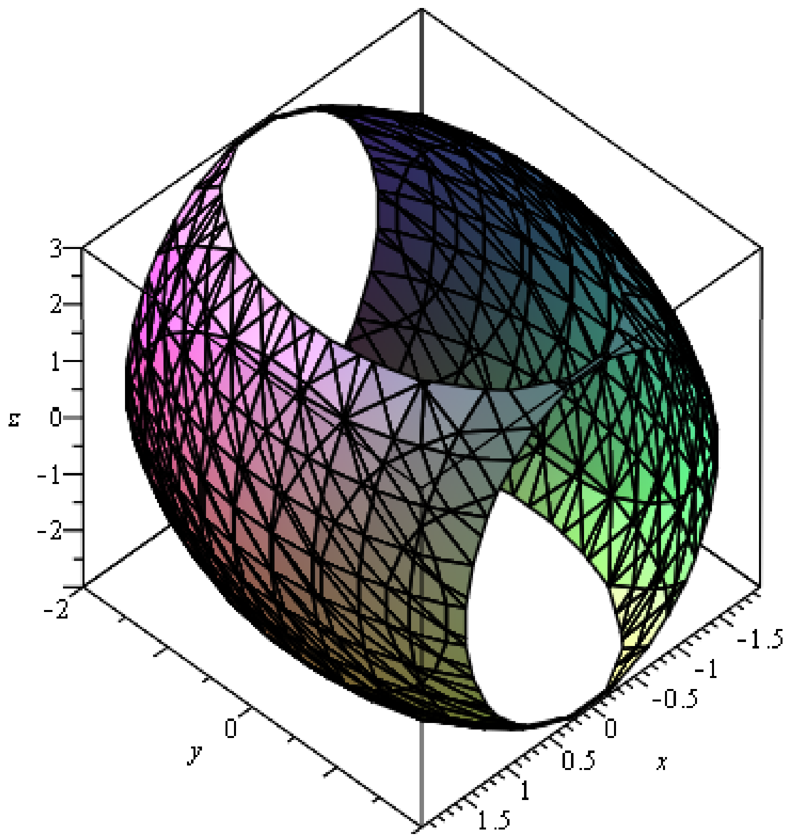
3. $f(x, y) = \sin(2\pi x)\sin(2\pi y)$ dengan x dan y pada rentang dari 0 sampai 25

> $plot3d(\ \sin(2\cdot\pi\cdot x)\sin(2\cdot\pi\cdot y), x = 0\ ..\ 25, y = 0\ ..\ 25)$



4. Gambarkan kurva elipsoida $\frac{x^2}{4} + \frac{y^2}{9} + \frac{z^2}{16} = 1$ dengan range diatur sendiri sehingga kurva terlihat utuh

> $implicitplot3d\left(\frac{x^2}{4} + \frac{y^2}{9} + \frac{z^2}{16} = 1, x = -2 .. 2, y = -2 .. 2, z = -3 .. 3\right)$



LATIHAN VIII

> with(Student[Calculus1])

[AntiderivativePlot, AntiderivativeTutor, ApproximateInt, ApproximateIntTutor, ArcLength, ArcLengthTutor, Asymptotes, Clear, CriticalPoints, CurveAnalysisTutor, DerivativePlot, DerivativeTutor, DiffTutor, ExtremePoints, FunctionAverage, FunctionAverageTutor, FunctionChart, FunctionPlot, GetMessage, GetNumProblems, GetProblem, Hint, InflectionPoints, IntTutor, Integrand, InversePlot, InverseTutor, LimitTutor, MeanValueTheorem, MeanValueTheoremTutor, NewtonQuotient, NewtonsMethod, NewtonsMethodTutor, PointInterpolation, RiemannSum, RollesTheorem, Roots, Rule, Show, ShowIncomplete, ShowSolution, ShowSteps, Summand, SurfaceOfRevolution, SurfaceOfRevolutionTutor, Tangent, TangentSecantTutor, TangentTutor, TaylorApproximation, TaylorApproximationTutor, Understand, Undo, VolumeOfRevolution, VolumeOfRevolutionTutor, WhatProblem] **(26)**

1. Derevatif fungsi $f(x) = x \sin\left(\frac{1}{x}\right)$

> $diff\left(x \cdot \sin\left(\frac{1}{x}\right), x\right)$

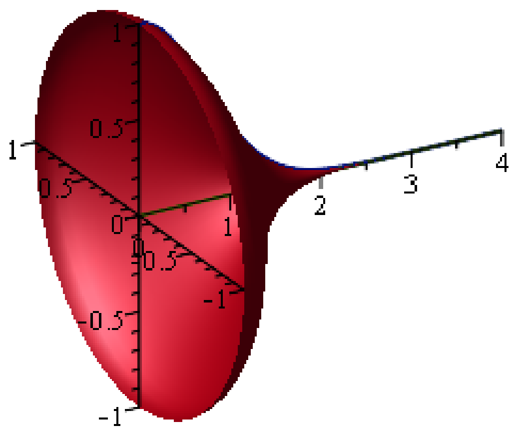
$$0 \tag{27}$$

2. Luas daerah yang dibatasi kurva $y = e^{-x^2}$ dari $x = 0$ sampai x = 4

> $SurfaceOfRevolution\left(e^{-x^2}, x = 0 .. 4\right)$

$$\int_0^4 2\,\pi\,e^{-x^2}\sqrt{1 + 4\,x^2\left(e^{-x^2}\right)^2}\,dx \tag{28}$$

> $SurfaceOfRevolution\left(e^{-x^2}, x = 0 .. 4, output = plot\right)$



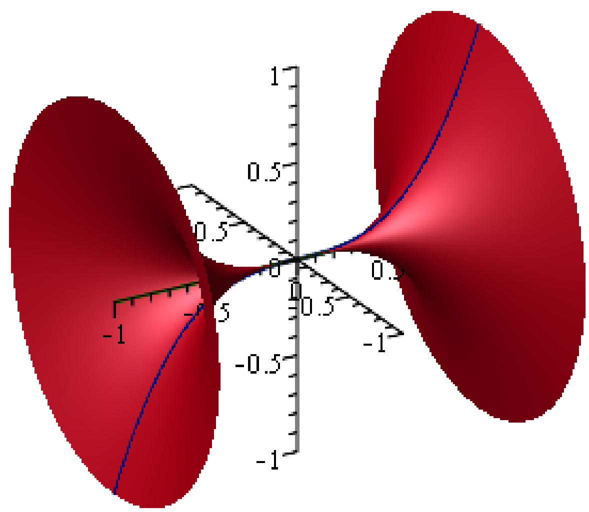
Surface of revolution formed when $f(x) = e^{-x^2}$, $0 \le x \le 4$, is rotated about a horizontal axis.

3. Luas dan volume benda putar yang terbentuk dari pemutaran kurva $y = x^3$ dari $x = -1$ sampai $x = 1$

> $SurfaceOfRevolution\left(x^3, x = -1 .. 1\right)$

$$\frac{20}{27}\sqrt{10}\,\pi - \frac{2}{27}\,\pi \tag{29}$$

> $SurfaceOfRevolution\left(x^3, x=-1\ ..\ 1, output=plot\right)$

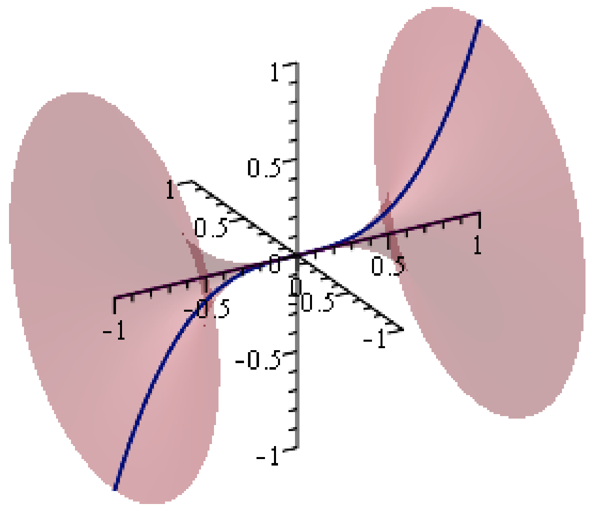


Surface of revolution formed when $f(x) = x^3$, $-1 \le x \le 1$, is rotated about a horizontal axis.

> $VolumeOfRevolution\left(x^3, x=-1\ ..\ 1\right)$

$$\frac{2}{7}\pi \tag{30}$$

> $VolumeOfRevolution\left(x^3, x=-1\ ..\ 1, output=plot\right)$



The solid of revolution created on $-1 \le x \le 1$ by rotation of $f(x) = x^3$
about the axis $y = 0$.

4. $\lim_{x \to 0} \left(1 + \frac{1}{x}\right)^x$ bandingkan hasilnya dengan e

> $limit\left(\left(\left(1 + \frac{1}{x}\right)^x\right), x = 0\right)$

$$1 \tag{31}$$

> $limit\left(\left(\left(1 + \frac{1}{x}\right)^x\right), x = e\right)$

$$\frac{(e+1)^e}{e^e} \tag{32}$$

5. $\lim_{x \to 0+} \left(\frac{1}{x} - \frac{1}{\arctan x}\right)$

> $limit\left(\left(\frac{1}{x} - \frac{1}{\arctan(x)}\right), x = 0, left\right)$

$$0 \tag{33}$$

6.

$$\lim_{x \to \left(\frac{\pi}{2}\right)^-} (\sec x - \tan x)$$

> $limit\left((\sec(x) - \tan(x)), x = \left(\frac{\pi}{2}\right), right\right)$

$$0 \tag{34}$$

7. fungsi $f(x) = \begin{cases} x \sin\left(\frac{1}{x}\right) & \textit{bila} \quad x \neq 0 \\ 0 & \textit{bila} \quad x = 0 \end{cases}$

> $piecewise\left(x \neq 0, x \cdot \sin\left(\frac{1}{x}\right), x = 0, 0\right)$

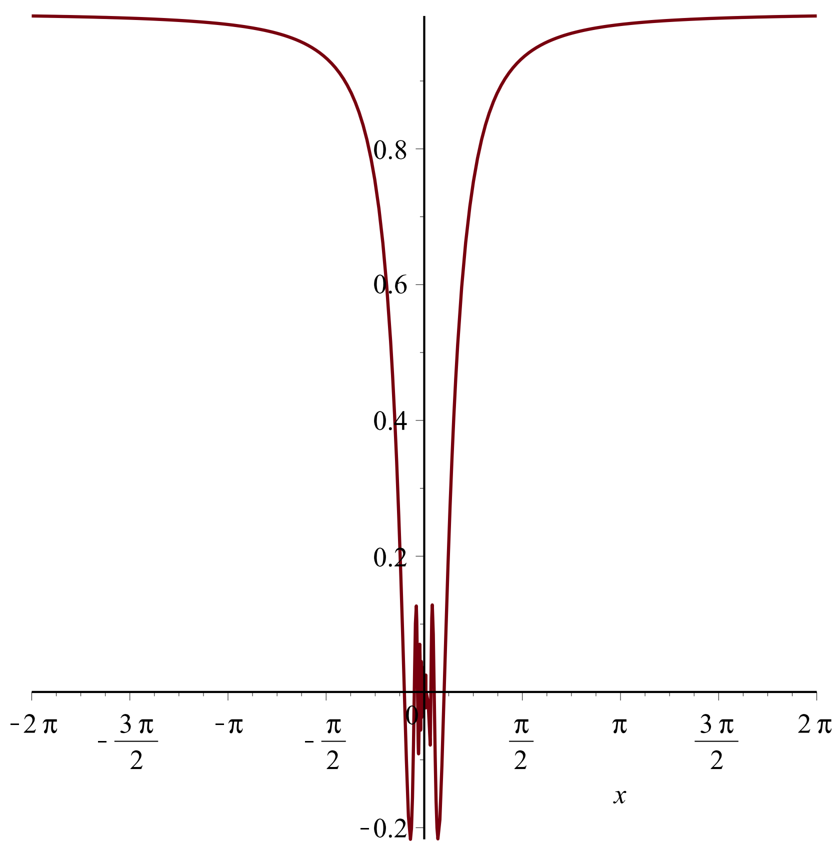
$$\begin{cases} x \sin\left(\frac{1}{x}\right) & x \neq 0 \\ 0 & x = 0 \end{cases} \tag{35}$$

> $f := x \rightarrow piecewise\left(x \neq 0, x \cdot \sin\left(\frac{1}{x}\right), x = 0, 0\right)$

$$f := x \rightarrow piecewise\left(x \neq 0, x \sin\left(\frac{1}{x}\right), x = 0, 0\right) \tag{36}$$

(a) Grafik fungsi $y = x$ dan $y = -x$ dari $x = -\frac{1}{\pi}$ sampai $x = \frac{1}{\pi}$

> $plot(f(x), x)$



(b) $\lim_{x \to 0} f(x) dx$

> $limit(f(x), x = 0) dx$

$$0 \tag{37}$$

(c) $\int f(x)\ \mathrm{d}x$

> $int(f(x), x) dx$

$$\left(\begin{cases} \frac{1}{2} \sin\left(\frac{1}{x}\right) x^2 + \frac{1}{2} \cos\left(\frac{1}{x}\right) x + \frac{1}{2} \mathrm{Si}\left(\frac{1}{x}\right) & x < 0 \\ -\frac{1}{4} \pi & x = 0 \\ \frac{1}{2} \sin\left(\frac{1}{x}\right) x^2 + \frac{1}{2} \cos\left(\frac{1}{x}\right) x + \frac{1}{2} \mathrm{Si}\left(\frac{1}{x}\right) - \frac{1}{4} \pi & 0 < x \end{cases} \right) dx \tag{38}$$

(d) $\frac{\mathrm{d}}{\mathrm{d}x} f(x)$

> $diff(f(x), x)$

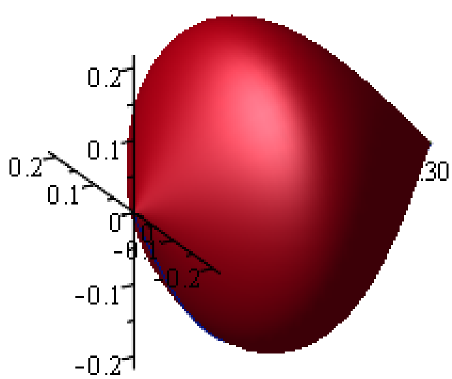
$$\begin{cases} -1..1 & x=0 \\ \sin\left(\frac{1}{x}\right) - \frac{\cos\left(\frac{1}{x}\right)}{x} & otherwise \end{cases} \quad \textbf{(39)}$$

8. Luas daerah dan volume benda putar, jika $f(x)$ pada soal no 7 diputar mengelilingi sumbu x dari $x = \frac{1}{(2\pi)}$ sampai $x = \frac{1}{\pi}$

> $SurfaceOfRevolution\left(f(x), x = \frac{1}{(2\pi)} .. \frac{1}{\pi}\right)$

$$\int_{\frac{1}{2\pi}}^{\frac{1}{\pi}} \left(-2\pi \sin\left(\frac{1}{x}\right) \sqrt{\sin\left(\frac{1}{x}\right)^2 x^2 - 2\sin\left(\frac{1}{x}\right)\cos\left(\frac{1}{x}\right)x + \cos\left(\frac{1}{x}\right)^2 + x^2}\right) dx \quad \textbf{(40)}$$

> $SurfaceOfRevolution\left(f(x), x = \frac{1}{(2\pi)} .. \frac{1}{\pi}, output = plot\right)$



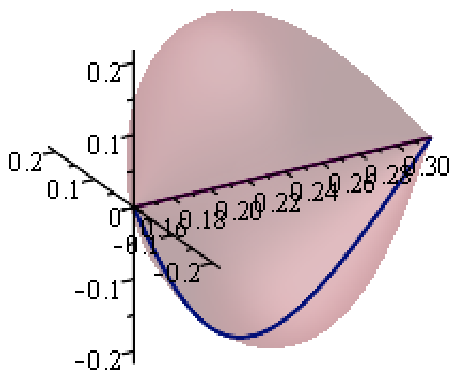
Surface of revolution formed when $f(x) = \begin{cases} x\sin\left(\frac{1}{x}\right) & x \neq 0 \\ 0 & x = 0 \end{cases}$,

$\frac{1}{2\pi} \leq x \leq \frac{1}{\pi}$, is rotated about a horizontal axis.

> $VolumeOfRevolution\left(f(x), x=\frac{1}{(2\pi)} .. \frac{1}{\pi}\right)$

$$-\frac{2}{3}\pi \operatorname{Si}(4\pi)+\frac{1}{6}+\frac{2}{3}\pi \operatorname{Si}(2\pi) \quad \textbf{(41)}$$

> $VolumeOfRevolution\left(f(x), x=\frac{1}{(2\pi)} .. \frac{1}{\pi}, output=plot\right)$



The solid of revolution created on $\frac{1}{2\pi} \leq x \leq \frac{1}{\pi}$ by rotation of

$f(x) = \begin{cases} x\sin\left(\frac{1}{x}\right) & x \neq 0 \\ 0 & x = 0 \end{cases}$ about the axis $y=0$.