Title

Math Solutions Consulting

$\frac{dy(x)}{dx}−2y(x)=0$
$\frac{dy(x)}{dx}=2y(x)$
$\frac{\frac{dy(x)}{dx}}{y(x)}=2$
$∫\frac{\frac{dy(x)}{dx}}{y(x)}dx=∫2dx$
$log(y(x))=2x+c\_{1}$
$y(x)=e^{2x+c\_{1}}$
$y(x)=c\_{1}e^{2x}$
Sustituyendo $y(0)=9$ en $y(x)=c\_{1}e^{2x}$:
$c\_{1}=9$
$y(x)=9e^{2x}$

$\frac{dy(x)}{dx}+10y(x)=15$
$\frac{dy(x)}{dx}=−5(2y(x)−3)$
$\frac{\frac{dy(x)}{dx}}{2y(x)−3}=−5$
$∫\frac{\frac{dy(x)}{dx}}{2y(x)−3}dx=∫−5dx$
$\frac{1}{2}log(2y(x)−3)=−5x+c\_{1}$
$y(x)=\frac{1}{2}\left(e^{2\left(−5x+c\_{1}\right)}+3\right)$
Sustituyendo $y(0)=0$ en $y(x)=\frac{1}{2}\left(e^{2\left(−5x+c\_{1}\right)}+3\right)$
$\frac{1}{2}\left(e^{2c\_{1}}+3\right)=0$
$c\_{1}=log(−i\sqrt{3})  c\_{1}=log(i\sqrt{3})$
Sustituyendo $c\_{1}=log(−i\sqrt{3})$ en $y(x)=\frac{1}{2}\left(e^{2\left(−5x+ϵ\_{1}\right)}+3\right)$
$y(x)=−\frac{3}{2}e^{−10x}+\frac{3}{2}$
Sustituyendo $c\_{1}=log(i\sqrt{3})$ en $y(x)=\frac{1}{2}\left(e^{2\left(−5x+c\_{1}\right)}+3\right)$
$y(x)=−\frac{3}{2}e^{−10x}+\frac{3}{2}$

$\frac{dy(x)}{dx}=23$
$y(x)=∫23dx=23x+c\_{1}$
Sustituyendo $y(0)=1$ en $y(x)=23x+c\_{1}$
$c\_{1}=1$
$y(x)=23x+1$

$\frac{dy(x)}{dx}−7y(x)=7$
$\frac{dy(x)}{dx}=7(y(x)+1)$
$\frac{\frac{dy(x)}{dx}}{y(x)+1}=7$
$∫\frac{\frac{dy(x)}{dx}}{y(x)+1}dx=∫7dx$
$log(y(x)+1)=7x+c\_{1}$
$y(x)=e^{7x+c\_{1}}−1$
$y(x)=c\_{1}e^{7x}−1$
Sustituyendo $y(0)=7$ en $y(x)=e^{7x}c\_{1}−1$
$c\_{1}−1=7$
$c\_{1}=8$
$y(x)=8e^{7x}−1$

$\frac{dy(t)}{dt}+2ty(t)=t$
$\frac{dy(t)}{dt}=t−2ty(t)$
$\frac{dy(t)}{dt}=t(−2y(t)+1)$
$\frac{\frac{dy(t)}{dt}}{−2y(t)+1}=t$
$∫\frac{\frac{dy(t)}{dt}}{−2y(t)+1}dt=∫tdt$
$−\frac{1}{2}log(−2y(t)+1)=\frac{t^{2}}{2}+c\_{1}$
$y(t)=−\frac{1}{2}e^{−t^{2}−2c\_{1}}+\frac{1}{2}$
Sustituyendo $y(0)=\frac{3}{2}$ en $(t)=e^{−t^{2}}c\_{1}+\frac{1}{2}$
$c\_{1}+\frac{1}{2}=\frac{3}{2}$
$c\_{1}=1$
$y(t)=e^{−t^{2}}+\frac{1}{2}$

$\frac{dy(t)}{dt}+t^{2}y(t)=5t^{2}$
$\frac{dy(t)}{dt}=5t^{2}−t^{2}y(t)$
$\frac{\frac{dy(t)}{dt}}{−y(t)+5}=t^{2}$
$∫\frac{\frac{dy(t)}{dt}}{−y(t)+5}dt=∫t^{2}dt$
$−log(−y(t)+5)=\frac{t^{3}}{3}+c\_{1}$
$y(t)=c\_{1}e^{−t^{3}/3}+5$
Sustituyendo $y(0)=6$ en $y(t)=e^{−t^{3}/3}c\_{1}+5$
$c\_{1}+5=6$
$c\_{1}=1$
$y(t)=e^{−t^{3}/3}+5$

$2\frac{dy(t)}{dt}+12y(t)+2e^{t}=0$
$\frac{dy(t)}{dt}+6y(t)=−e^{t}$
Sea $μ(t)=e^{∫6dt}=e^{6t}$
$e^{6t}\frac{dy(t)}{dt}+\left(6e^{6t}\right)y(t)=−e^{7t}$
Sustituyendo $6e^{6t}=\frac{d}{dt}\left(e^{6t}\right)$ $e^{6t}\frac{dy(t)}{dt}+\frac{d}{dt}\left(e^{6t}\right)y(t)=−e^{7t}$
$\frac{d}{dt}\left(e^{6t}y(t)\right)=−e^{7t}$
$∫\frac{d}{dt}\left(e^{6t}y(t)\right)dt=∫−e^{7t}dt$
$e^{6t}y(t)=−\frac{e^{7t}}{7}+c\_{1}$
$y(t)=−\frac{e^{t}}{7}+c\_{1}e^{−6t}$
Sustituyendo $y(0)=\frac{6}{7}$ en $y(t)=−\frac{c^{t}}{7}+e^{−6t}c\_{1}$
$c\_{1}−\frac{1}{7}=\frac{6}{7}$
$c\_{1}=1$
$y(t)=−\frac{e^{t}}{7}+e^{−6t}$

$\frac{dy(t)}{dt}=−\frac{1}{y(t)}$
$\frac{dy(t)}{dt}y(t)=−1$
$∫\frac{dy(t)}{dt}y(t)dt=∫−1dt$
$\frac{y(t)^{2}}{2}=−t+c\_{1}$
$y(t)=\pm \sqrt{2}\sqrt{−t+c\_{1}}$

$\frac{dy(t)}{dt}=3ty(t)^{2}$
$\frac{\frac{dy(t)}{dt}}{y(t)^{2}}=3t$
$∫\frac{\frac{dy(t)}{dt}}{y(t)^{2}}dt=∫3tdt$
$−\frac{1}{y(t)}=\frac{3t^{2}}{2}+c\_{1}$
$y(t)=−\frac{2}{3t^{2}+2c\_{1}}$
$y(t)=−\frac{2}{3t^{2}+c\_{1}}$