Name: ID #: Section #:

Q1) [**3pts**] Solve $(2y - \frac{1}{x} - \cos 3x)\frac{dy}{dx} + \frac{y}{x^2} - 4x^3 + 3y\sin 3x = 0$.

Solution:

Q2) [**4pts**] Solve $x^2\frac{dy}{dx} - 2xy = 3y^4,\ y(1) = \frac{1}{2}$.

Solution:

Q3) [**3pts**] Initially 100 milligrams of a radioactive substance was present. After 6 hours the mass had decreased by 3%. If the rate of decay is proportional to the amount of the substance present at time t, find the amount remaining after 24 hours.

Solution:

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Q1) [**4pts**] Solve $\left(\dfrac{1}{1+y^2}+\cos x-2xy\right)\dfrac{dy}{dx}=y(y+\sin x),\ y(0)=1.$

Solution:

Q2) [**3pts**] Solve $3(1+x^2)\dfrac{dy}{dx}=2xy(y^3-1).$

Solution:

Q3) [**3pts**] A thermometer is taken from an inside room to the outside, where the air temperature is 5^oF. After 1 minute the termometer reads 55^oF, and after 5 minutes it reads 30^oF. Find the initial temperature of the inside room.

Solution: