

Solve:

- 1) Solve the differential equation: $y' = 3x^2y^2$.
* Substitute $\frac{dy}{dx}$ for y' .
- 2) Solve the differential equation: $y' = (e^x)y^2$.
- 3) Solve the differential equation: $y' = (\sin x)y^2$.
- 4) Solve the differential equation:
 $\frac{dy}{dx} = -2xy^2$.
- 5) Solve the differential equation: $y' = 3xy$.
- 6) A bacteria grows at a constant proportional rate of 0.3 members per member per year. How long will it take for the number of members to double? ($k = 0.3$)
- 7) A bacteria culture initially contains 400 members and grows at a rate proportional to its size. One year later, it contains 1400 members. Find the number of bacteria after 3 years.
- 8) The half life of Rutherfordium is 13.1 hours. We began with a 1000 mg sample, and now we have a 300 mg sample. Find the amount of time that has past.
- 9) The half life of Dubnium is 5.56 hours. We began with a 900 mg sample, and now we have a 400 mg sample. Find the amount of time that has past.
- 10) The half life of Ununquadium is 1.33 years. If we start with 200 mg, find the amount that will be left after 3 years.