PAGE 71:

Find the orthogonal Trajectories of the family of curves

12. 
$$y^2 = c(1-x^2)$$

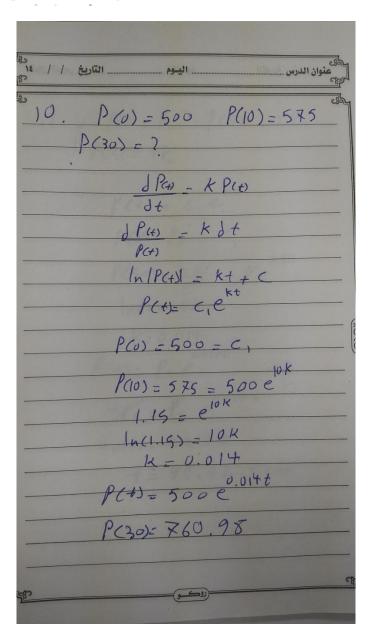
65	ve,
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plant of the state	
12. y²= ((1-x²)	
(= y 1-x2	
1-×2	
0 - 2yg'(1-x2)-y2(-2x)	+300
$(1-x^2)^2$	-
$= 2yy'(1-x^2) = -2y^2x$	
- 4' 25'X X'	
$y' = -2y^{2}x = -xy$ $2y(1-x^{2}) = 1-x^{2}$	
Q - 1 - 1 - x2	
$y = \frac{1}{f(x,y)} = \frac{1-x^2}{xy}$	
xydy = (1 - x2) dx	
$ydy = (1-x^2) dx$	•
3 J X	
y2 = In X1 - x2 +	C
2	
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	
1 2 1 2 1 2 1 2 1 2 1 2 1 2 2 2 2 2 2 2	
2 wy? Au /2013	

21. Find the member of the orthogonal trajectories for  $x^2 + 3y^2 = cy$  that passes through (1, 2).

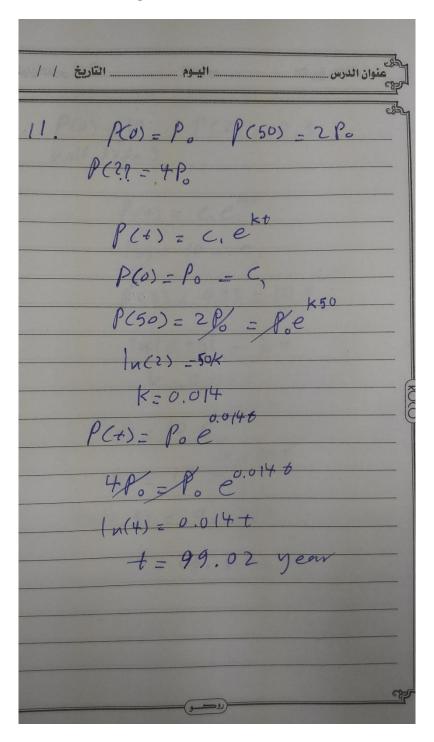
Es. 2 u x du = (u2 - 1) dx In 102 1 = In |x 1 + C 1 y2 -11 - 1 n | x | z c at (1,2)

## PAGE 90:

10) The population of a town grows at a rate proportional to the population at time t. The initial population of 500 increases by 15% in 10 years. What will be the population in 30 years?.



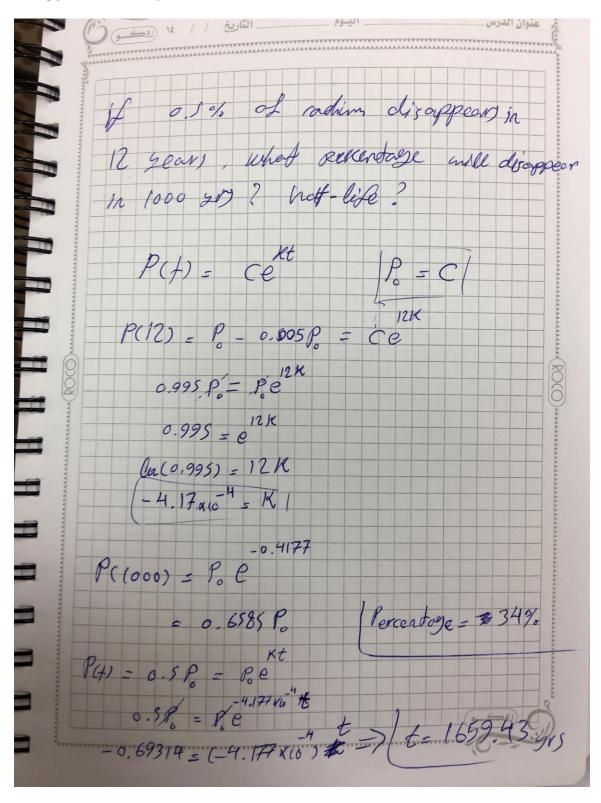
11) The population of a town grows at a rate proportional to the population at time. The initial population  $P_0$  becomes double after 50 years. When the population becomes  $4P_0$ ?.



13) Initially there were 10 mg. of radioactive material present. After 2 months the mass decreased by 5%. If the rate of decay is proportional to the amount present at any time, then determine the falf-life of this material.

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7	13. P(0) = 10 P(2) = 9.5 half-life?
	P(+) = ae ex
	P(2) = 0.95 = 10 e
NO.	Inlog51 - 2K   K=0.026
	P(4) = 10 e = 0,026t = 0,026t
	1 u(0,5) = 0.026t t=26,7 m
4	( ( ( )

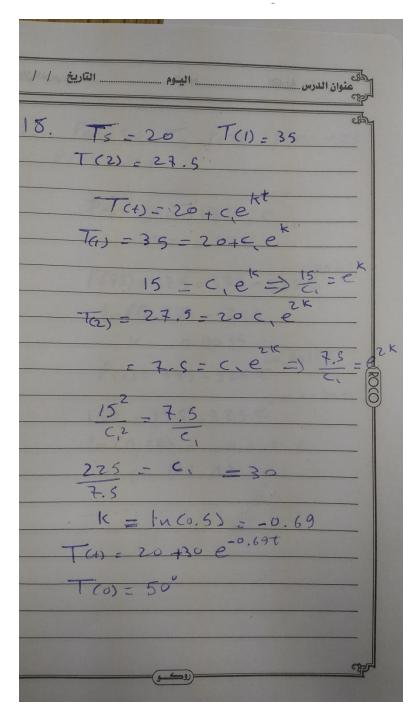
16) If 0.5% of radium disappears in 12 years .Find what percentage will disappear in 1000 years?.What is the half-life of radium?.



اليوم التريخ / / ١٤ طي عنوان الدرس عنوان الدرس 16. PCO)=100 P(12)=99.5 P(1000)=77 PHS = C, ekt Pa)=100=C P(12) = 99.5=100 € In (0,995) = 12 R K = -0.00042 PC+) = 100 e -000042+ P(1000)= 65.7 D 100 - 65,7 - 34. -0.00042+ 2) 50-100e In (0.5) = -0.000427 = 1650.4 years

18) A hot iron rod was left in a room where the temperature was 20°C. After one minute the temperature of the rod was recorded 35°C., and after two minutes it was 27.5°C. What was the initial

temperature of the rod?.



22) A body initially at  $50^{0}C$  is put into a  $375^{0}C$  oven. After 75 minutes it is found that the temperature of the body is  $125^{0}C$ . How long the body will take to attain the temperature  $150^{0}C$ ?

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22. Pos=50 Ts=375 P(75)-125
P(3) = 150
Pco) = 50 = 375 + C
P(75) = 125 = 375 - 325 e
In(0.77) - 75k
PC+) = 375-325 C
150 = 375 - 325 e
ln(0.69) = -0.0035t t = 106.02 m
(1 <del></del> 1)
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