# Worksheet 02 Solve the homogenous D.E's:

(1) (y2-ny) dn + 2n2 dy =0 pns: n/y = hntm) +c

sdep 2: Identification Impliest function: Reducible to variable seperable, but degree of all terms is identical = homogeneous function Step 2: Renvite & Substitute m(u·n) - (u·n) = de n + u  $\frac{1}{n} dn = -\int_{U^2} du = \frac{1}{n} \ln(m) = -\frac{U^{2+1}}{n} + C$ In(n) = + u1+c => In(n) = 1 +c , u= 8/ (2) (x²-y²) du + 2ny dy = 0 Ans: n²+y² = an Step 1: Identification > Hunge Implicit function + degree of each law & dentical Step 2: Rewrite & Substitute = n du + 4 8fep3: Replace & indegrate (u·n)2 - n2 = ndy + U an(un)

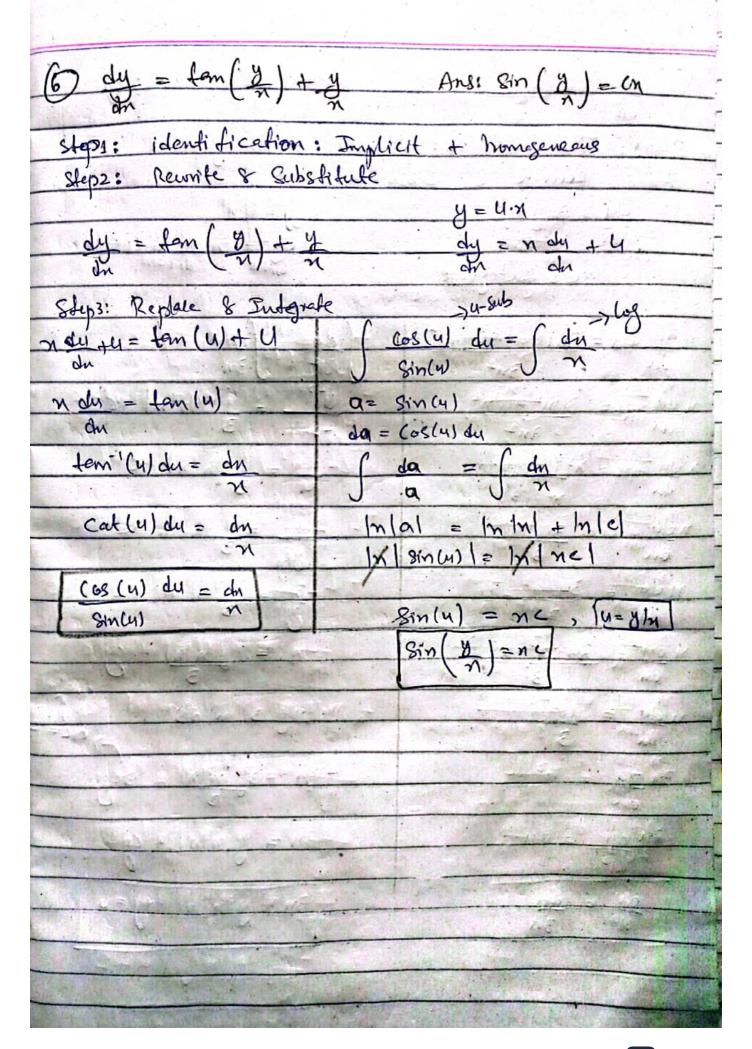
(3) m (y-n) dy = y (y	And: Of - h my = c
Close Tolak Oralian & Tol	sweet + nomogeneous
Step 1: I denditication! Fing step 2: Rewrite & Substitute	
	x(z=y+n) y=U·n
on neg-ni	
The second secon	on on
Man +11 = 12+ 22/1	The state of the s
Step 3: Replace & Sutgrate	n dy = 84
wan in = (n.w) + w (n.w)	dh u-1
dr 3(um) - m2	
1 ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) (	$du \div \left(\frac{du}{u-1}\right) = \frac{1}{n} dn$
n dy + u = um + um	( u-1 du = (1 dn
du Uni-nz	J. am The
THE RESERVE	[ u du - [ du - [ ] die
n dy tu = m2 (42 tu)	Sudu-Sdu = fran
die - 14(1-1)	I I du - 1 [ du - 1 P-1 de
The Artifaction of the	2 f du - 1 f du = f-1 du
2 dy + 11 = 12+11 :	1 (4) - 2  n(4) =  n/n)+c
du 114-134	
ndy = 42 +4 -4	1 (8/n) - 1 (m(8/n) = - m/n)+
an = 4-1	a mala militaria
n du = 1274 - 11(1-1)	2 (8/11) = In/11) + In/19/11/te
dn (1-1)	The Line of the Late of the La
n du = y2+4-62+4.	u = m(n) + m(u) 1/2 +c.
dn u-1	a line
ndy = ay	= In(null) +c
( dn 4-1)	
	4 = 2/n(nux-) +200°

U= ln(nu1/2)+C => U= ln(n24)+C U- m(n2U) #C => y - ln(n2(y/)) = c y - In(ny) = C (9) M (n-y) dy +y² dn =6. Ansi y= ny Un C Step 2: Dedeutification: Homogeneous + Implicit 8tep 2: Rewrite & Substitute 2-2 (um) for du of u uzx dn Ju-1 2 du su = - 122xx on du +u= -u2 ndy = -u' - 4 u - ln(4) = ln/n) +c n du = -u= u(1-u). U = |n(n) + h(4) +c u= In(n) + In(v/n)+c n du = -u2-u+42 y = n ln(y) +C n dy = -4 n du =

<u> </u>	
(5) dy + n-4 =0	
on 2m-y	
	Implicit + homogeneous
Steps: Rewrite 8 Syl	stitute
Styris: Reunite & integrate	y= U:N
dy = by-n	O Company
on any	dy = n du + 4
n du +u= 2(un)-n	2-4 du = dn
dn an-un	WEIN TO LEAR WITE
n du +4 = gun - n	12-4 du = (dn
dn 2m-un	( N=1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1
n du +u= n(211-1)	1 2 da - Pudy = dn
dn n (2-4)	JU2-1 JU2-1 JX
n dy +4= 24-1	1 3 du - [ u du = [dn.]
dr 2-4	J (4-1)(441) J 42-1 J 21
n du ju = 2u-1.	The Manager Printing American
dn 2-4	=> 2 dy
n dy = 24-1 -4	J (u-1)(u+1)
dn 2-4	2 = A + B
n du = 24-1-4(2-4)	(u-1)(u+1) - u-1 u+1
dn a-4	8 = A(u+1) + B(u-1)
n du = 2/4-1-2/4 +422	9 = M(N+B) + A-B
du 2-4	A+B=0 ) A-B=2
n du = 42-1	put A=2+B (A=2+B)
dn 2-4.	2+13+13=0 put 13=-1
$\left[\frac{du+\left(\frac{u^{2}-1}{2}-u\right)}{2u}\right]\frac{2u}{du}=1$	2+2B=0 A=2-1
· ·	2B=-2 A=1
8-4 du = dn	[B=-1]
421	( ady = ( dn ( du
The state of the s	J (4-1) (441) J 4-1 J 441

2 dy postfal a = 42-1. da = du dy de = udy - In lu+1 mm + micl -In 14+1 Inlal = Inlact = InInc - In (42-1)1/2 InInc Inluci V 42-1 Inc V42-1 mincl m 5/m+1 J(D/m)2mne In mine = Inlnc

	V.
mliumi C	12-n2 / = h /n c/
Man	The last the second sec
1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-	11 = m/nc)
M 1 -4 2 2 11	The state of the s
1./ 1:10 - 1 / 1 - 2	
(Star) X (1/2 N2	1 = M/2 C/1
15,1	TOTAL A LINE OF THE STATE OF TH
y-1, x x = x C	$(y-n)^{1/3} = c(y+n)^{3/3}$ Squaring on both sides
yth Tyz-nz	Squaring on both sides
9,11	System of the same
y-n = nc + in sul	(y-n)=x2 = c (y+n)=x2
y+n Jy=n2	
a milantin	$(y-n) = c(y+n)^3$
4-4 = MCx Vy=n2	The state of the s
you n is	y-n= c (y+n)3
The state of the s	Company of the second
y-4 2 C Jy= N2	
you.	一种 一种 一种 一种
10 11 11 11 11 11 11 11 11 11 11 11 11	
y-n = c V (y-n)(y+n)	
ym	
AA A A	The Filter of the Contract of
y-4 = ( /y-n /yth	
y+n	
y-n = c Jytn (ytn)	
yg-n H-11.	
14 1/2 1 13/2	
$(y-n)^{1/2}=c(y+n)^{3/2}$	
	2
43	



	implicit + homogeneous
Step 2: Remote & Subsi	AND THE RESIDENCE OF THE PROPERTY OF THE PROPE
dy = 3ny 4y2	y = Un
Step3: Replace & Integrate	dy = n.du + 4
each tebace & michael	
ndu tu = 3m(am)+(um)2	(dy - (dn
du (3m2.	112: 300
n du tu = 3cm2 tu242	1 -2+1 = 1  m m  +e
2/1	3
n du tu = 2 2 (34+42)	-1 = 1 m/n/ +e
W- (3)	
ndy + U= 34442	-1 =1 In hilde
71 du = 34 +42 - 4	J/m 3
dn 3 -1	-n = 1  n  n   +c= 1
4 du = 34+42-34	The property of the second sec
dn 3	-n = ymml + cy
M du = 42	multime a 112 constant
dn 3	11 3 (m b/s 11)
3n du = 42	-3n = 3y  m n  + 3cy
du	3
3n du = du	-3n = y  n n  + cy
$\frac{du}{u^2} = \frac{du}{3n}$	3n + y   n   n   tey =0

8 dy = n2 - 2y2	Ans: 4y2-n2= C/n2
on any	
'Step 1: I dentification	: Implicit + homogeneous
Slepz: Reunte 8 Sul	sstitute.
$\frac{dy}{dx} = \frac{n^2 - 2y^2}{2xy}$	y = U·n
ch any	dy = n du + 4
Step 3: Replace & Integra	afe an an
$n du + u = n^2 - a(u \cdot n)^2$	( ay du= ( dx
am (un)	J 1-442 J. 7
n dy tu = n2 - dunt	a=1-442; da=-84 dy; da=-844
an antu	-de = andy
n du qu = n2 (1-ait)	La L
an n2 (24)	-1 (de = (dn
n dy ju= 1-24"	$\frac{-1}{u}\int \frac{da}{a} = \int \frac{dn}{n}$
an ay	-1 mal = mml + micl -
n du = 1-201-4	4.7
an au	-1 m/1-4421 = m/x.cl -
~ du = 1 - 24 - 24 -	studies - was see -
in au	m/2-442/= -4/m/x.c/
n du = 1-84-24	m 12-442 = m/4.c)-41
on au	nz .
Du du = dn	1x   n2-4y2   = 1/n   1 - 1
1-44-242 N	m² mheu
The second second	m2-442 ( ; ca = e'
au du= dn	ne ne 1/c = c
1-442 M	n2-4y2= c -c=c
Nate: Any power or Sum,	n2
Subficulion, multiplication	$-(n^2-4y^2)=-C$
divisor to C is always	The state of the s
C because it results in	14y2-n2 = C
Constant.	N <sup>2</sup>

8) Co242) 1.	No. 22 Mil-C
3) (n2+y2) dy = ry dn	Ans: -n2 + My = C
Step 1: Islentification: home 8 substit	
Step 1: Identification: hom	ageneous + Implicit
Step 2: Rounte & Substit	ule
dy = my	dy = ndy + U
dy = my An n2yy2 Step 3: Replace & Jute:	and an
Step 3: Replace & Jutes	grate
n du + 4= n(un)	$-\int \frac{1}{11^3} \frac{1}{3} du = \int \frac{dn}{n}$
on 2+(um)2	
on du the method	- ((1+42) U-3du= mm)+c
	10
n du + n = 2 (n)	-[su-3+ su'du = Inm/+c
on ~ ~ (1 + 11 = )	
n du +u= 4	- [ u-3+1 +  n/u ] = In/n/+e
dn ster	A STATE OF THE PARTY OF THE PAR
n du = u -u	-[-1 + moul] = mmlte
dn 1 atur	au <sup>2</sup>
ndu = U-U(1+42)	1 = m/41 = m/m/+c
an 12+42	Au'
n dy = u-u-u3	1 = mm1+m/41+c
dn 1+42	9(H),
ndu = - U3	m2 = miniul +c
dn 1442	ay2
1+42 du = du	n2 = m/n. 4/10
-U3 N	عرباء م
1 2-2-1	
- No. U	$\frac{n^2}{2y^2} = \ln(y) + e$
22 (11)	$-n^{2} + m(u) = -c$
	3y2
	$-n^2 + h(y) = c$
	242
	$-n^{2} + m(y) = -C$ $-n^{2} + m(y) = C$ $-n^{2} + m(y) = C$ $-n^{2} + m(y) = C$

10 [n cos (y/n)+ y sin(y/n)]y-[ysin(y/n)-n cos (y/n)]ny=0 Ans: my cosy/n = 9 Steps: Identification: Homogenous + Implicit Step 2: 12 eurife & Substitute [ncos (yln) +y sin(vm)]y - [y sin(vh) -ncos (yln)]n dy =0 - Ly 8m (ym) -n cos(ym) In dy = - Treos (ym) +y sin (ym) Jy dy = [n cos(ym) + ysinlym] y

Tysinlym -n coslym)]n Step3: Replace 8 Integrate n du ju=[ncos(u)+(um) sin(y)](um)
dn [[um) sin(u) - ncos(u)]n n dy + 4 = Un2 Cos(4) + 4242 8in(4) Un2 Sin(4) - n2 Bos(4) n dy + 4 = m2 (4 (08(4) + 42 8in(4) n2 (4 Sin(4) - Cos(4) on dy +4 = 4(08(4) + 428191(4) u Sin(4) - Cos(4) 4 (03(4) + 42 sin (4) - 4 (4 sin(4) - Cos (4)) (18in(4) - Cos (4) n dy = U (08(4) +42 six(4) - 42 str (4) + 4 (08(4) Usin(4) - (08(4 n du = 24 (08 (u) 4819(4)- (65(4)

n du = 24 (08(4)	
dn usin(u) - Cos(u)	u coscul a li h = c
(USty (u) - cos(u) dix=(dn)	wich an
au (os(y) N	u(08(4) = C, u=y/n
(48/n/4) du (cos(4) dy = (dn	MORPHON IS MIND THE PRINCE OF THE PARTY OF T
Dy(os(4) Jangoslu) Ja	y cos(y/n) = C
2 ∫ Stn(u) du -1 ∫ du = ∫ dn 2 ∫ cos(u) 2 ∫ u = ∫ n	
	my cos cyln) = C
a= (+8/4), -da= Sin(4) du	N
1 -de - 1 du = 1 dn	my cos(ym)=c
-1 m/al - 1 m/ul = m/n/+/n/c)	Latthack and to the Late
2 2	The Nation - William I have
-1 m 1 cos(u)1-1 m   u   = m m.cl	
	aland the same and the same
-1 [m/coscul + mlul]=/mlm.cl	think that + his to the - man we
	in the supplied that I was truly
-I[mlucos(u)]=mln.cl	
Popular to	11 1 1012 3 HALL 11 11 11 11 11 11
m/ucoscu) = In/n·c/x-a	x - 1,1/1,2 1/1,12 1
hill a gent a state of	- who in the sound
mlu (05 (4)   = -2 mln.cl	the deposit of the second second
m/4 (08(4) /= m/(n·c)-2/	m'11 - 14/23/11 11 11/2
11/4 (2304) 12 M1 (164)	Med - India to the second
m/ 4 (05 (47 ) = 1/2 1	January - 10/2012 March
m/ u (08 (4) ) = m/ 1	Date of the second seco
	= 40 11 11 10 10 11 11 11 11 11 11
4 cos (4) = 1	ACTION AND ADDRESS OF
n2c2	The second secon