***SIMPLE DIFFERENTIAL EQUATIONS FROM NCEA PAPERS.***

***1***

***SOLUTION***

***s = - 2cos( t – 1 ) + c***

 ***2 2***

***Sub t = 1, s = 0***

***0 = - 2 cos 0 + c***

***c = 2***

***s = - 2cos( t – 1 ) + 2***

 ***2 2***

2



SOLUTION

ds = 3 – 3sin(3t)

dt

s = 3t + cos(3t) + c

when t = 0 s0 = 0 + cos0 + c = 1 + c

when t = 4 s4 = 12 + cos12 + c

dist during 4 sec = (12 + cos12 + c) – (1 + c)

 = 11 + cos12

 = 11.8 m

3

SOLUTION

***dv = a = 3200***

***dt 160 – 4t***

***v = -800 ln(160 – 4t) + c***

***sub t = 0, v = 0***

***0 = -800 ln(160) + c***

***v = 800ln(160) – 800ln(160 – 4t)***

***v = 800 ln( 160 )***

 ***160 – 4t***

***Sub t = 30***

***v = 800 ln( 4 ) = 1109 m/s***

4

dV = 50 (t + 1) – 2

dt

V = - 50 (t + 1) – 1  + c

V = -50 + c

 (t + 1)

Sub t = 0, V = 10

10 = -50 + c so c = 60

V = -50 + 60

 (t + 1)

Sub t = 60 so V = 59.2 L

5



d = -5cos(t) + 0.4t2 + c

sub t = 0 d1 = -5 + c

sub t = 8 d2 = -5cos8 + .4×82 + c

Dist d2 – d1 = -5cos8 + .4×82 + 5 31.3 m

6



7



d = 6t – 5 ln(t + 1) + c

sub t = 4 d1 = 24 – 5 ln(5) + c

sub t = 3 d2 = 18 – 5 ln(4) + c

so Dist in 4th sec = d1 – d2 = 15.95 – 11.07 = 4.88 m

8





9



