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18/engob1078 ENG 382 18/Engob1078

Command Window

```
clear
clc
formod short
M = 3.5;
v = 0.5;
S = 9.8;
f = m*g
v = sqrt((((f+(0.02*v)*(log(v)^3))+(10*v)+17150)/0.3);
for i = 1:inf
  Lita(i+1) = i;
v(i+1) = sqrt((((((f+(0.02*v(i)))*(log(v(i)))^3)+(10*v(i))
+17150)/0.3);
Er(i+1) = abs(((v(i+1)-v(i))/v(i+1)))*100);
if er(i+1)<=1E-11
   break
end
end
Tabloid = table(Lita', v', Er')
```

Output

Iteration	V	Ea
0	0.5	0
1	239.05	99.791
2	294.17	18.736
3	302.61	2.7894
4	303.85	0.40792
5	304.04	0.060144
6	304.06	0.0088222
7	304.07	0.0012941
8	304.07	0.00018981
9	304.07	$2.7842e^{-05}$
10	304.07	$4.7865e^{-06}$
11	304.07	$8.7865e^{-08}$
12	304.07	$1.2888e^{-8}$
13	304.07	$1.8904e^{-09}$
14	304.07	$2.7727e^{-10}$
15	304.07	$4.0679e^{-11}$
16	304.07	$5.9635e^{-12}$

Converging at Iteration = 7; V = 304.07

Proof

$$f_D = \frac{0.3v^2}{500+(1.v)^3} - 0.02v$$

If v = 304.07

Recall $f_D = 9.8 + 3.5 = 3430$

Substitute v = 304.07

$$f_D = \frac{0.3+(304.07)}{500+(1.(304.07)^3} = 0.02(304.07)$$

$f_D = 40.381967 31 - 6.0814$

$f_D = 34.3$