

2250 -4, Monday September 10
 Computation sheet for Example 2, section 2.3

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> 25*ln(294.0/245);
4.558038920
> y:= t-> -245*t + 294*25*(1 - exp(-.04*t));
y := t → -245 t + 7350 - 7350 e(-.04 t)
> v:= t -> 294*exp(-.04*t) - 245;
v := t → 294 e(-.04 t) - 245
> solve(v(t)=0,t); #find when max height
4.558038920
> y(4.558038920); #max height
108.280465
> solve(y(t)=0,t); #find when returns to ground
9.410949931, 0.
> 9.410949931 - 4.558038920; #time descending
4.852911011
> v(9.410949931); #speed when it lands
-43.2273093
Conclusions: bolt rises for 4.56 seconds, to a height of 108.3 meters. Then it spends 4.85 seconds
descending, landing with a velocity of -43.3 meters per second.
> with(plots):
Warning, the name changecoords has been redefined
> z:= t->-4.9*t^2 + 49*t;
#the no resistance model
z := t → -4.9 t2 + 49 t
> plot({z(t),y(t)}, t = 0..10, color=black,
title='comparison of linear drag vs. no drag models');

```

comparison of linear drag vs. no drag models

