

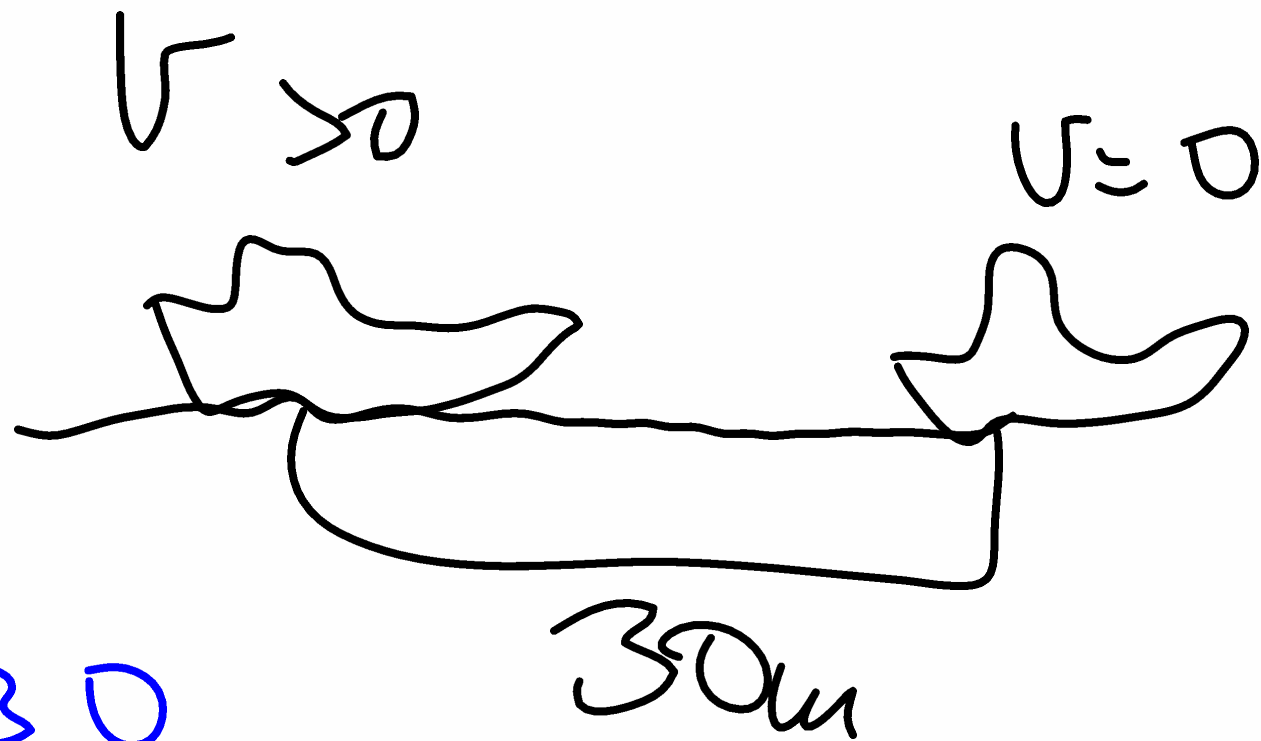
ASSIGNMENT I

Tue Mar 5 2019

page 147 Exer 15:

$$d(v) = 0.002(2v^2 + 10v + 3000)$$

The boat ~~takes~~ 30m to stop. Find the speed v it was travelling at.



$$d(v) = 30$$

Ans: v ?

$$30 = d(v)$$

This is an equation on v .

$$\frac{2}{1000}(2v^2 + 10v + 3000) = 30 \rightarrow \begin{aligned} 2v^2 + 10v + 3000 &= 15000 \\ 2v^2 + 10v - 12000 &= 0 \end{aligned}$$

$$2v^2 + 10v - 12000 = 0$$

We solve for v using the quadratic formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$v = \frac{-10 \pm \sqrt{10^2 - 4 \cdot 2 \cdot (-12000)}}{2 \cdot 2} = \frac{-10 \pm \sqrt{100 + 96000}}{4}$$

$$v = \frac{-10 \pm \sqrt{96100}}{4} = \frac{-10 \pm 310}{4} = \begin{cases} \frac{300}{4} = 75 \text{ m/s} \\ \frac{-320}{4} = -80 \text{ m/s} \end{cases}$$

~~No neg speed~~

16) How can we graph $f(x) = 2x^2 - 4x - 30$ without using table of values, nor a graphing calculator

Ans: let's rewrite $f(x)$ in factor form or in vertex form

1) Factor Form: $f(x) = a(x-d)(x-e)$

i) Write Def: $f(x) = 0$

$$x = \frac{2+8}{2} = 5 = d$$
$$x = \frac{2-8}{2} = -3 = e$$

II) Find x-intercepts by solving $2x^2 - 4x - 30 = 0$

$$x = \frac{2 \pm \sqrt{2^2 - 4(2)(-15)}}{2} = \frac{2 \pm \sqrt{64}}{2}$$

III) Determine 'a': look for y-intercept.

$$f(0) = 2 \cdot 0^2 - 4 \cdot 0 - 30 = -30$$

Substituting
our partial
factor form

$$a(0-5)(0+3) = -30$$

$$a(-5)3 = -30$$

$$-15a = -30$$

$$\boxed{a = \frac{-30}{-15} = 2}$$

Now we know

$$f(x) = 2(x-5)(x+3)$$

location of vertex?

$$x_v = \frac{-3 + 5}{2} = 1$$

$$f(x_v) = f(1) = 2 \cdot 1^2 - 4 \cdot 1 - 30 = 5 - 32$$

