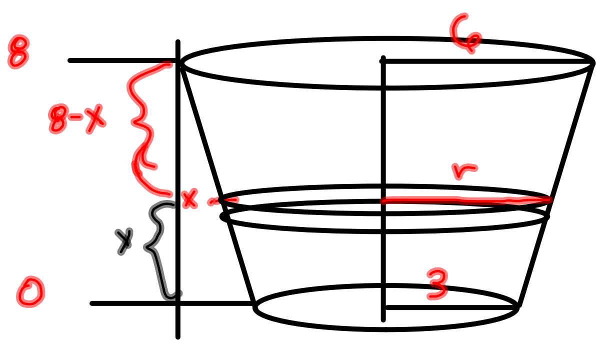
§5.4 #23



Area of representative disk is πr^2

$r=3$ when $x=0$ $(0,3)$ $(3,0)$

$r=6$ when $x=8$ $(8,6)$

$m=\frac{6-3}{8-0}=\frac{3}{8}$

$r=\frac{3}{8}(x-0)+3$

$=\frac{3}{8}x+3$

$=\frac{3}{8}(x+8)$

$\pi r^2=\pi\left(\frac{3}{8}\right)^2(x+8)^2$

$=\pi\left(\frac{9}{64}\right)(x^2+16x+64)$

So volume $=\frac{9\pi}{64}(x^2+16x+64)\Delta x$

Force $=\left(\frac{9\pi}{64}\right)(62.5)(x^2+16x+64)\Delta x$

work $=\frac{(62.5)(9)\pi}{64}(x^2+16x+64)(8-x)\Delta x$

$A\int_0^8(8-x)(x^2+16x+64)\,dx$, where $A=\frac{(62.5)(9\pi)}{64}$

$=A\int_0^8(-x^3-8x^2+64x+512)\,dx$

$=A\left[-\frac{1}{4}x^4-\frac{8}{3}x^3+32x^2+512x\right]_0^8$

$=A\left[-\frac{1}{4}(8)^4-\frac{8}{3}(8)^3+32(8)^2+512(8)\right]$

$+32$ → mistake in sol'ns.

$$\frac{62.5\cdot 9\cdot \mathrm{Pi}}{64}\cdot\int_0^8 (x+8)^2\cdot(8-x)\,dx$$

$$33000.00000\,\pi$$

$evalf(\%)$

$$1.036725576\ 10^5$$

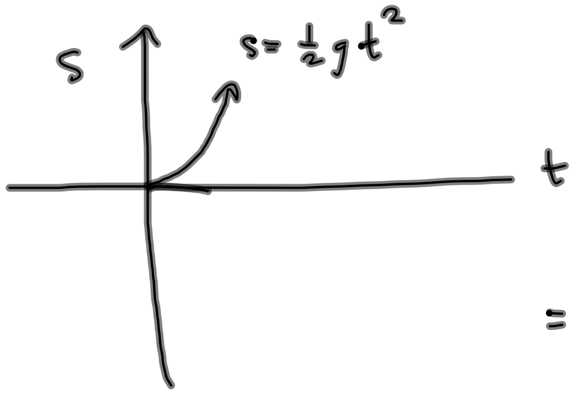
§5.5 #20

$s = \frac{1}{2}gt^2 \quad , \quad v(T) = v_T$

Compute AVG of velocities wrt t, we get $v_{AVG} = \frac{1}{2}V_T$

But AVG wrt s, gives $v_{AVG} = \frac{2}{3}V_T$

$g = 9.8 \ m/s^2$



$v(t) = \frac{ds}{dt} = gt$

$$\frac{1}{T}\int_0^T gt\,dt$$

$$= \frac{1}{T}\cdot\frac{1}{2}gt^2\Big]_0^T = \frac{1}{T}\cdot\frac{1}{2}gT^2$$

$$= \frac{1}{2}gT = \frac{1}{2}V_T$$

$$s = \frac{1}{2} g t^2 = s$$

$$t^2 = \frac{2s}{g}$$

$$t = \sqrt{\frac{2s}{g}}$$

s is related to $t^2 \rightsquigarrow$
t .. .. .. $s^{\frac{1}{2}} \rightsquigarrow \frac{2}{3} s^{\frac{3}{2}}$

$s(0) = 0$
$s(T) = \frac{1}{2} g T^2$

$$v = gt = g\sqrt{\frac{2s}{g}} = \sqrt{g^2}\sqrt{\frac{2s}{g}}$$

$$= \sqrt{\frac{2sg^2}{g}} = \sqrt{2sg} = (2sg)^{\frac{1}{2}}$$

$$= \sqrt{2g}\, s^{\frac{1}{2}}$$

$$v_{AVG} = \frac{1}{\frac{1}{2}gT^2}\sqrt{2g}\int_0^{\frac{1}{2}gT^2} s^{1/2}\, ds = \frac{2}{gT^2}\sqrt{2g}\,\frac{2}{3}\left[s^{\frac{3}{2}}\right]_0^{\frac{1}{2}gT^2}$$

$$= \frac{2}{gT^2}\sqrt{2g}\cdot\frac{2}{3}\cdot\left(\frac{1}{2}gT^2\right)^{3/2}$$

$$= \frac{4\sqrt{2g}}{3gT^2}\left(\frac{1}{2}gT^2\right)\sqrt{\frac{1}{2}gT^2} = \frac{2}{3}\sqrt{2g}\sqrt{\frac{1}{2}gT^2}$$

$$= \frac{\cancel{2}\sqrt{2g}}{3}\,\frac{\sqrt{2}}{\cancel{2}}\sqrt{gT^2}$$

$$= \frac{2\sqrt{g}\sqrt{gT^2}}{3}$$

$$= \frac{2gT}{3} = \frac{2}{3} v_T$$

Nov 13-1:06 PM

$$\lim_{x\to 2} \frac{2x^2+x-10}{3x^2-13x+14}$$

Tues: 12/3 @ 12pm
FINAL EXAM

$2x^2+x-10=0$

$a=2, b=1, c=-10$

$b^2-4ac = 1^2-4(2)(-10)$

$= 1+80$

$= 81$

$\sqrt{81} = 9$

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

$$= \frac{-1\pm 9}{2(2)}$$

$$= \frac{-1\pm 9}{4}$$

$$\boxed{\frac{8}{4}=2 \qquad \frac{-10}{4} = -\frac{5}{2}}$$

$(x-2)$

$(x-(-\frac{5}{2}))$

$$\frac{2\cancel{(x-2)}(x+\frac{5}{2})}{3\cancel{(x-2)}(x-7/3)}$$

$a=3, b=-13, c=14$

$b^2-4ac = 169-4(3)(14)$

$= 169-168$

$= 1$

$$x = \frac{13\pm 1}{2(3)}$$

$\frac{14}{6}=\frac{7}{3}$

$\frac{12}{6}=2$