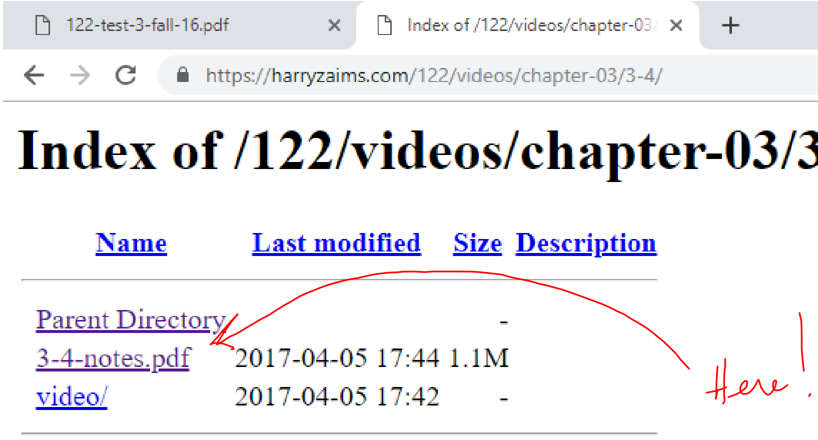
WORK THE EXERCISES THAT ACCOMPANY THE VIDEOS.

3-4-notes.pdf that's in with the Section 3.4 Videos (for example) is what I want handed in.



Index of /122/videos/chapter-03/3-4

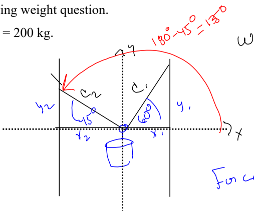
Name	Last modified	Size	Description
Parent Directory		-	
3-4-notes.pdf	2017-04-05 17:44	1.1M	
video/	2017-04-05 17:42	-	

Here!

LOOK FOR CHAPTER 4 QUESTIONS IN THE BONUS MATERIAL ON TEST 3!!!!

Hanging weight question.

Mass = 200 kg.



What's the tension in the 2 chains?

All forces are in balance.

Force : $\langle 0, -1960 \rangle$

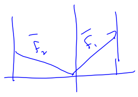
Horiz ↗ vert ↑

$$F = ma = (200 \text{kg})\left(\frac{9.8 \text{ m}}{s^2}\right) = \frac{1960 \text{ Kg}\cdot\text{m}}{s^2} = 1990 \text{N}$$

$y_2 + y_1 = 1960 \Rightarrow$

$x_1 + x_2 = 0$

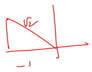
$\frac{y_2}{c_2} = \sin 135^\circ$ $\frac{y_1}{c_1} = \sin 60^\circ$



$$\bar{F}_1 + \bar{F}_2 = \langle 0, -1960 \rangle$$

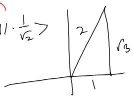
$\bar{F}_1 = \langle x_1, y_1 \rangle$ $\bar{F}_2 = \langle x_2, y_2 \rangle$

$= \langle \|\bar{F}_1\| \cos 60^\circ, \|\bar{F}_1\| \sin 60^\circ \rangle$



$$\bar{F}_1 + \bar{F}_2 = \langle \|\bar{F}_1\|\cos 60^\circ + \|\bar{F}_2\|\cos 135^\circ, \|\bar{F}_1\|\sin 60^\circ + \|\bar{F}_2\|\sin 135^\circ \rangle$$

$$= \langle \|\bar{F}_1\| \cdot \frac{1}{2} + \|\bar{F}_2\| \cdot -\frac{1}{\sqrt{2}}, \|\bar{F}_1\| \cdot \frac{\sqrt{3}}{2} + \|\bar{F}_2\| \cdot \frac{1}{\sqrt{2}} \rangle$$



$$= \langle 0, -1960 \rangle$$

$\|\bar{F}_1\| = a$, $\|\bar{F}_2\| = b$

$\frac{a}{2} - \frac{b}{\sqrt{2}} = 0$ & $\frac{\sqrt{3}a}{2} + \frac{b}{\sqrt{2}} = -1960$

$2\sqrt{2}$ times

$\sqrt{2}a - 2b = 0$

$+ \quad \sqrt{6}a + 2b = -1960$

$(\cancel{2}\sqrt{2})\left(\frac{a}{\cancel{2}}\right) = \sqrt{2}a$

$(2\sqrt{2})\left(\frac{b}{\sqrt{2}}\right) = 2b$

$\sqrt{2}a + \sqrt{6}a = -1960$

$a(\sqrt{2} + \sqrt{6}) = -1960$

$$\boxed{a = \frac{-1960}{\sqrt{2} + \sqrt{6}}}$$

$\sqrt{2}a - 2b = 0$

$2b = \sqrt{2}a$

$$b = \frac{1}{2}\sqrt{2}a = \frac{\sqrt{2}}{2}\left(\frac{-1960}{\sqrt{2}+\sqrt{6}}\right) = \frac{-1960\cancel{\sqrt{2}}}{2\cancel{\sqrt{2}}(1+\sqrt{3})} \boxed{= \frac{-980}{\sqrt{3}+1} = b}$$

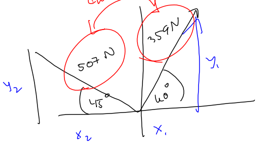
$\sqrt{6} = \sqrt{3 \cdot 2} = \sqrt{3}\sqrt{2}$

Problem with my setup is the tension should oppose the force of gravity. Should've used + 1960.

$\|\bar{F}_1\| = a = +\frac{1960}{\sqrt{2}+\sqrt{6}}$ Thx Conor. 507.2853284 N $= \|\bar{F}_1\|$

$\|\bar{F}_2\| = b = +\frac{980}{\sqrt{3}+1}$ 358.7048956 N $= \|\bar{F}_2\|$

Got these backwards, again.



Something's wrong.

why?

$\bar{F}_2 = \langle x_2, y_2 \rangle \approx$ ~~$\langle 507 \cos 135^\circ, 507 \sin 135^\circ \rangle$~~

$\approx \langle 359 \cos 135^\circ, 359 \sin 135^\circ \rangle$

~~$\approx \langle$-358.5031380, 358.5031380$\rangle$~~

-253.8513344 253.8513344

$\bar{F}_1 = \langle x_1, y_1 \rangle \approx$ ~~$\langle 359 \cos 60^\circ, 359 \sin 60^\circ \rangle$~~

$\langle 507 \cos 60^\circ, 507 \sin 60^\circ \rangle$

$\approx \langle$ 179.5000000, 310.9031200 $\rangle$

253.5000000 439.0748798

But $x_1 + x_2 = 0$?!

$y_1 + y_2 = (200)(9.8)$!?

Chapter 4 Stuff

$28 = 3 \cdot 9 + 1$

$$\begin{array}{r|l} & 9\ r\ 1 \\ 3 & 28 \\ & -27 \\ \hline & 1 \end{array}$$

$28 = 3 \cdot 9 + 1$

$f(x) = 3x^3 - 8x^2 + 10x - 4$

$f(2)$: Divide by $x-2$

$$\begin{array}{r|rrrr} 2 & 3 & -8 & 10 & -4 \\ & & 6 & -4 & 12 \\ \hline & 3 & -2 & 6 & \boxed{8 = f(2)} \\ & x^2 & x & c & r \end{array}$$

This says

$f(x) = (x-2)(3x^2 - 2x + 6) + 8$

So, $f(2) = (2-2)(3(2)^2 - 2(2) + 6) + 8$

$= 0 \cdot (\sim\sim) + 8 = 8$

$1+i$ is a zero of $f(x)$

$(3+2i)(5-7i) = 15 - 21i + 10i - 14i^2$

$= 15 - 11i + 14 = 29 - 11i$

$i^2 = -1$

$\sqrt{-1} = i$

$1+i$ is a zero of $f(x)$

$$\begin{array}{r|rrrr} 1+i & 3 & -8 & 10 & -4 \\ & & 3+3i & -8-2i & 4 \\ \hline & 3 & -5+3i & 2-2i & 0\,! \end{array}$$

$r = 0 \Rightarrow x - (1+i)$

$(1+i)(-5+3i) = -5 + 3i - 5i + 3i^2 = -5 - 2i - 3 = -8 - 2i$

$(1+i)(2-2i) = 2(1+i)(1-i) = 2(1^2 + 1^2) = 4$

Break it down the rest of the way?

$$\begin{array}{r|rrrr} 1+i & 3 & -8 & 10 & -4 \\ & & 3+3i & -8-2i & 4 \\ \hline 1-i & 3 & -5+3i & 2-2i & 0\,! \\ & & 3-3i & -2+2i & \\ \hline & 3 & -2 & 0 & \\ & x & c & r & \end{array}$$

Conjugate Pairs Theorem

This says $f(x) = (x-(1+i))(x-(1-i))(3x-2)$

$= (x-1-i)(x-1+i)(3x-2)$

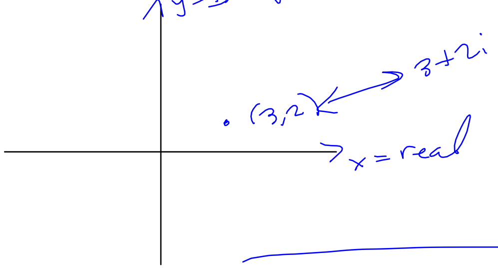
$= (x^2 - x + iy - x + 1 - i - ix + i - i^2)(3x-2)$

$= (x^2 - 2x + 1 + 1)(3x-2) = (3x-2)(x^2 - 2x + 2)$

$= 3x^3 - 6x^2 + 6x - 2x^2 + 4x - 4$

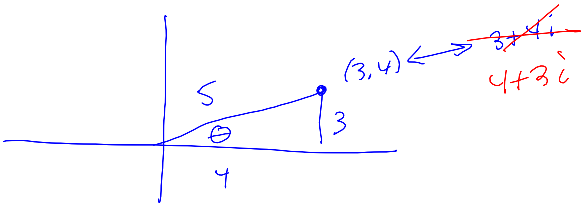
$= 3x^3 - 8x^2 + 10x - 4 = f(x)$ ✓

Complex Plane :



3-4-5 Right Triangle

$$\boxed{\theta \approx 36.86989765^\circ}$$



Trig Form :

$\frac{4}{5} = \cos\theta$ $\frac{3}{5} = \sin\theta$

$4 = 5\cos\theta$ $3 = 5\sin\theta$

So $3+4i = 5(\cos\theta + i\sin\theta)$

$= 5(\cos(36...^\circ) + i\sin(36...^\circ))$

TRIG FORM

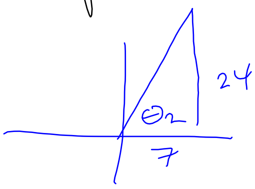
$z = 4+3i$

$z^2 = (4+3i)^2 = 16 + 2(4)(3)i + (3i)^2$

$= 16 + 24i - 9$

$= 7 + 24i$

$\sqrt{7^2+24^2} = 25 = 5^2$



$\theta = 36....^\circ$

$\theta_2 = 73.73979531$

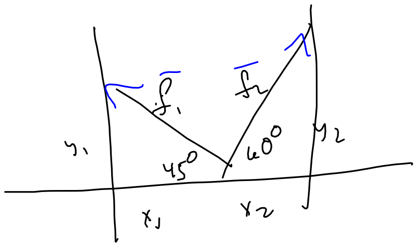
$z = r(\cos\theta + i\sin\theta)$ DeMoivre

$z^2 = r^2(\cos(2\theta) + i\sin(2\theta))$

$\sqrt{z} : \sqrt{r}\left(\cos\left(\frac{\theta}{2}\right) + i\sin\left(\frac{\theta}{2}\right)\right)$

$w = r_2(\cos\theta_2 + i\sin\theta_2)$

$\Longrightarrow zw = rr_2(\cos(\theta+\theta_2) + i\sin(\theta+\theta_2))$



$\langle x_1+x_2, y_1+y_2\rangle = \bar{f}_1+\bar{f}_2 \quad = \langle 0, 1960\rangle$