§12.1 #s 3, 8, 10, 11, 16, 20, 31, 37 3-D

§12.2 #s 4, 5, 15, 17, 19, 23, 51 Vectors & Dot Product

~~3-D stuff~~

Housekeeping.

Homework: Old-school.

My house? 2358 50th Ave 4 blocks South of Aims.

Scan to PDF & email to

hmills1@online.aims.edu

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Scan to PDF format.

Testing on campus TBA.

Probably EDBH 131.

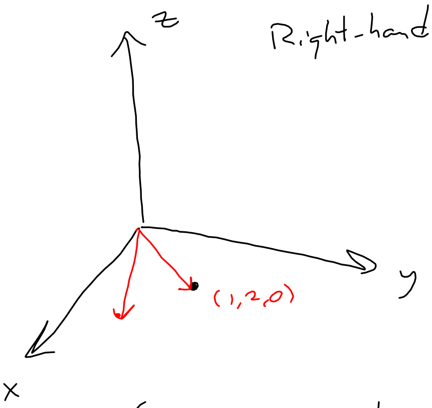
Vectors §12.2

$\bar{v} = \langle 1,2,0\rangle$

$\bar{w} = \langle 2,1,0\rangle$

2 vectors in the $z=0$, i.e., xy-plane.

Right-hand Rule

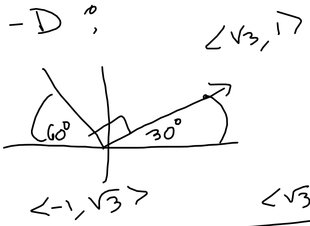


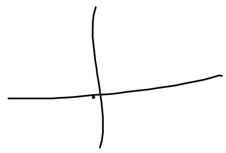
Dot Product of $\bar{w}$ & $\bar{v}$:

$\bar{v}\cdot\bar{w} = 1\cdot 2+2\cdot 1+0\cdot 0 = 4$ (& in same direction)

Dot product tells us how "parallel" vectors are.

2-D:





$\langle\sqrt{3},1\rangle\cdot\langle -1,\sqrt{3}\rangle = -\sqrt{3}+\sqrt{3} = 0$

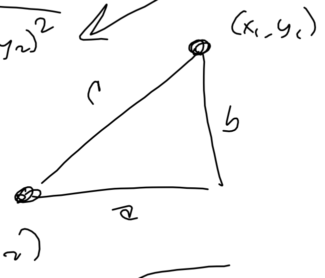
$\boxed{\text{Cosine}}$

Recall distance in 2-D

$A = (x_1, y_1)\ ,\ (x_2, y_2) = B$

$$D(A,B) = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

Pythagorus!



$c = \sqrt{a^2 + b^2} =$

This generalizes to <u>ANY</u> dimension, in particular to 3-D:

$A = (x_1, y_1, z_1), B = (x_2, y_2, z_2)$

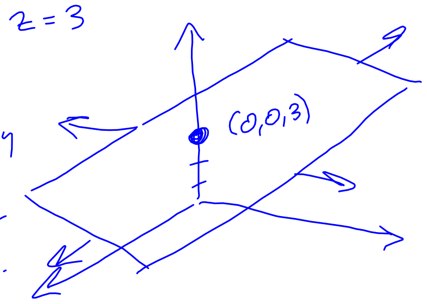
$$D(A,B) = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2 + (z_1 - z_2)^2}$$

circle: $(x-a)^2 + (y-b)^2 = r^2$

sphere: $(x-a)^2 + (y-b)^2 + (z-c)^2 = r^2$

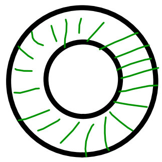
Ball $(x-a)^2 + (y-b)^2 + (z-c)^2 \leq r^2$

Graphing planes, usually by showing x-, y-, & z- intercepts.



2-D

$\{(x,y) \mid r < \sqrt{x^2+y^2} < R\}$



Annulus.

$\{x \mid x$ is an underage alcoholic$\}$

Rational #s $\mathbb{Q} = \{ \frac{a}{b} \mid a,b \in \mathbb{Z},\ b \neq 0 \}$

$\mathbb{Z} = \{\ldots, -3, -2, -1, 0, 1, 2, 3, \ldots\}$

$\mathbb{N} = \{1, 2, 3, \ldots\}$