LESSON 2

MA 16200·SPRING 2023

DR. HOOD
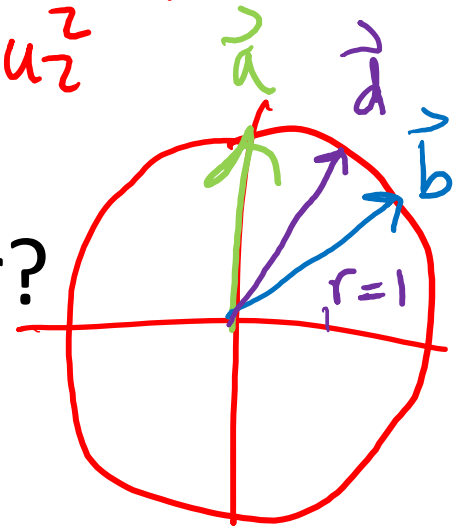
SUPPLEMENTAL INSTRUCTION

SI Leader	Session 1	Session 2	Session 3	Office hour
Alex Hunton	Mon @ 7:30 PM UNIV 001	Tue @ 7:30 PM UNIV 003	Thu @ 4:30 PM UNIV 117	Thu @ 2:00 PM WILY C215
Phoebe Bailey	Sun @ 6:30 PM WILY C215	Mon @ 6:30 PM WTHR 420	Wed @ 6:30 PM WTHR 420	Wed @ 10:30 AM WILY C215

WARM UP

$$\vec{u} = \langle u_1, u_2 \rangle$$

$$|\vec{u}| = 1 = \sqrt{u_1^2 + u_2^2}$$

Which of the following is **<u>not</u>** a unit vector?

a) $\langle 0, 1 \rangle$

b) $\left\langle \dfrac{\sqrt{2}}{2}, \dfrac{\sqrt{2}}{2} \right\rangle$

c) $\left\langle \dfrac{1}{3}, \dfrac{2}{3} \right\rangle$

d) $\left\langle \dfrac{1}{2}, \dfrac{\sqrt{3}}{2} \right\rangle$

$$\rightarrow \quad |\vec{c}| = \sqrt{\left(\tfrac{1}{3}\right)^2 + \left(\tfrac{2}{3}\right)^2} = \sqrt{\tfrac{5}{9}} = \tfrac{\sqrt{5}}{3} \neq 1$$

$\vec{a} \quad \vec{d} \quad \vec{b}$

$r = 1$

ANNOUNCEMENTS

- **MyLab Math Technical Problems**
  - Down Tuesday Jan 10 from 1pm – 8pm
  - Now resolved – try again to register
  - Check status: https://status.pearson.com/s/
- **Pearson Help Table (in person)**

DATE: Thursday, January 12th

TIME: 12:30-4pm

LOCATION: Krannert Drawing Room. This is in the lobby area near the Hub corner

APPLY CALCULUS TO DATA SCIENCE

- Would you like to earn honors credits for MA16200? Are you interested in learning how to apply calculus to data science problems? If so, consider taking the companion (one-credit) course **MA16290: "Data Science Lab: Calculus."** In this course, you will
  - explore applications of calculus to data science
  - learn to program in Python
  - learn to use Arduino sensors and microprocessors to acquire data

- More information here: https://engineering.purdue.edu/~mboutin/Data_Science_labs.html

OFFICE HOURS

- **Dr. Hood's Office Hours:**
  - Mon, Wed, Fri at 12:30 – 1:30pm in MATH 844
  - (may change slightly after first week)

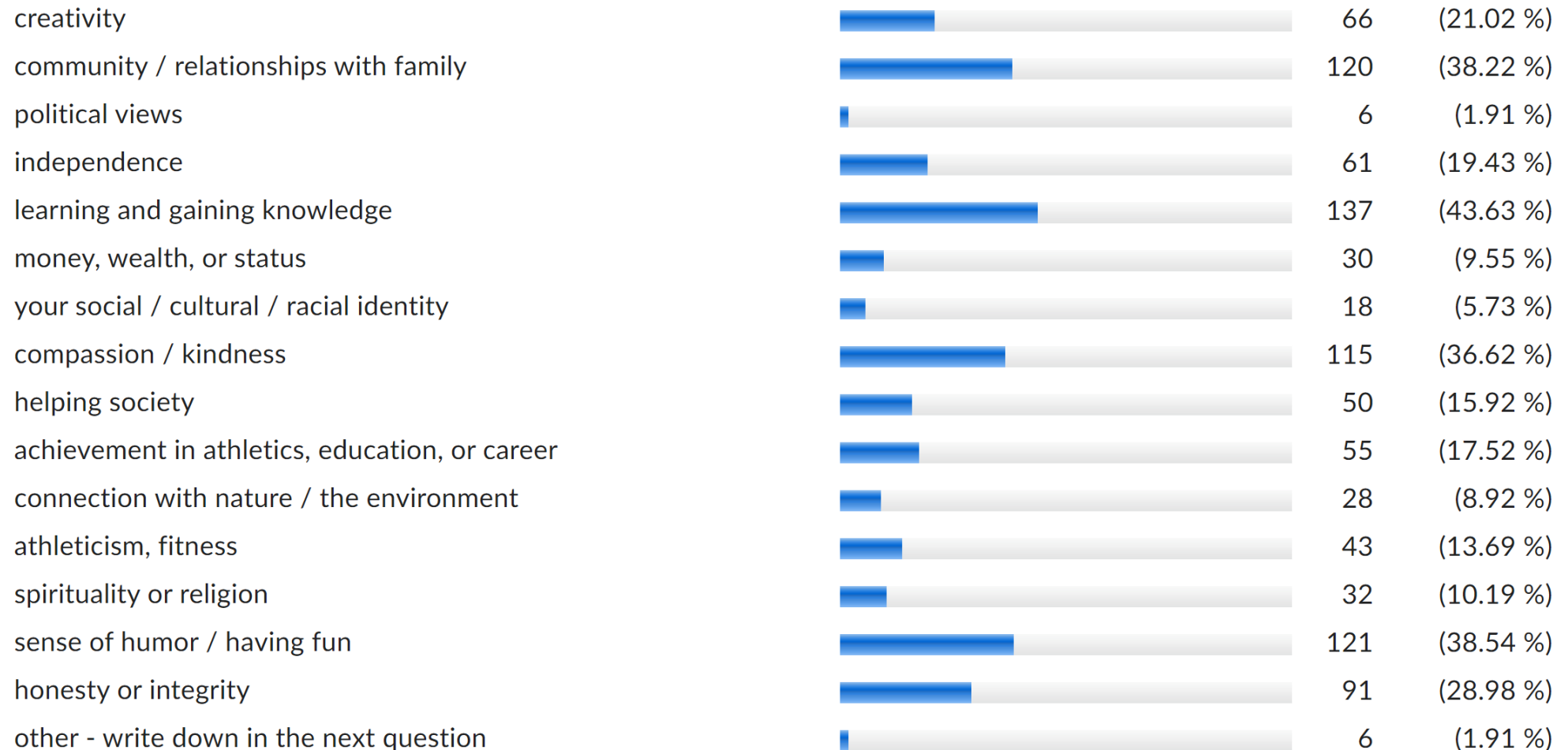- **TA's have office hours in the Math Resource Room (MRR)**
  - WTHR 313
  - Schedule posted online on Wed Jan 11:
    - https://www.math.purdue.edu/academic/courses/helproom

GETTING TO KNOW YOU

Question 1

Check the two or three values that are *most* important to you.

Value	Count	Percent
creativity	66	(21.02 %)
community / relationships with family	120	(38.22 %)
political views	6	(1.91 %)
independence	61	(19.43 %)
learning and gaining knowledge	137	(43.63 %)
money, wealth, or status	30	(9.55 %)
your social / cultural / racial identity	18	(5.73 %)
compassion / kindness	115	(36.62 %)
helping society	50	(15.92 %)
achievement in athletics, education, or career	55	(17.52 %)
connection with nature / the environment	28	(8.92 %)
athleticism, fitness	43	(13.69 %)
spirituality or religion	32	(10.19 %)
sense of humor / having fun	121	(38.54 %)
honesty or integrity	91	(28.98 %)
other - write down in the next question	6	(1.91 %)

POLL 1

If $\vec{u} = \langle 1,1,1 \rangle$ and $\vec{v} = \langle 2,7,6 \rangle$, what is $\vec{v} - 2\vec{u}$?

a) $\langle -3, -13, -11 \rangle$

b) $\langle 1,6,5 \rangle$

c) $\langle 0,5,4 \rangle$

$\vec{v} - 2\vec{u}$

$\langle 2,7,6 \rangle - 2\langle 1,1,1 \rangle$

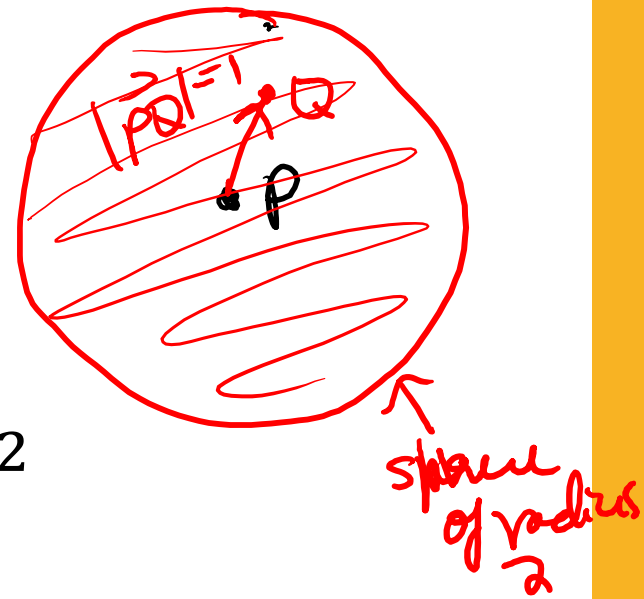$\langle 2-2, 7-2, 6-2 \rangle$

$\langle 0,5,4 \rangle$

POLL 2

$Q(x, y, z)$

$P(0, 1, 3)$

$|\vec{PQ}| = 1$ $\vec{PQ}$ Q P

Give a geometric description of the inequality:

$$(x - 0)^2 + (y - 1)^2 + (z - 3)^2 \leq 2^2$$

sphere of radius 2

$|\vec{PQ}| \leq 2$ $|\vec{PQ}|^2 \leq 2^2$

a) A sphere of radius 2 centered at (0,1,3) $=$

b) A ball of radius 2 centered at (0,1,3)

c) Every point outside the ball of radius 2 centered at (0,1,3) $\geq$

$|\vec{PQ}| \geq 2$

POLL 3

Find a vector with length 7 that has the same direction as $\vec{v} = \langle 1, -3, 4 \rangle$.

a) $\left\langle \dfrac{7}{\sqrt{26}}, \dfrac{-21}{\sqrt{26}}, \dfrac{28}{\sqrt{26}} \right\rangle$

b) $\langle 7, -21, 28 \rangle$

c) $\left\langle \dfrac{7}{\sqrt{26}}, \dfrac{7}{\sqrt{26}}, \dfrac{7}{\sqrt{26}} \right\rangle$