Welcome To Math 34A!
Differential Calculus

Instructor:
   Ebrahim Ebrahim, `ebrahim@math.ucsb.edu`
   South Hall 6701

Office Hours:
   Mondays 9:30 to 10:30
   Wednesdays 9:30 to 10:30
   Wednesdays 12:30 to 1:30

© 2017 Daryl Cooper, Peter M. Garfield
Please do not distribute outside of this course.

Math 34A is about. . .

- Problem-solving using reasoning
- Turning English into Math (and vice versa)

Math 34A is not about. . .

- Memorizing formulas
- Rote computations

Do You Have An i>clicker?

A = Yes, B = No

Everything Is On GauchoSpace

See https://gauchospace.ucsb.edu/

- Syllabus
- Homework:
  - On WeBWorK (link on GauchoSpace)
  - Due before every lecture (at 9:30 AM)
  - First one is due Thursday, Jan 10th!
  - (better to think of it as being due on the night of Wednesday, Jan 9th)
- Information about discussions and TAs
- Dates of midterm exams and final exam.
  - First midterm is Jan 24! (Yikes!)
- Grading system
- Consider signing up with CLAS = Campus Learning Assistance Services (their classes start Wed)

Everything Is On GauchoSpace

See https://gauchospace.ucsb.edu/

- Purpose of the class: Solving new problems you haven't seen before.
  - Use reasoning.
  - This is very difficult.
  - Memorizing formulas is silly.
  - Word problems are the point.

- You should read the textbook!
  - It's quite good!
  - These lectures are not just presenting the textbook– they complement it.
  - Your homework problems are pulled from the textbook.
  - To be ready for exams you should follow both the textbook and the lectures.

Introduction
○○○○○

Problem-Solving
●○

Word Problems
○

Percentages
○○○○

Crasher Info
○

Problems!

1. Solve for x: $4x + 7 = 12$

$A = 3$ $B = 6$ $C = 5/4$ $D = 19/4$ $E = ?$

Answer: $\boxed{C}$

2. Solve for x: $ax + b = c$.

$A = c/a$ $B = bc/a$ $C = (c+b)/a$ $D = c-b/a$ $E = (c-b)/a$

Answer: $\boxed{E}$

More Problems!

3. Solve for x: $2x + 7 = ax + k$

$$A = (2 - k)/(a - 7) \qquad B = (k - 7)/(2 - a)$$

$$C = (k - 7)/(a - 2) \qquad D = k - 7/a - 2 \qquad E =?$$

Answer: $\boxed{B}$

4. Expand: $(1 - x)(1 + x + x^2)$

Moral: Parentheses are awesome!

Introduction
○○○○○

Problem-Solving
○○

Word Problems
●

Percentages
○○○○

Crasher Info
○

Word Problems!

4. The sum of three consecutive numbers is 99. What are the numbers?

Answer: $\boxed{32, \ 33, \ 34}$

5. Twice one number is three times another number. The sum of the two numbers is 110. What are the numbers?

Answer: $\boxed{66, \ 44}$

6. The perimeter of a rectangle is twice its area. Find a formula for the length of the rectangle in terms of its width.

Answer: $\boxed{L = \frac{W}{W-1}}$

Introduction
○○○○○

Problem-Solving
○○

Word Problems
○

Percentages
●○○○

Crasher Info
○

Introduction to Percentages

- cent means hundred
- percent means <mark>per hundred</mark> or <mark>out of one hundred</mark> .
- So 50% means 50 out of 100.

> To convert a fraction to a percentage: multiply by 100%

Questions:

1. What is 3/4 as %?

$$A = 0.75\% \quad B = 30\% \quad C = 7.5\% \quad D = 75\% \quad \boxed{D}$$

2. What is 20% of 30?

$$A = 600 \quad B = 60 \quad C = 6 \quad D = 0.6 \quad \boxed{C}$$

You Try It!

3. Click A,B,C,D as you do these problems

(A) What is 20% of x?

(B) What is 70% as a fraction?

(C) What is $x\%$ of 50?

(D) What is $\dfrac{x}{x+1}$ as $\%$?

Answers: (A) $x/5$ (B) $7/10$ (C) $x/2$ (D) $\left(\dfrac{100x}{x+1}\right)\%$

How many did you get right?

$$A = 4 \smiley \quad B = 3 \quad C = 2 \quad D = 1 \quad E = \frownie$$

Mixing Paint

4. If I combine 5 liters of blue paint with 15 liters of red paint, what percentage of red paint is in the combination?

$$A\ 15\% \quad B\ 5\% \quad C\ 75\% \quad D\ 25\% \quad E\ \text{Other} \quad \boxed{C}$$

5. If I combine x liters of blue paint with y liters of red paint, what percentage of blue paint is in the combination?

$$A\ \left(\frac{x}{x+y}\right)\% \quad B\ \left(\frac{y}{x+y}\right)\% \quad C\ \left(\frac{100y}{x+y}\right)\%$$

$$D\ \left(\frac{100x}{x+y}\right)\% \quad E\ \text{Other} \quad \boxed{D}$$

One More Problem!

6. Express $x\%$ of 4 plus $y\%$ of 3 as a percentage of 12.

Idea: Break down the problem into simple steps in English. Explain what I'm doing to myself.

Waitlist / Crashers

- All approval codes are controlled by the Math Department
  - Before Jan 12:
    - Automatically done from waitlist through GOLD.
    - Approval codes emailed.
    - Approval codes are not currently available.
  - Jan 12 to Jan 28 (last day to add)
    - Only students on waitlist and crashing!
    - Approval codes mailed during Jan 18 to Jan 28.
    - You have 24 hours to add.

- If you're crashing, please sign my crashers' list!