Name: \_\_\_\_\_ Caleb McWhorter — Solutions

**MATH 101** 

Fall 2023 "I see the muscle shirt came today. Muscles coming tomorrow? Did ya'

HW 6: Due 10/02 get a tracking number? Oh, I hope he got a tracking number."

-Daryl, Letterkenny

**Problem 1.** (10pt) Showing all your work, compute the following:

- (a) 83% of 1,295
- (b) 3% of 920
- (c) 99% of 67
- (d) 165% of 81
- (e) 20% of 45.30

**Solution.** We use the fact that to find a % of a number N, ones computes  $N \cdot \%_d$ , where  $\%_d$  is the percentage written as a decimal.

(a) 
$$83\%$$
 of  $1,295 = 1295(0.83) = 1074.85$ 

(b) 
$$3\% \text{ of } 920 = 290(0.03) = 8.7$$

(c) 
$$99\% \text{ of } 67 = 67 (0.99) = 66.33$$

(d) 
$$165\% \text{ of } 81 = 81(1.65) = 133.65$$

(e) 
$$20\% \text{ of } 45.30 = 45.30(0.20) = 9.06$$

Problem 2. (10pt) Showing all your work, compute the following:

- (a) 560 increased by 4%
- (b) 357 decreased by 23%
- (c) 993 decreased by 95%
- (d) 55 increased by 105%
- (e) 89.4 increased by 224%

**Solution.** We use the fact that to increase or decrease a number N by a percentage %, ones computes  $N(1 \pm \%_d)$ , where  $\%_d$  is the percentage as a decimal and one chooses '+' if a percentage increase and '-' if a percentage decrease.

(a) 560 increased by 
$$4\% = 560(1 + 0.04) = 560(1.04) = 582.4$$

(b) 
$$357$$
 decreased by  $23\% = 357(1 - 0.23) = 357(0.77) = 274.89$ 

(c) 993 decreased by 
$$95\% = 993(1 - 0.95) = 993(0.05) = 49.65$$

(d) 55 increased by 
$$105\% = 55(1 + 1.05) = 55(2.05) = 112.75$$

(e) 
$$89.4 \text{ increased by } 224\% = 89.4(1+2.24) = 89.4(3.24) = 289.656$$

**Problem 3.** (10pt) Your biology class course grade is determined by the following components:

Homeworks	30%
Labs	20%
Midterm	20%
Final	20%
Project	10%

Suppose that your homework average was 86%, your lab average was 75%, your midterm average was 68%, your final grade was 81%, and your project grade was 92%.

- (a) Compute your course average.
- (b) If the final exam had not yet occurred, i.e. you had not yet received the 81%, but all the other course grades were as listed above, then what is your current course average?

## Solution.

(a) We have...

$$\begin{aligned} \text{Overall Course Average} &= \frac{\sum w_i x_i}{\sum w_i} \\ &= \frac{0.30 \cdot 0.86 + 0.20 \cdot 0.75 + 0.20 \cdot 0.68 + 0.20 \cdot 0.81 + 0.10 \cdot 0.92}{0.30 + 0.20 + 0.20 + 0.20 + 0.10} \\ &= \frac{0.30 \cdot 0.86 + 0.20 \cdot 0.75 + 0.20 \cdot 0.68 + 0.20 \cdot 0.81 + 0.10 \cdot 0.92}{1} \\ &= 0.258 + 0.15 + 0.136 + 0.162 + 0.092 \\ &= 0.798 \\ &= 79.8\% \end{aligned}$$

(b) We have...

Current Course Average 
$$= \frac{\sum w_i x_i}{\sum w_i}$$

$$= \frac{0.30 \cdot 0.86 + 0.20 \cdot 0.75 + 0.20 \cdot 0.68 + 0.10 \cdot 0.92}{0.30 + 0.20 + 0.20 + 0.10}$$

$$= \frac{0.30 \cdot 0.86 + 0.20 \cdot 0.75 + 0.20 \cdot 0.68 + 0.10 \cdot 0.92}{0.80}$$

$$= \frac{0.258 + 0.15 + 0.136 + 0.092}{0.80}$$

$$= \frac{0.636}{0.80}$$

$$= 0.795$$

$$= 79.5\%$$

**Problem 4.** (10pt) Suppose you received the following grades this semester:

Course	Credits	Grade
CS 320: Ethics in a Technological Society	3	C+
CS 380: Networking	4	B+
CS485: Web Programming	3	B-
CS 424: Data Mining	3	A-
ECON 101: Principles of Macroeconomics	3	Α

Given the following grade values,

Grade	Values	Grade	Values
A	4.0	C+	2.3
A-	3.7	C	2.0
B+	3.3	C-	1.7
В	3.0	D	1.0
B-	2.7	F	0

- (a) Compute your semester GPA.
- (b) If your previous GPA based on 76 credits was 3.012, what is your current overall GPA?

## Solution.

(a) We have...

$$\begin{split} \text{Semester GPA} &= \frac{\sum w_i x_i}{\sum w_i} \\ &= \frac{3 \cdot 2.3 + 4 \cdot 3.3 + 3 \cdot 2.7 + 3 \cdot 3.7 + 3 \cdot 4.0}{3 + 4 + 3 + 3 + 3} \\ &= \frac{6.9 + 13.2 + 8.1 + 11.1 + 12}{16} \\ &= \frac{51.3}{16} \\ &\approx 3.206 \end{split}$$

(b) We have...

$$\begin{aligned} \text{Overall GPA} &= \frac{\text{Previous Credits} \cdot \text{Previous GPA} + \text{Semester Credits} \cdot \text{Semester GPA}}{\text{Overall Credits}} \\ &= \frac{76 \cdot 3.012 + 16 \cdot 3.206}{76 + 16} \\ &= \frac{228.912 + 51.296}{92} \\ &= \frac{280.208}{92} \\ &\approx 3.046 \end{aligned}$$