

- Question 1

4 points

How Did I Do?

Jenna is using her car for work and created a model for the cost, per mile, of driving her car. It is given by the equation:

$$J = \frac{g}{22} + 0.0536$$

where $J =$ Cost, per mile, of driving Jenna's car (in dollars)

g = Cost of gas (dollars/gallon).

Make sure that you fill in each answer area before checking "How Did I Do?".

a. If the cost of gas is \$3.90 per gallon, what is the cost, per mile, of driving Jenna's car?

Round to the nearest cent (2 decimal places).

\$	Number	per mile
1	10	10
2	20	20
3	30	30
4	40	40
5	50	50
6	60	60
7	70	70
8	80	80
9	90	90
10	100	100

b. Is g a variable? Explain your reasoning.

c. What other variables (in addition to cost of gas) could have been included for this context?

A screenshot of a rich text editor interface. The top toolbar contains icons for undo, redo, copy, paste, search, and various text alignment and formatting options. Below the toolbar, there are buttons for text color, background color, and font style (bold, italic, underline, strikethrough, subscript, superscript). To the right of these buttons are dropdown menus for 'Styles', 'Font', and 'Size'. The main text area is empty. In the bottom right corner, it says 'Words: 0'.

d. Choose one of the variables you listed in part (c) above. Describe one way to measure that variable.

A screenshot of a rich text editor interface, identical to the one above. It features a toolbar with various editing icons, a row of text formatting buttons (color, background color, bold, italic, underline, strikethrough, subscript, superscript), and dropdown menus for 'Styles', 'Font', and 'Size'. The main text area is empty. In the bottom right corner, it says 'Words: 0'.

- Question 2

9 points

How Did I Do?

In baseball statistics, slugging percentage (abbreviated SLG) is a popular measure of the power of a batter. It is calculated as total bases earned divided by at-bats:

$$SLG = \frac{S + 2 \cdot D + 3 \cdot T + 4 \cdot HR}{AB}$$

where AB is the number of at-bats for a given player, and S , D , T , and HR are the number of singles, doubles, triples, and home runs, respectively. (Walks are specifically excluded from this model and do not count as at-bats.)

Make sure that you fill in each answer area before checking "How Did I Do?".

- a. What are the units for slugging percentage?

- b. The table below shows statistics for the baseball player David Ortiz.[†] Fill in Ortiz's SLG for each year.

Round your answers to three decimal places.

Year	AB	S	D	T	HR	SLG
2011	525	92	40	1	29	Number

Submit Assignment

Quit & Save

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- Question 3

25 points

How Did I Do?

In class, we used BMI to determine whether athletes were obese. The BMI calculation is based on the relationship between weight and height. There are other formulas that try to account for additional variables when estimating body fat. Deurenberg and Weststrate[†] developed the following formula for estimating body fat percentages:

$$\text{Men's Adult Body Fat Percentage} = 1.2 * \text{BMI} + 0.23 * \text{Age} - 16.2$$

$$\text{Women's Adult Body Fat Percentage} = 1.2 * \text{BMI} + 0.23 * \text{Age} - 5.4$$

The table below provides the names and ages (at the time their height and weight were measured) of the athletes you classified in class.

Make sure that you fill in each answer area before checking "How Did I Do?"

- a. Fill in the BMI and BMI classifications from Questions 6 and 7 in class.

Round your answer for the BMI to one decimal place.

- b. Use Deurenberg and Weststrate's formula to estimate each athlete's body fat percentage at the age given. Enter your answers in the "Estimated Body Fat Percentage" column.

Round your answer to two decimal places.

- c. The American Council on Exercise uses the following classification system based on Body Fat Percentage:[‡]

Description	Women	Men
Essential Fat	10 – 13%	2 – 5%
Athletes	14 – 20%	6 – 13%
Fitness	21 – 24%	14 – 17%
Average	25 – 31%	18 – 24%
Obese	32%+	25%+

Find the athletes' classifications based on their estimated body fat percentage and enter the information in the "BF% Classification" column of the table above. (Note: Use the middle column for Ronda Rousey, Jasmine James,

c. The American Council on Exercise uses the following classification system based on Body Fat Percentage:[‡]

Description	Women	Men
Essential Fat	10 – 13%	2 – 5%
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Fitness	21 – 24%	14 – 17%
Average	25 – 31%	18 – 24%
Obese	32%+	25%+

Find the athletes' classifications based on their estimated body fat percentage and enter the information in the "BF% Classification" column of the table above. (Note: Use the middle column for Ronda Rousey, Jasmine James, and Maria Sharapova. Use the third column for Rory McIlroy, David Ortiz, and Shaquille O'Neal.)

d. Compare the classification based on BMI for Jasmine James to the classification based on body fat percentage. Do the classifications match? Why might this be the case?

Equation Editor

Styles

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Words: 0

Athlete	Age	BMI	BMI Classification	Estimated Body	BF% Classification
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Submit Assignment

Quit & Save

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Athlete	Age	BMI (from Question 6) Round to 1 decimal place.	BMI Classification (from Question 7)	Estimated Body Fat Percentage (BF%) Round to 2 decimal places.	BF% Classification
Rory McIlroy	27	Number	(Click for List)	Number %	(Click for List)
Ronda Rousey	29	Number	(Click for List)	Number %	(Click for List)
David Ortiz	40	Number	(Click for List)	Number %	(Click for List)
Jasmine James	25	Number	(Click for List)	Number %	(Click for List)
Shaquille O'Neal	36	Number	(Click for List)	Number %	(Click for List)
Maria Sharapova	29	Number	(Click for List)	Number %	(Click for List)

[†]<http://www.halls.md/bmi/fat.htm>, accessed April 7, 2017

*<http://www.acefitness.org/blog/112/what-are-the-guidelines-for-percentage-of-body-fat/>, accessed April 23, 2017

Question 4

1 point

Do you think that BMI is a reasonable estimate of body fat composition? Why or why not?

Does BMI help classify people as “overweight?” Is it useful for classifying all kinds of people, at all weight levels?

What good does using the BMI formula do? What harm does using the BMI formula do?

- Question 4

1 point

Do you think that BMI is a reasonable estimate of body fat composition? Why or why not?

Does BMI help classify people as "overweight?" Is it useful for classifying all kinds of people, at all weight levels?

What good does using the BMI formula do? What harm does using the BMI formula do?

- Question 5

3 points

How Did I Do?

Recall Deurenberg and Weststrate's formula for estimating body fat percentages:

$$\text{Men's Adult Body Fat Percentage} = 1.2 * \text{BMI} + 0.23 * \text{Age} - 16.2$$

$$\text{Women's Adult Body Fat Percentage} = 1.2 * \text{BMI} + 0.23 * \text{Age} - 5.4$$

Using these formulas, consider how the two different mathematical models work in the following scenarios.

Make sure that you fill in each answer area before checking "How Did I Do?".

- a. If Pedro keeps his BMI constant over time, what will happen to his estimated body fat percentage as he ages?

Question 5

3 points

How Did I Do?

Recall Deurenberg and Weststrate's formula for estimating body fat percentages:

$$\text{Men's Adult Body Fat Percentage} = 1.2 * \text{BMI} + 0.23 * \text{Age} - 16.2$$

$$\text{Women's Adult Body Fat Percentage} = 1.2 * \text{BMI} + 0.23 * \text{Age} - 5.4$$

Using these formulas, consider how the two different mathematical models work in the following scenarios.

Make sure that you fill in each answer area before checking "How Did I Do?"

- a. If Pedro keeps his BMI constant over time, what will happen to his estimated body fat percentage as he ages?
- ☐ The body fat percentage will increase.
 - ☐ The body fat percentage will decrease.
 - ☐ The body fat percentage will stay the same.
- b. Aimee and Christopher are twin sister and brother, respectively. If they have the same height and weight, who will have a greater estimated body fat percentage?
- ☐ Aimee.
 - ☐ Christopher.
 - ☐ They will have the same body fat percentage.
- c. This year, Nisheidi increased her BMI by 1 from last year. She also got one year older. Which increase, age or BMI, will have a greater impact on her estimated body fat percentage?
- ☐ Increased age by 1 year.
 - ☐ Increased BMI by 1 point.
 - ☐ They would have the same impact.

- Question 6

5 points

How Did I Do?

Many pediatric dosages of drugs are determined by using the child's body surface area. The Mosteller formula is often used for this purpose. To determine a child's body surface area (in square meters), the child's height (in inches) and weight (in pounds) are multiplied together; this number is divided by 3131 and then a square root is taken of the result. Thus

$$A = \sqrt{\frac{h \cdot w}{3131}}$$

where:

A = the child's body surface area (in square meters)

h = the child's height (in inches)

w = the child's weight (in pounds)

Make sure that you fill in each answer area before checking "How Did I Do?".

- a. Use this formula to find the surface area of a child who is 4 feet tall and weighs 73 pounds.

Note: You will need to first convert the height into inches.

Round to the nearest hundredth of a square meter (2 decimal places).

  m²

- b. To get the dosage of an allergy medicine for a child, the following formula is used:

$$D = \frac{25 \cdot A}{1.73} \text{ mg}$$

where A is the body surface area, in square meters. Use your answer from part a to calculate the dosage of this allergy medicine for this child.

Round to the nearest tenth of a milligram (1 decimal place).

  mg

- c. One practitioner forgot to convert the feet to inches and used "4" for the height in the equation for the child's body surface area. What surface area did this practitioner calculate?

Round to the nearest hundredth of a square meter (2 decimal places).

- c. One practitioner forgot to convert the feet to inches and used "4" for the height in the equation for the child's body surface area. What surface area did this practitioner calculate?

Round to the nearest hundredth of a square meter (2 decimal places).

  m²

- d. What was the resulting dose from making this error?

Round to the nearest tenth of a milligram (1 decimal place).

  mg

- e. What do you think would be the result of the miscalculated prescription?

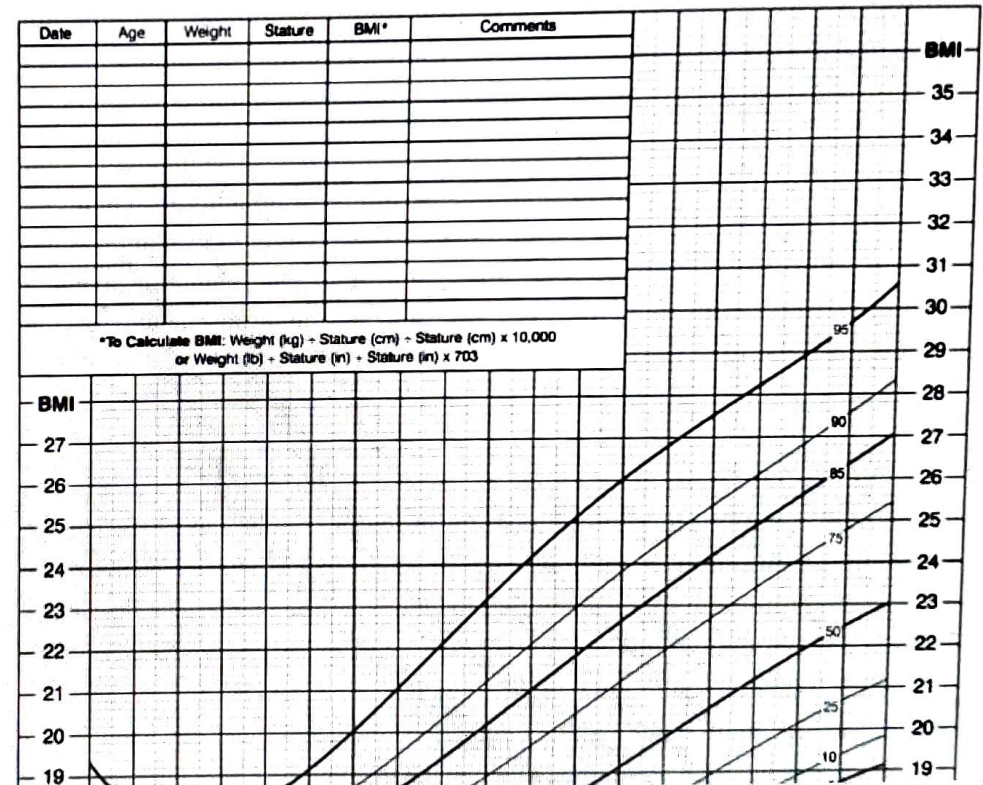
                                     

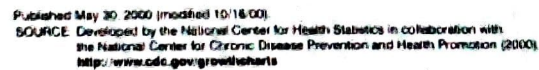
How Did I Do?

Look at the chart, and make sure you understand how it was used to determine that Enrique falls in the 75th percentile, given his age and BMI.

NAME _____
RECORD # _____



RECORD # _____



Quit & Save

Make sure that you fill in each answer area before checking "How Did I Do?".

a. Alex is a 15-year-old boy who weighs 120 pounds and measures 4 feet 11 inches tall. Calculate Alex's BMI using the formula from the in-class lesson

Then use the chart above to determine his percentile rank.

b. Joshua is 16 years old and falls into the 25th percentile. What is his approximate BMI?

c. A boy is tracked from age 6 until age 15 using this BMI-For-Age growth chart. Suppose that throughout this entire time, he has always been in the 85th percentile rank. What happens to his BMI as he ages from 6 to 15?

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- d. A boy is tracked from age 6 until age 15 using this BMI-For-Age growth chart. Suppose that throughout this entire time, his BMI has stayed at 17 kg/m^2 . What happens to his percentile rank as he ages from 6 to 15?

The screenshot displays the Microsoft Word interface with the Equation Editor ribbon selected. The ribbon contains various icons for equation-related functions, including undo, redo, copy, paste, and search. The Equation Editor section shows options for font style (A, A, I, x), font face (B, I, U, S, x2, x^2), and font size (Size). The status bar at the bottom right indicates 'Words: 0'.