

# Test 3-1 REVIEW Analyzing Numerical Data

## Weighted Averages

Name: \_\_\_\_\_



When a weighted average is applied to a set of numbers, more importance (weight) is placed on some components of the set. Your final average in this class I probably an example of a weighted average.

Consider two grading systems

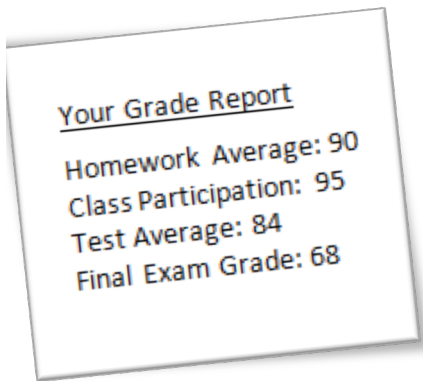


Mr. Tats Grade Weighting	
Homework Average	25%
Class Participation	10%
Test Average	40%
Final Exam Grade	25%

Mrs. Etercsid Grade Weighting	
Homework Average	15%
Class Participation	10%
Test Average	60%
Final Exam Grade	15%



1. If you had the following grade shown below, determine what your grade would be with each teacher.

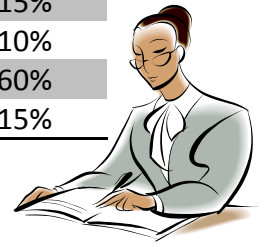


2. Use the following information to find your course average in Mr. Tats class:
  - Homework {83, 92, 95, 90}
  - Class Participation {90, 100}
  - Test Grades {90, 78, 84, 88}
  - Final Exam Grade {84}
3. If Mr. Tats allowed you to retake your final exam, what score would you have to get on the final exam to make at least a 90% in the class?



Mr. Tats Grade Weighting	
Homework Average	25%
Class Participation	10%
Test Average	40%
Final Exam Grade	25%

Mrs. Etercsid Grade Weighting	
Homework Average	15%
Class Participation	10%
Test Average	60%
Final Exam Grade	15%



4. The following shows a student's grade in Ms. Etercsid's class. Determine the minimum grade need on the final exam to make at least a 70% in the class.
- Homework {70, 82, 64}
  - Class Participation {70, 80}
  - Test Grades {60, 68, 62, 74}
  - Final Exam Grade {??}

### Other weighted averages

5. A new cars salesperson, sold an average of \$28,000 per day for the first 5 days she worked. The next 3 days she worked, she sold an average of \$42,000. How much did she sell on average per day over the entire 8 days?



6. Kelly works two jobs. She usually works at a retail store for 7 hours during the day and is paid \$12 per hour by the store. In the evening she works at a restaurant as a manager for 5 hours and is paid \$20 per hour. How much does she make on average per hour for the day?



7. James worked for 12 consecutive days, earning an average wage of \$160 per day as a contractor. During the first 6 days, James averaged \$140 per day and his average wage for the next 5 days was \$175. How much did he earn on the last day?



## Slugging Percentage

In baseball there are many common statistics used batting average and slugging percentage. Batting average is just simply the percentage of the number of "at bats" for which the player gets a hit. If a player has 20 hits in 50 at bats then their batting average would be,  $\frac{20}{50} = 0.400$ . Their slugging percentage however, weights the type of hit where doubles count double, triples count triple, and homeruns count quadruple and would be given by the formula:



$$\text{Slugging Percentage} = \frac{(\text{singles}) + 2 \cdot (\text{doubles}) + 3 \cdot (\text{triples}) + 4 \cdot (\text{home runs})}{(\text{at bats})}$$

8. Calculate Freddie's Slugging Percentage if he has 42 singles, 12 doubles, 4 triples, and 14 home runs in 230 at bats.



9. Can you use the above information to determine Freddie's current batting average?

10. If Andrelton has a slugging percentage of 0.450 and has 12 doubles, 3 triples, and 8 homeruns in 200 at bats then how many singles must he have?

11. Can you determine Andrelton's current batting average?

## Quarterback Ratings

The National Football League (NFL) rates quarterbacks for statistical purposes against a fixed performance standard based on the statistical achievements of all qualified pro passers since 1960. This system allows passing performances to be compared from one season to the next. The following categories are used to compute the quarterback rating:

- percent of completions per attempt (**%COMP**)
- percent of touchdown passes per attempt (**%TD**)
- percent of interceptions per attempt (**%INT**)
- average yards gained per attempt (**YD**)

(From [www.nfl.com/help/quarterbackratingformula](http://www.nfl.com/help/quarterbackratingformula))

The following is the formula for compiling the quarterback rating (**QR**):

$$QR = \frac{25 + 10(\%COMP) + 40(\%TD) - 50(\%INT) + 50(YD)}{12}$$

12. As of 2015, Cam Newton has one of the highest career quarterback ratings in the NFL. He completed 296 passes in 495 attempts for a total of 3837 yards, with 35 touchdowns and 10 interceptions. Find Newton's 2015 quarterback rating.



13. New Dallas Cowboy quarterback Dak Prescott has made a tremendous difference for the team in the 2016 season. He has completed 231 passes in 340 attempts for a total of 2835 yards, with 18 touchdowns and 2 interceptions. Find Prescott's 2016 quarterback rating.



## Fan Cost Index

14. The Fan Cost Index™ (FCI) comprises the prices of four (4) average-price tickets, two (2) other drinks, four (4) small soft drinks, four (4) regular-size hot dogs, parking for one (1) car, two (2) game programs and two (2) least-expensive, adult-size adjustable caps. The Average Ticket Price in the following table represents the average cost of a ticket for each member of the family.

**2015/2016 Fan Cost Index**

Team	Avg. Ticket Price	Soft Drink (size in oz)	Other Drink	Hot Dog	Parking	Program	Cap	FCI
New York Knicks	129.38	5.50 (24oz)	10.50	6.50	30.00	6.00	23.95	
Los Angeles Lakers	103.27	5.25 (21 oz)	8.50	5.75	25.00	5.00	18.00	
Cleveland Cavaliers	48.12	3.00 (16 oz)	4.00	3.00	10.00	-----	20.00	
Miami Heat	76.73	5.00 (24 oz)	8.50	7.00	35.00	10.00	18.00	
San Antonio Spurs	54.88	2.50 (16 oz)	5.50	5.00	5.00	-----	30.00	
Dallas Mavericks	49.76	3.00 (16 oz)	5.00	3.50	10.00	5.00	12.99	

Complete the 2015 table by calculating the missing FCI values.

15. Find a personal cost index (PCI) in which you select only the items and the number of those items that you and three friends would buy (for example, 4 tickets, 8 hot dogs, no soft drinks, no caps).

## Credit Cards

A **check digit** is used to help validate credit card numbers. The credit card companies use the Codabar method to determine the check digit. This method consists of the following steps:

- Add the digits in the odd-numbered positions and double this total.
- Add the number of odd-position digits that are more than 4 to the total.
- Add the even-position digits.
- Choose a check digit that makes this calculation total a number whose final digit is 0.

Libraries, shipping/receiving companies, and blood banks also use the Codabar method.

16. What is the check digit (**d**) for the VISA card number 4364 2813 2705 018**d**?



1234 5678 9012 1314  
Mill Issuer Account Check  
Identifier Number Digit

17. Given the check digit is 3, find the missing number **X** for the Mater card number 5164 2**X**13 2705 0183?

18. **Show** that 4128 0018 4389 0117 is an invalid VISA credit card number. What would be the check digit?

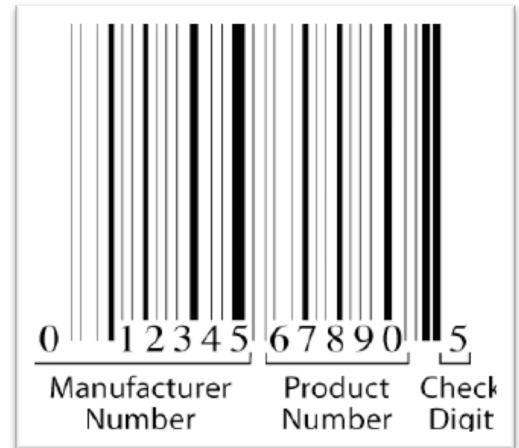
## Universal Product Codes (UPCs), typically in the form of barcodes

Universal Product Codes (UPCs), typically in the form of barcodes, identify retail products.

The 12-digit UPC barcode consists of three parts:

- manufacturer number,
- product number, and
- check digit.

For example, the manufacturer number for the Dr. Pepper Company is 078000 and appears in the first six digits of all of the company's product UPC barcodes. GS1, formerly the Uniform Code Council, issues a company this six-digit number. Every item sold by a company requires a different five-digit product number. This includes specific products, their different sizes, their array of colors, their variety of flavors, and other distinguishing features. The last number is the check digit, which guards against entry errors and fraud. The check digit in a UPC number (that is, the twelfth digit) is determined in the following manner:



- Multiply the first digit by 3.
- Add the second digit.
- Multiply the third digit by 3.
- Add the fourth digit.
- Continue this alternating process for the Digits 5 to 12.

The check digit is chosen so that the calculation described previously totals a number whose final digit is 0. In the UPC number  $a_1a_2a_3a_4a_5a_6a_7a_8a_9a_{10}a_{11}d$ , the check digit is  $d$ , for which the sum

$$3a_1 + a_2 + 3a_3 + a_4 + 3a_5 + a_6 + 3a_7 + a_8 + 3a_9 + a_{10} + 3a_{11} + d$$

ends in 0. In this weighted sum, the weights are: {3, 1, 3, 1, 3, 1, 3, 1, 3, 1, 3, 1}.

When entering a code number, the single-digit error is most common (for example, keying in 8 instead of 3). Another common error is the transposition error, where the order of two adjacent digits is reversed (for example, writing 83 instead of 38). Systems have been established to detect and correct (when possible) these and other errors almost immediately.

In Exercises 15 - 16, the UPC numbers of various products were written down.  
Determine if they were copied correctly using the UPC check system.

19. Vicks Cherry Cough Drops: 3 23900 00127 5	20. Apple iPod™ case: 8 07360 04150 3 13
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21. Use the UPC in Problem 15 to show what happens to the check procedure if you reverse two adjacent digits.