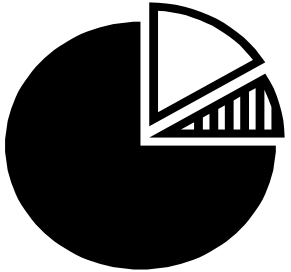
Teaching Percentages Across the Curriculum



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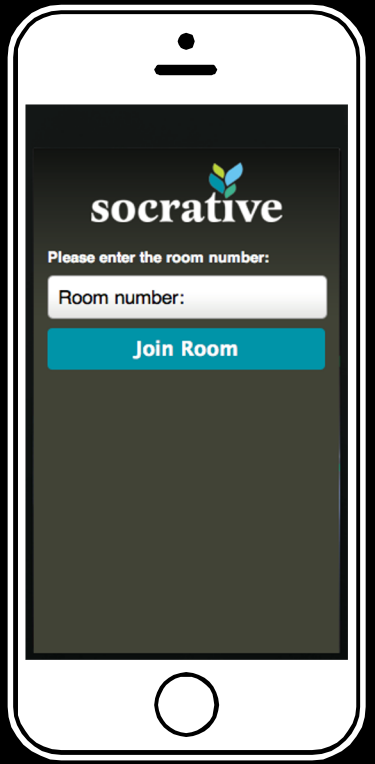
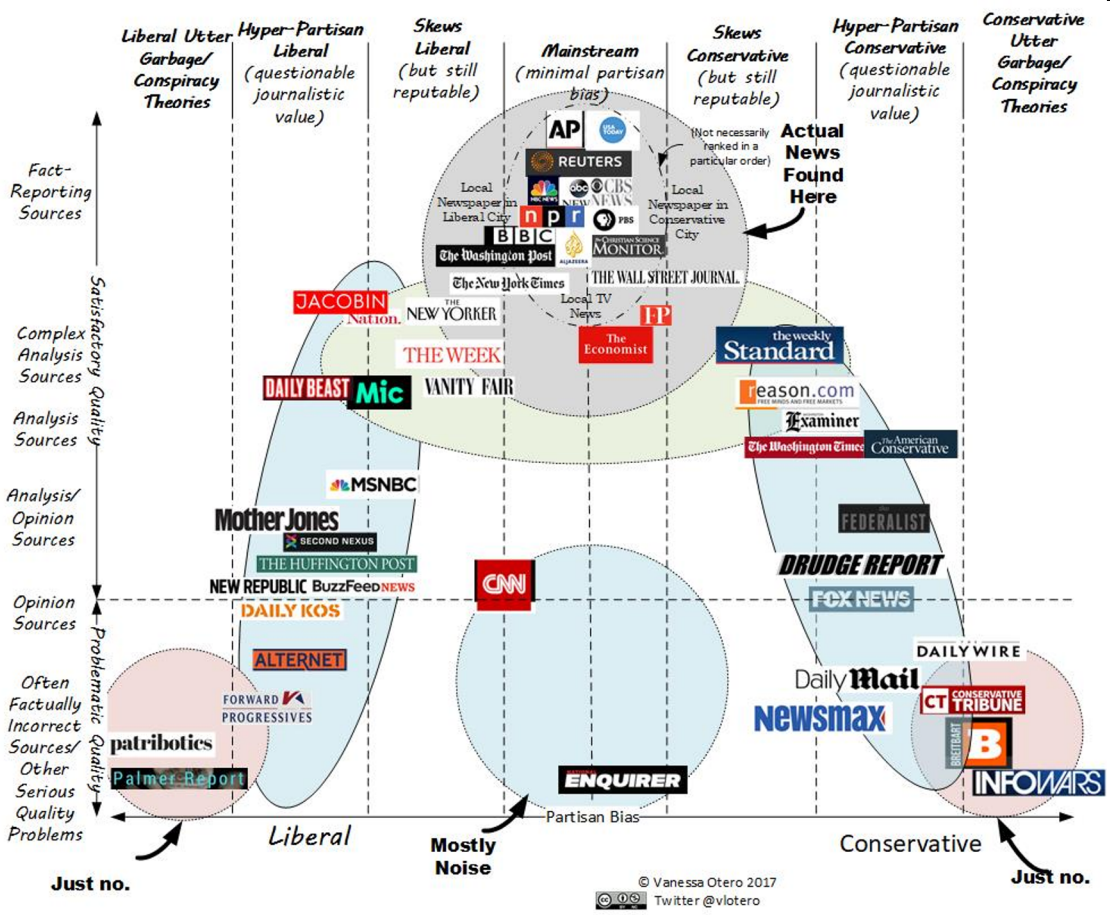
Mathematics Department
TLC Day, April 6, 2018

Icebreaker Using Socrative

- Download and open the free Socrative Student mobile app or go to www.socrative.com on your internet browser.
- Choose the student login option, which will ironically require no login at all.
- Enter this room name: MATHPROFJEFF
- Then follow the instructions.




Liberal Utter Garbage/ Conspiracy Theories
Hyper-Partisan Liberal (questionable journalistic value)
Skews Liberal (but still reputable)
Mainstream (minimal partisan bias)
Skews Conservative (but still reputable)
Hyper-Partisan Conservative (questionable journalistic value)
Conservative Utter Garbage/ Conspiracy Theories
Fact-Reporting Sources
Complex Analysis Sources
Analysis Sources
Analysis/ Opinion Sources
Opinion Sources
Often Factually Incorrect Sources/ Other Serious Quality Problems
Satisfactory Quality
Problematic Quality
(Not necessarily ranked in a particular order)
Actual News Found Here
Local Newspaper in Liberal City
Local Newspaper in Conservative City
Local TV News
AP
REUTERS
NBC NEWS
abc
CBS NEWS
npr
PBS
BBC
The Washington Post
Christian Science Monitor
AL JAZEERA
The New York Times
THE WALL STREET JOURNAL.
JACOBIN
The Nation.
THE NEW YORKER
The Economist
IP
THE WEEK
VANITY FAIR
DAILY BEAST
Mic
the weekly Standard
reason.com
FREE MINDS AND FREE MARKETS
Examiner
The Washington Times
The American Conservative
MSNBC
Mother Jones
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DRUDGE REPORT
FOX NEWS
DAILY WIRE
Daily Mail
Newsmax
CT CONSERVATIVE TRIBUNE
BREITBART
B
INFOWARS
Partisan Bias
Liberal
Mostly Noise
Conservative
Just no.
Just no.
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1.

INTRODUCTION

PERCENTAGES ACROSS THE CURRICULUM

In 2009 the Assessment Committee's Quantitative Reasoning report recommended more emphasis on teaching percentages.

In this seminar we will discuss various ways to do this. We will use Socrative during the seminar as an alternative to clickers, which will require you to answer questions with your smartphone.

2.

A BIG PROBLEM

INNUMERACY

- Innumeracy, the mathematical analogue of illiteracy, is a term used to refer to a growing trend in the inability of people to understand numbers, statistics, and probabilities.

- Numbers are essential to understanding the world, and ignorance, or even an anti-intellectual stance against understanding how they work, can lead to significant consequences personally and for society as a whole.

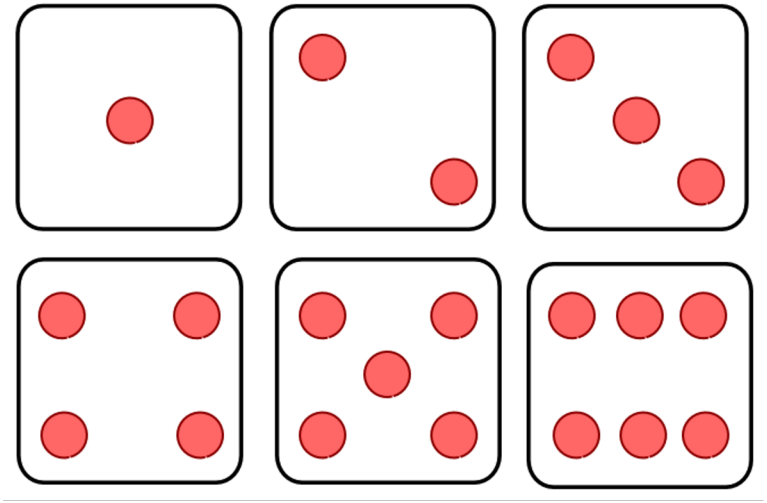
EXAMPLE

PROBABILITIES & THE 2016 ELECTION

One recent example of the general public not understanding percentages involves probability and the 2016 election. Statistician Nate Silver posted on his blog that Hillary Clinton had at least a 65% chance of winning. When she lost, many people said Nate Silver was wrong.

Yet this is an incorrect way of understanding the situation. A 65% chance of success is like rolling a single 6-sided die and needing to get 1 through 4. It's possible to get 5 or 6, yet a bit less likely than 1 through 4. Nate Silver was not wrong, but rather the 2016 election was simply like rolling a 5 or 6 on the die.

Possible outcomes when rolling a fair 6-sided die



3.

AN IMPERATIVE NEED

QUANTITATIVE REASONING

- Quantitative reasoning (QR) may be defined as “the application of basic mathematics skills to the analysis and interpretation of real-world quantitative information in the context of a discipline or an interdisciplinary problem to draw conclusions that are relevant to students in their daily lives.”

- The term numeracy is also used in conjunction with these skills.

- Numeracy is generally defined as an understanding of, and ability to do basic number manipulations: addition, subtraction, multiplication, division, fractions, decimals and **percents.**

4.

2009 QR ASSESSMENT

PERCENTAGES

Across the college, in a range of disciplines, there are courses and syllabi that use points systems to award grades to assignment and calculate a student's final grade. These courses only require students to use simple addition skills to calculate their grades. Courses and syllabi that use percentages for assignments and weighted percentages to calculate final grades are more complex and would require students to become more familiar and hopefully practice understanding and using percentages – the weakest skill identified in this assessment.

5.

INTERACTIVE ACTIVITY

USING SOCRATIVE

EXAMPLE 1

FIGURE OUT YOUR GRADE!

Your course grade is to be determined from the following table:

ITEM	WEIGHT
Tests	50%
Homework	20%
Labs	20%
Quizzes	10%

If your final grade is calculated according to the following percentage scale:

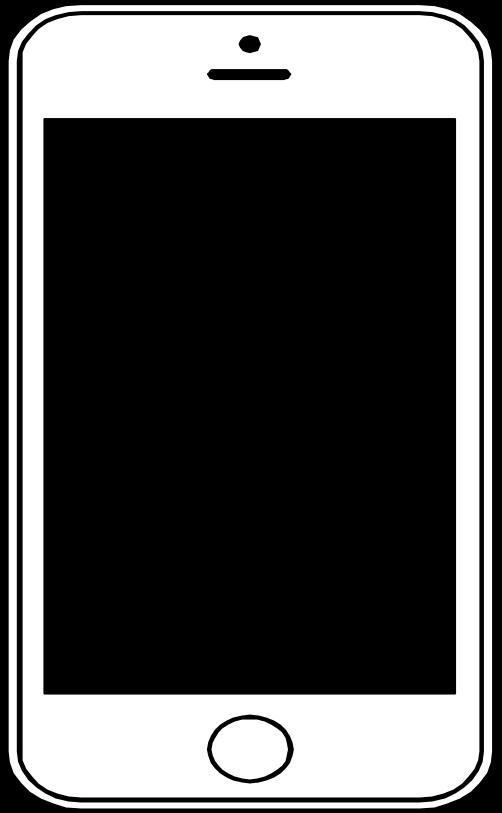
GRADE	RANGE
A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	0-59%

Assuming you have earned the following points so far:

ITEM	POINTS EARNED OUT OF MAXIMUM POSSIBLE
Tests	95 out of 100 possible
Homework	45 out of 50 possible
Labs	30 out of 50 possible
Quizzes	70 out of 100 possible

What is your current percentage grade?

Answer using Socrative



Correct Answer:

The current percentage grade is 84.5%.

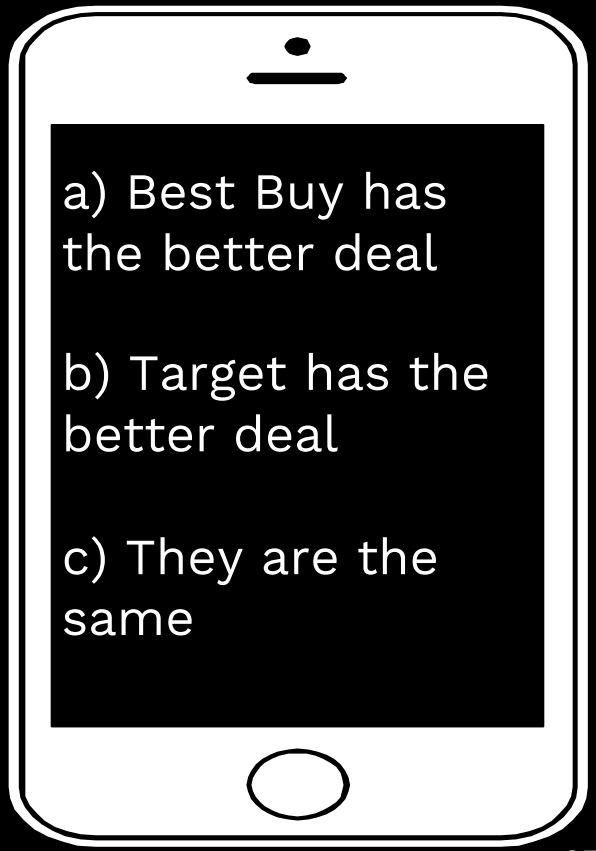
EXAMPLE 2

PERCENTAGES IN OUR DAILY LIVES

Suppose it’s Black Friday tomorrow and Best Buy is advertising a flat screen TV on sale for 40% off the regular price of $499.99, and it will be further reduced by 15% off of that sale price if you make it there by 7am!
Target is selling the same TV set throughout the day tomorrow at 50% off the same original price.

Which of the following do you think is the accurate statement?

Answer using Socrative



Correct Answer:

b) Target has the better deal.

EXAMPLE 3

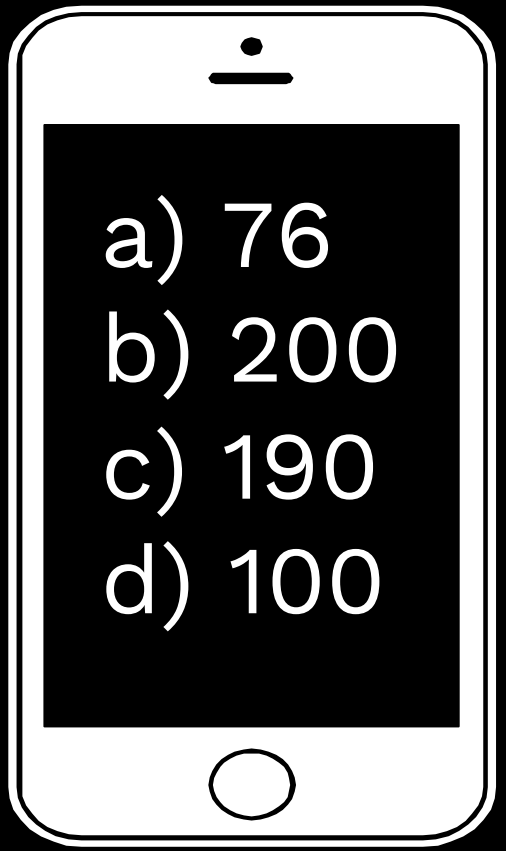
INTERPRET AND DRAW INFERENCES FROM A TABLE

Study the table below and answer the following 3 questions.

Table 5. Reasons for Retirement by Age at Retirement			
	Age at Retirement		
Reason for retirement	Under 62	Between 62-64	65 or older
Age	10.5	21.6	64.6
Ready to retire	10.5	50	14.6
Health problems	26.3	11.9	8.3
Plant closed	10.5	1.5	-
Benefits	10.5	3	-
Make way for younger workers	2.6	1.5	6.0
Bad work conditions/industry uncertainty	5.3	4.5	-
Family concerns	7.9	-	2.9
Enjoy life	7.9	1.5	2.1
Other	7.9	4.5	2.1
	100%	100%	100%
n =	76	66	48

What is the total number of surveyed retirees on which Table 5 is based?

Answer using Socrative

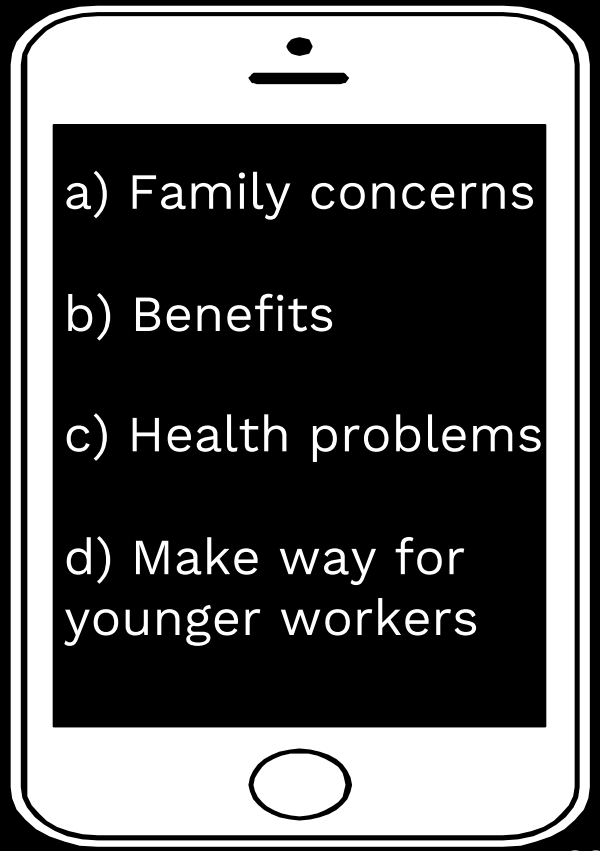


Correct Answer:

c) 190

For the surveyed retirees under age 62 from Table 5, what was the least mentioned reason for retirement?

Answer using Socrative

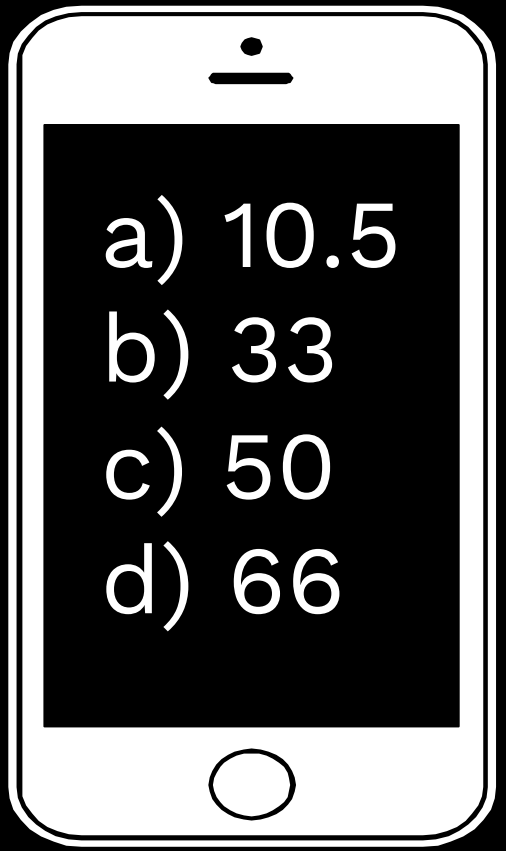


Correct Answer:

d) Make way for younger workers

How many of the surveyed retirees who were between 62 and 64 reported that their reason for retirement was that they were “Ready to retire”?

Answer using Socrative



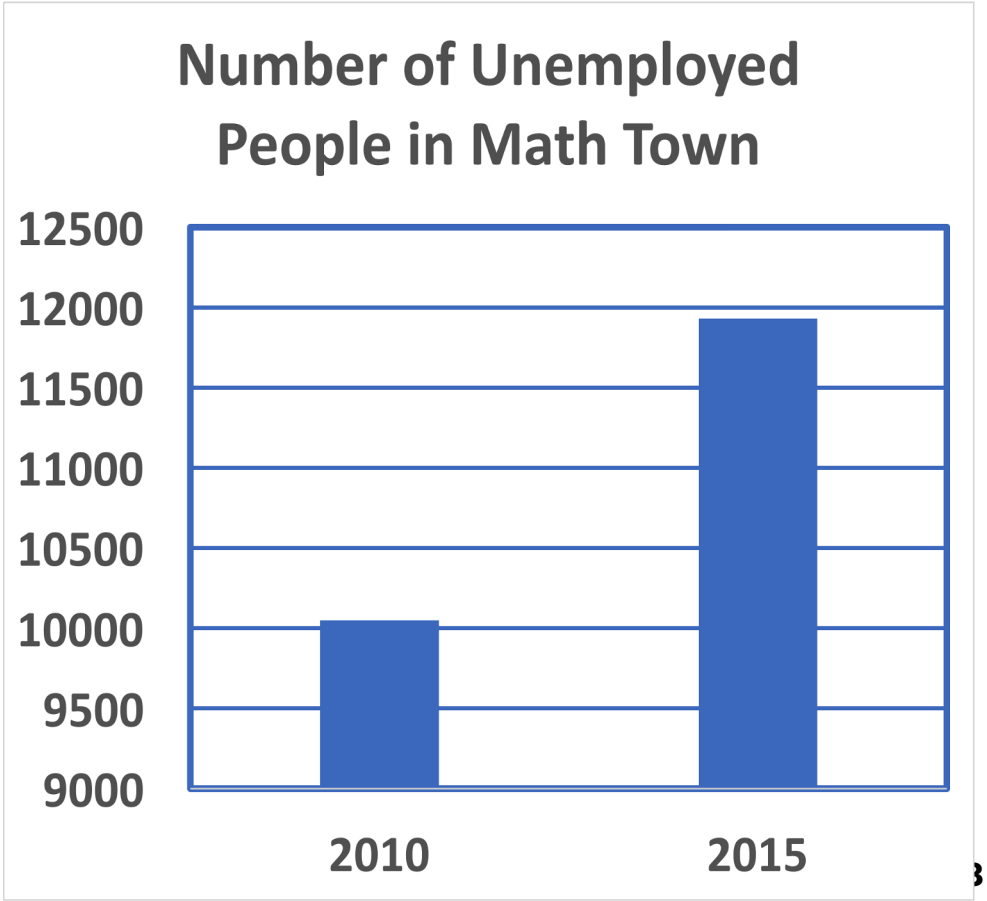
Correct Answer:

b) 33

EXAMPLE 4

INTERPRET AND DRAW INFERENCES FROM A GRAPH

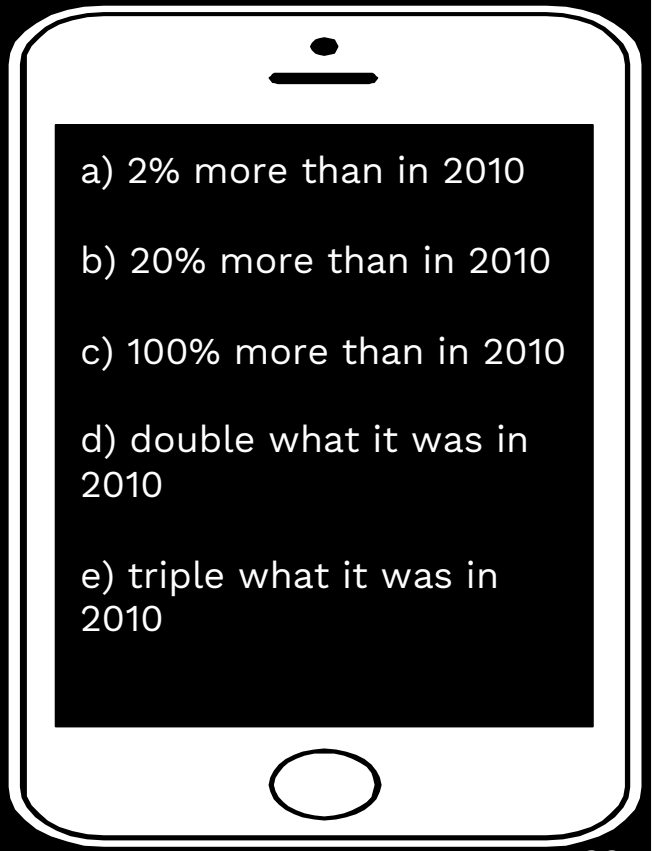
Consider the graph on the left



Which of the following is the best approximation of comparing the 2010 and 2015 data?

The number of unemployed in 2015 was

Answer using Socrative



Correct Answer:

b)The number of unemployed in 2015 was 20% more than in 2010.

DISCUSSION

Q&A

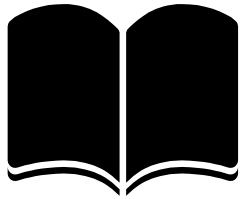
6.

CONCLUDING REMARKS

- This was a conversation for the whole college and puts basic math skills into every classroom, regardless of discipline or subject.

- In particular, a wider emphasis on percentages across the curriculum would be desired, especially since students will likely find them as part of the grading schemes of all classes.

REFERENCES



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