

🔑🔑🔑 Key Math

- There are 2 basic types of percent questions; ‘comparison-percent’ and ‘self-percent’

Comparison-percent question –example;

Answer the question based on the table below regarding summonses issued by squad;

	July	August	September
B1	105	120	115
B2	75	85	95
B3	95	110	105

1. According to the table, which squad has the highest percent increase in summonses issued?
A) B1 from July to August
B) B1 from August to September
C) B2 from July to August
D) B3 from July to August

The 3 step KEY formula for ‘comparison-percent’ questions is “Difference \div Old”

- I. Get the difference between the two numbers.
- II. Using a calculator, divide the difference by the older number.
- III. Move the decimal point 2 places to the right and add a percent sign (%).

$$\frac{\text{Difference}}{\text{Old}}$$

Use the 3 steps of the KEY Formula on each of the four choices

Choice A:

- I. The difference between 105 and 120 is 15
- II. 15 divided by 105 is .1428
- III. .1428 becomes 14.28%

Choice B:

Eliminate this choice. It is a DECREASE.

Choice C:

- I. The difference between 75 and 85 is 10
- II. 10 divided by 75 is .1333
- III. .1333 becomes 13.33%

Choice D:

- IV. The difference between 95 and 110 is 15
- V. 15 divided by 95 is .1578
- VI. .1578 becomes 15.78%

Now it's a simple matter of comparing the 3 answers to see which is highest;
A = 14.28,
B = X,
C = 13.33,
D = 15.78

Clearly, D is the answer

Self-percent question –example:

Answer the question based on the table below regarding robberies for the month;

Robberies in August, 2014	
Gunpoint Robberies	3
Strong-arm Robberies	9
Total Robberies	12

2. According to the table above, what percent of robberies were at gunpoint?
- A) .75%
 - B) .25%
 - C) 40%
 - D) 25%

The 2 step KEY formula for ‘self-percent’ questions is “Target ÷ Total”

$$\frac{\text{Target}}{\text{Total}}$$

- I. Using a calculator, divide the target number by the total number.
- II. Move the decimal point 2 places to the right and add a percent sign (%).

(The Target # is the one the question asks about, in this case, ‘Gunpoint’ Robberies = 3. The Total # is the total in the overall category, in this case, Total Robberies = 12)

Work out the numbers in the table in accordance with the formula;

- I. Gunpoint robberies is the smaller # so divide 3 by the bigger number, 12 and you get .25
- II. Move the decimal two places to the right and add the percent sign and you get 25%

The answer is D)

–watch out for some of the earlier choices (“B” in this case) to give you the result of your calculations (.25) before you move the decimal -don’t fall for it!!

Now here are some examples of how Math was asked on recent Sgt tests;

1. As a newly promoted sergeant, you have been asked to assist in preparing for an upcoming Compstat meeting. Your lieutenant has asked you to ascertain which of the four major crime complaints found in the grid below have the highest percent increase for this month (28 day period) compared to this same month from last year.

- A) Felony Assault
 B) Burglary
 C) Gr. Larceny
 D) G.L.A.

	Week to Date			28 Day		
	2019	2018	% change	2019	2018	% change
Felony Assault	8	9		31	37	
Burglary	18	24		78	86	
Grand Larceny	22	22		102	80	
G.L.A.	24	18		74	62	

Practice!! Fill in all the blank boxes above by calculating the % changes. Remember to use a “+” or “-“ sign depending if it’s an increase or a decrease.

Answer

1. First thing you should have done was eliminate choices A) & B) because they are both DECREASES! The lieutenant asked you which of the four categories had the highest percent *increase*.

- Now calculate the percent increase for the remaining categories. The first step in the KEY Formula is to get the difference between the two numbers. Grand Larceny went from 80 to 102 so your difference is 22. Now, continuing with the second step in the KEY Formula, divide the difference, 22 by the old, 80 and you come up with .275 Remember, you’re NOT DONE. Move the decimal two places to the right and input the percent sign and you have your answer; 27.5%
- Your next move is to calculate the percent increase in the last category, G.L.A. The difference there is 12 (74-62). Now divide the difference, 12 by the old, 62 and you get .193 Move the decimal & input the percent sign and you arrive at 19.3% The correct answer is C).

2. There are 243 UMOS in your command and 194 of them are not Patrol Wagon qualified. What percent of UMOS in the command are Patrol Wagon qualified?

- A) 20.16%
 B) .30%
 C) 79.84%
 D) .20%

Answer

2. If this one looked easy, look again. The question asked what percent of the command IS Patrol Wagon qualified. 194 is the number of people NOT qualified. To use 194 for your calculations was a MISTAKE! The first thing you had to do was subtract 194 from 243 to get the number of people that ARE Patrol Wagon qualified. Now you have your Target #, 49 in this Self-percent question. Once you plug 49 into the formula (49 ÷ 243) you come up with .2016 but you’re still not done, according to the formula –you still must move the decimal 2 places and input the % to get 20.16%. Answer is A).