

## SAT-Like Math Questions

### Topic: Percentages

### Calculator Permitted

#### Warm up:

1.) Convert each of the following to a percentage:

0.36 = \_\_\_\_\_      2.3 = \_\_\_\_\_      12 = \_\_\_\_\_      0.00097 = \_\_\_\_\_

2.) Convert each of the following to a decimal:

14% = \_\_\_\_\_      130% = \_\_\_\_\_      .02% = \_\_\_\_\_      62% = \_\_\_\_\_

3.) Simple word problems:

What is 12% of 50? \_\_\_\_\_      What is 150% of 20? \_\_\_\_\_

16 is what percent of 80? \_\_\_\_\_      31 is 110% of what number? \_\_\_\_\_

4.) Percent increase and decrease: Use the formula  $\frac{|New-Old|}{Old} \times 100\%$

What is the percent increase from 100 to 500? \_\_\_\_\_

What is the percent increase from 25 to 30? \_\_\_\_\_

What is the percent decrease from 67 to 50? \_\_\_\_\_

What is the percent decrease from 30 to 15? \_\_\_\_\_

5.) Percent increase: multiply by  $(1 + r)$

What is 60 increased by 14%? \_\_\_\_\_

What is \$12 after a 6% sales tax is added? \_\_\_\_\_

6.) Percent decrease: multiply by  $(1 - r)$

What is \$50 after a 30% discount? \_\_\_\_\_

175 decreased by 75% is what? \_\_\_\_\_

**Easy:**

7.) A painter charges \$1700 to paint the exterior of a house. The painter must use 57% of this money to purchase supplies for the job. What is the profit that the painter makes?

- A) \$731
- B) \$969
- C) \$1643
- D) \$2669

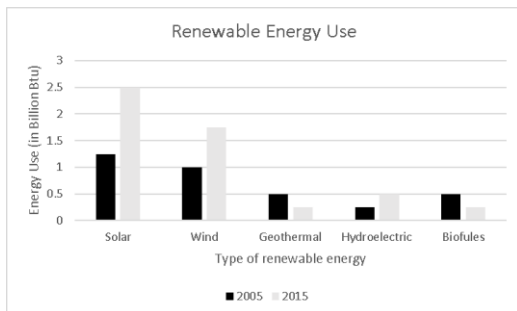
8.) At South Side Elementary school, approximately 25% of the second graders and 13% of the third graders participated in the science fair. If there are 168 second graders and 201 third graders at South Side, approximately how many second and third grade students participated in the science fair?

- A) 68
- B) 72
- C) 140
- D) 369

9.) Dalilah surveyed a random sample of students in the freshman class to determine which theme they preferred for the homecoming dance. Of the 80 students surveyed, 70% preferred “Dancing with the Stars” over the other options. Based on this information, about how many students in the entire 374-person class would be expected to prefer “Dancing with the Stars” as the theme for the homecoming dance?

- A) 56
- B) 262
- C) 300
- D) 374

Use the following chart to answer questions 10 and 11:



10.) Of the following, which best approximates the percent increase in solar power between 2005 and 2015?

- A) 50%
- B) 75%
- C) 100%
- D) 125%

11.) Of the following, which best approximates the percent decrease in the use of biofuels between 2005 and 2015?

- A) 50%
- B) 75%
- C) 100%
- D) 125%

12.) In the town of Southbury, Mrs. Olson's third grade class has 28 students. Mrs. Olson conducted a survey and found that approximately 71.4 percent of her students had at least one pet at home. If the students in Mrs. Olson's class are representative of the students in Southbury, and there are 5,832 third grade students in Southbury, which of the following best estimates the number of third graders in Southbury who have no pets at home?

- A) 1166
- B) 1668
- C) 4164
- D) 8168

**Medium:**

13.) Kathie bought a teapot at a kitchen supply store that gave a 25% discount off the original price. The total amount she paid was  $t$  dollars, including a 6% sales tax on the discounted price. Which of the following represents the original price of the teapot in terms of  $t$ ?

- A)  $0.81t$
- B)  $\frac{t}{0.81}$
- C)  $(0.75)(1.06)t$
- D)  $\frac{t}{(0.75)(1.06)}$

14.) Ryan bought a stock at the beginning of 2017 valued at  $s$  dollars. At the beginning of 2018 the stock had increased in value by 5%. Between the beginning of 2018 and the beginning of 2019, the stock increased by an additional 7%. What was the value of Ryan's stock in the beginning of 2019 in terms of  $s$ ?

A)  $s(1.05)(1.07)$

B)  $\frac{s}{(1.05)(1.07)}$

C)  $s(0.95)(0.97)$

D)  $\frac{s}{(0.05)(0.07)}$

15.) Aditi is a marine biologist studying the mating patterns of whales. According to her research, schools of beluga whales produce 25% more offspring than what schools of orca whales produce. Based on this research, if a school of beluga whales had 30 offspring, how many offspring would Aditi predict a school of orca whales of the same size would produce?

A) 22

B) 24

C) 33

D) 38

16.) At the Hillside School, the two 8<sup>th</sup> grade classes are raising young trout in their classrooms. The tank in Mr. Lucha's room has 20% more trout than the tank in Mrs. Echol's room. If there are 84 trout in Mr. Lucha's tank, how many are in Mrs. Echol's?

A) 105

B) 101

C) 70

D) 67

**Hard:**

17.) The sum of three numbers is 1133. One of the numbers,  $k$ , is 20% greater than the sum of the other two numbers. What is the value of  $k$ ?

- A) 453
- B) 515
- C) 618
- D) 906

18.) A rectangle was altered by increasing its length by 20% and decreasing its width by  $p$  percent. If these changes decreased the area of the rectangle by 40%, what is the value of  $p$ ?

- A) 10
- B) 15
- C) 25
- D) 50

19.) A city planner estimates that the population of a certain small town will increase by 5% every 10 years. If the current population of the town is 10,000, which of the following expressions represents the population  $y$  years from now?

- A)  $10000(1.05)^{\frac{y}{10}}$
- B)  $10000(.05)^{10y}$
- C)  $10000(0.95)^{\frac{y}{10}}$
- D)  $10000(1.05)^{10y}$

20.) A high school administrator is giving a civics quiz to all the juniors in her school to prepare them for an upcoming election. There are 420 juniors in the school, and she gives them the quiz over two days. On the first day, she gives the quiz to 210 juniors, and 160 of them answer the first question correctly. On the second day, she gives the quiz to the remainder of the students, and  $j$  answer the first question correctly. If more than 80% of all the juniors answered the first question correctly, which of the following inequalities best describes the possible values of  $j$ ?

- A)  $j > 0.8(420 - 160)$ , where  $j \leq 210$
- B)  $j > 0.8(420 + 160)$ , where  $j \leq 210$
- C)  $j - 160 > 0.8(420)$ , where  $j \leq 210$
- D)  $j + 160 > 0.8(420)$ , where  $j \leq 210$

**Questions 21 and 22 are based on the following:**

Cam opened a bank account that earns 2 percent interest compounded annually. His initial deposit was \$1500, and he uses the expression  $\$1500(r)^x$  to find the value of the account after  $x$  years.

21.) What is the value of  $r$  in the expression?

22.) Cam's friend John found an account that earns 3 percent interest compounded annually. John made an initial deposit of \$1500 into this account at the same time that Cam made his \$1500 initial deposit. After 4 years, how much more money will John's account have in it than Cam's account? (Round to the nearest dollar and ignore the dollar sign when gridding your answer.)

21.)

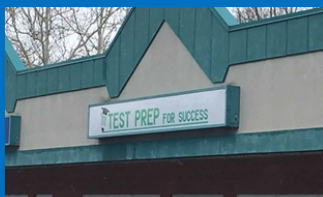
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0	○	○	○	○
1	○	○	○	○
2	○	○	○	○
3	○	○	○	○
4	○	○	○	○
5	○	○	○	○
6	○	○	○	○
7	○	○	○	○
8	○	○	○	○
9	○	○	○	○

22.)

/	○	○	○	○
.	○	○	○	○
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1	○	○	○	○
2	○	○	○	○
3	○	○	○	○
4	○	○	○	○
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6	○	○	○	○
7	○	○	○	○
8	○	○	○	○
9	○	○	○	○

**Answer Key:**

- |                                |        |           |
|--------------------------------|--------|-----------|
| 1.) 36%, 230%, 1200%,<br>.097% | 8.) A  | 16.) C    |
| 2.) .14, 1.3, .0002, .62       | 9.) B  | 17.) C    |
| 3.) 6, 30, 20, 28.2            | 10.) C | 18.) D    |
| 4.) 400%, 20%, 25%, 50%        | 11.) A | 19.) A    |
| 5.) 68.4, \$12.75              | 12.) B | 20.) D    |
| 6.) \$35, 43.75                | 13.) D | 21.) 1.02 |
| 7.) A                          | 14.) A | 22.) 65   |
|                                | 15.) B |           |



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