

Date Completed: \_\_\_\_\_

Mentor Initials: \_\_\_\_\_

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## Percents (Advanced)

### Multiple Choice

1. If  $p$  and  $q$  are positive numbers, what percent of  $(q^3 - 4)$  is  $p$ ?  
A)  $\frac{p}{q^3-4}$   
B)  $\frac{q^3-4}{100p}$   
C)  $\frac{100p}{q^3-4}$   
D)  $\frac{p}{100(q^3-4)}$
2. If 60% of the number  $x$  is equal to 150% of the number  $y$ , then the number  $y$  is what percent of  $x$ ?  
A) 0.2%  
B) 0.4%  
C) 20%  
D) 40%
3. On Tuesday, a 'Green Mamba' ice cream in Harare cost \$5. The price increased by 15% on Wednesday, but on Friday the price was reduced by 20% for a weekend promotion. The price on Friday can be represented by the expression  $5b$ , where  $b$  is a constant. What is the value of  $b$ ?  
A) .65  
B) .68  
C) .92  
D) 1.35
4. The changes in a city's population from one decade to the next decade for 3 consecutive decades were a 15% increase, a 25% increase, and a 20% decrease. About what percent was the increase in the city's population over the 3 decades?  
A) 15%  
B) 20%  
C) 25%  
D) 40%

5. You are deciding between buying an Ohio State sweatshirt and a Michigan sweatshirt. The Ohio State sweatshirt costs 25% more than the Michigan sweatshirt. If the Ohio State sweatshirt costs 75\$, how much does the Michigan sweatshirt cost?
- A) \$50  
B) \$56  
C) \$60  
D) \$75
6. Lindsey purchased a used motorcycle for a discounted rate of 40% less than the listed price. The total amount she paid to the cashier was  $t$  dollars, including a 7 percent sales tax on the discounted price. Which of the following represents the listed price in terms of  $t$ ?
- A)  $.67t$   
B)  $\frac{t}{.67}$   
C)  $(.6)(1.07)t$   
D)  $\frac{t}{(.6)(1.07)}$
7. A yoga studio made  $q$  profits in 2010. If its profits increased by 10% in 2011, again by 13% in 2012, and again by 15% in 2013, what were its profits in 2013, in terms of  $q$ ?
- A)  $(1.1)(1.13)(1.15)q$   
B)  $3.9q$   
C)  $\frac{3.9}{q}$   
D)  $\frac{q}{(1.1)(1.13)(1.15)}$
8. The budget for a school yearbook was \$800 in 2012. The budget decreased by 14% from 2012 to 2013 and then increased by 18% from 2013 to 2014. Which of the following expressions represents the budget, in dollars, for the school yearbook in 2014?
- A)  $(1.14)(1.18)(800)$   
B)  $(0.86)(1.18)(800)$   
C)  $(1.14)(0.82)(800)$   
D)  $(0.86)(0.72)(800)$

9. In 1995 the populations of City A and City B were equal. From 1989 to 1995, the population of City A increased by 15% and the population of City B decreased by 20%. If the population of City A was 240,000 in 1989, what was the population of City B in 1989?
- A) 220,800
  - B) 276,000
  - C) 345,000
  - D) 360,000
10. The sale price of a t-shirt is 8% off the original price. The clearance price of the t-shirt is 25% off the sale price. The clearance price is what percent off the original price?
- A) 31%
  - B) 33%
  - C) 37%
  - D) 40%

### **Grid-In**

11. The number  $a$  is 30% less than the number  $b$ . The number  $c$  is 30% greater than  $a$ . The number  $c$  is how many times  $b$ ?
12. A coffee shop increased its sales by 14% from 2015 to 2016, and by 18% from 2016 to 2017. If sales increased by approximately  $p\%$  overall from 2015 to 2017, what is  $p$ ?
13. How many liters of a 20% iodine solution must be added to 4 liters of a 5% iodine solution to obtain a 15% iodine solution?

14. A magazine sold 4,635 subscriptions in 2015 and 5,562 in 2016. An accountant estimated that the percent increase from 2015 to 2016 would be double the percent increase from 2016 to 2017. Approximately how many subscriptions did the accountant expect the magazine to sell in 2017?
15. A triangle was altered by increasing its height by 75 percent and decreasing its base by  $q$  percent. If these alterations decreased the area of the triangle by 12.5 percent, what is the value of  $q$ ?