



STUDENT \_\_\_\_\_

GROUP \_\_\_\_\_

INSTRUCTOR \_\_\_\_\_

DATE \_\_\_\_\_

## Cumulative Review Homework

SCORE:

/60

**FOR NYC and SF:**

- **THIS HW IS DUE DECEMBER 15<sup>th</sup>**
- **BRING IT TO YOUR LAST WEEKDAY CLASS!!!**

For **full credit**, show all of your work and explain your reasoning!  
Each Question is worth **2 POINTS** unless otherwise indicated.

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1. Consider the decimal 0.0732

a) Write 0.0732 as a percentage.

b) Write 0.0732 as a fraction.

c) We can also express 0.0732 as a sum of fractions. Find the values of  $X$ ,  $Y$ , and  $Z$  that would make the equation below true:

$$0.0732 = \frac{7}{X} + \frac{3}{Y} + \frac{2}{Z}$$

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2. What is 0.001% of 6532?



HOMWORK

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3. 35% of some number  $a$  is equal to 84. What is the value of 45% of  $a$  ?

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4. Yu Xuan is a botanist studying the production of apples by two types of trees. She notices that Type A trees produce 35% less apples than Type B trees. Based on her observations, if Type A trees produced 195 apples this year, how many apples did Type B trees produce this year?



		Sport		
		Volleyball	Basketball	Total
Gender	Female	56	80	136
	Male	72	63	135
Total		128	143	271

5. (4 POINTS) A group of 10<sup>th</sup> grade students responded to a survey that asked whether students would prefer to be on a volleyball team or on a basketball team. The survey data were broken down as shown in the table above.

a) Approximately what percent of female students would rather be on the basketball team?

b) Approximately what percent of all students would rather be on the volleyball team?

c) Imagine you are the principal of this high school and have the budget to create only one sports team for 10<sup>th</sup> graders. Based on this data, should you create a basketball team or a volleyball team? Explain.



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6. Najat lost her bike helmet at school and she needs to buy a new one. At Bianca's Bike Bonanza Shop, she sees the following sign:

Bike Helmets on Sale, Today Only!  
Buy 1 Helmet at the original price, get the 2<sup>nd</sup> Helmet for 30% off!  
**WHAT A BARGAIN!!!**

Najat decides to buy two bike helmets to take advantage of the sale. If she pays \$68 total for both helmets, then what was the original price of one helmet? (Disregard sales tax)



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7. Zachary and Alexander are training for half-marathon. At the beginning of May, they ran 1.5 miles every day. By the end of May, they were running 2.1 miles every day.

a) By what percent did their running distance increase from the beginning of May to the end of May?

b) At the beginning of June, they increased their daily running distance by 25% more than the distance they were running by the end of May. If they run at this constant rate every day in June, what is the **total number of miles** they will run in June? (June has 30 days)



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8. a) Write an expression that means the same thing as “increasing a number  $k$  by 17%”?

b) Write an expression that means the same thing as “decreasing a number  $k$  by 17%”?

c) Write an expression that means the same thing as “increasing a number  $k$  by 17%, then decreasing this value by 17%”

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9. a) You increase a number  $n$  by  $p$  %, then decrease this new number by  $p$  %. **Is it ever possible to end up with the same number? Why or why not?** Show a numerical example to help explain your reasoning, and try to use algebra!

b) A rectangle was altered by increasing its length by 20 percent and decreasing its width by  $k$  percent. If these alterations increased the area of the rectangle by 8 percent, what is the value of  $k$ ?



10. a) For what values of  $x$  is the statement below always true? **Explain your reasoning.**

$$\sqrt{x^2} = x$$

b) Create an example to show that the equation  $\sqrt{a} - \sqrt{b} = \sqrt{a - b}$  is **not always true**. (choose values for  $a$  and  $b$  and see what happens...)



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**Questions 11 and 12 refer to the following information:**

Fatoumata opened a bank account that earns 9% interest **compound monthly**. Her initial deposit was \$3500, and she uses the expression  $3500(a)^{12t}$  to find the value of the account after  $t$  years.

11. What is the value of  $a$  in the expression?

12. Fatoumata's friend Elijah found an account that earns  $x$  % interest **compounded annually**. He also made an initial deposit of \$3500 into this account at the same time that Fatoumata made a deposit of \$3500 in her account. After 1 year, Fatoumata and Elijah have the same amount of money in their bank account. What is the value of  $x$  ? (Round your answer to the nearest hundredth of a percent)



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13. (4 POINTS) a) You and your friends deposit  $A$  dollars into different savings account plans, and let the money accrue interest over  $t$  years.

**For each of the following savings account plans, write an expression (in terms of  $A$  and  $t$ ) to represent the current value of your savings after  $t$  years.**

PLAN A: Each successive year, 25% of the initial savings is added to the value of the account.

PLAN B: Each successive year, 15% of the initial savings and \$600 is added to the value of the account.

PLAN C: Each successive year, \$350 is added to the value of the account.

PLAN D: Each successive year, 5% of the current value is added to the value of the account.

b) **Circle the plan** that yields exponential growth of the money in the account.





14. A population of 2,000 bacteria grows **continuously** at a rate of 50% per day. How many bacteria are there after a week?

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15. The model  $a \left(1 + \frac{r}{n}\right)^{nt}$  is used to describe compound interest. Sean puts \$6,000 in a savings account that pays 0.25% annual interest compounded **weekly** and leaves his money there for 2 years. He is trying to use the model to represent how his money will grow.

What is the value of  $a$  ?

What is the value of  $r$  ?

What is the value of  $n$  ?

What is the value of  $t$  ?

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16. Simplify the expression  $y^{-8} \cdot (y^5)^3 \cdot y^{-13}$



17. Why is  $3^0 = 1$ ? Explain.

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18. Simplify the expression  $\frac{\left(\frac{1}{4^6}\right)^4}{4^{-12}} \cdot 16^6$

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19. Griselda claims that  $2^x + 2^x + 2^x + 2^x$  is equal to  $8^x$ . Aleah says she is wrong and the expression is equal to  $2^{4x}$ . **Is Griselda right, is Aleah right, are they both right, or are they both wrong? If they are both wrong, what is the correct simplification?**

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20. a) The statements below are **sometimes true**. For each of these statements, provide one example for values of  $x$  and  $y$  that would make the statement **TRUE**, and one example for values of  $x$  and  $y$  that would make the statement **FALSE**. **The first one is done for you**

Statement	Example to make the statement TRUE	Example to make the statement FALSE
$x^3 > x$	$x = 2$ $2^3 > 2$	$x = -2$ $(-2)^3 < -2$
$\sqrt{x^2 + y^2} = x + y$		
$\sqrt{x} \geq x$		
$x = \sqrt{x^2}$		

b) Is the equation  $(xy)^{\frac{1}{4}} = \sqrt[4]{xy}$  always true, sometimes true, or never true?



21. Write two different expressions that are equal to  $\sqrt[3]{8^{120}}$ . For example  $\sqrt[3]{8^{90}} = 4^{45}$

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22. Write the following expressions without the radical sign  $\sqrt{\quad}$ . For example  $\sqrt[3]{a^5} = a^{\frac{5}{3}}$ .

a)  $\sqrt[6]{b}$

b)  $(\sqrt[3]{x})^7$

c)  $\sqrt[4]{y^{\frac{1}{5}}}$

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23. If  $\frac{9^b}{3^8} = 27^a$ , what is the value of  $a^2$  (Your answer should be in terms of  $b$ )



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24. Simplify the following expression:

$$\sqrt{18a^{31}b^3c^{14}}$$

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25. If  $\sqrt{75 - 5x} + 5 = x$ , what is the value of  $x$ ?

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26. If  $b = 2\sqrt{2}$  and  $3b = \sqrt{2x}$ , then what is the value of  $x$ ?



27. What is the sum of all solutions to the equation  $4\sqrt{x} + 6x = 6\sqrt{x}$ ?

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28. The equation  $\sqrt{a} + \sqrt{b} = \sqrt{a+b}$  is **not always true**. However, it is **sometimes true**.

For what values of  $a$  and  $b$  is this equation true?

**\*Hint:** Square both sides, and use the pattern  $(x + y)^2 = x^2 + 2xy + y^2$



**GREAT JOB THIS SEMESTER!**

