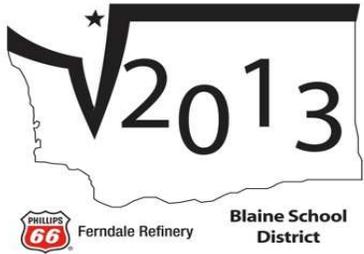


## Algebra – 5<sup>th</sup> Grade

Bubble in your answers on the answer sheet. Be sure to erase all mistakes completely. You do not need to bubble in leading zeros – the answer of “7” does not need to be answered as “007”. If your answer is a fraction like  $\frac{3}{16}$ , bubble in 316.

- 2 points:** Suppose that a bucket, when completely full with water, weighs 34 pounds. When it is half full with water, it weighs 19 pounds. How many pounds does the bucket weigh when it is completely empty?
- 2 points:** An exchange rate describes the amount of money that one would receive in exchange for a fixed amount of money in a different currency. Suppose that the exchange rate for Euro was 1.245 Euro = 1 US Dollar. If you had 20 Euro, how many US Dollars would you receive in exchange? **Express your answer to the nearest tenth.**
- 2 points:** When tryouts were first announced, the Math Glee Club had 10 members. By their first performance, they had increased their membership by 300%. By the end of the year, they had increased their membership that they had during the first performance by 200%. How many members did the Math Glee Club have at the end of the year?
- 3 points:** Suppose that you run a doll-making business, and have just determined your cost to make one zombie doll is \$2.99. Someone who initially invested in your product gets \$0.49 for every doll that is sold as well as 20% of the total sales. If you sold 500 zombie dolls at \$4.99 each during your first month, how much money in profit will you have made during that month? **Give your answer to the nearest dollar.**
- 3 points:** In your grandma’s world-famous “pi pie”, the ratio of sugar to flour is 3 : 5. If a total of 48 cups of the two ingredients are used, how many cups of sugar were used?
- 3 points:** On Monday, quite a few people slept in and skipped their college math class, so only  $\frac{7}{12}$  of the class was there. The next day, 5 more students came to class than the previous day, which meant that  $\frac{2}{3}$  of the class was there. How many students are enrolled in the class in all?

7. **3 points:** Unbelievably, George perfected a fruit-growing system where there was never any variation in the weight of each particular fruit. He weighed 3 apples and 2 oranges and found that together they weighed 38 ounces. To double check, he weighed 5 apples and 3 oranges and found that together they weighed 60 ounces – exactly what he expected. How many ounces does each orange weigh?
8. **4 points:** A fair initially pre-sold 1000 tickets when it had them priced at \$30 each. On the day of the fair, the price was raised by \$20, and the total money earned from that day's ticket sales was 10% less than the total money earned from the pre-sale. How many tickets were sold on the day of the fair?
9. **4 points:** If a pound of strawberries costs \$3.20, and a grocer wants to price a 12-ounce container of strawberries at a 25% higher per-ounce price than the pound, how much would that 12-ounce container of strawberries cost? **Express your answer as a number of cents.**
10. **4 points:** At *Math Books R Us*, when you buy two books at full price, you can purchase a third book for half the full price. If you were to buy seven books that all had the same original price, and it cost \$72, what was the cost, in dollars, of one of the books?

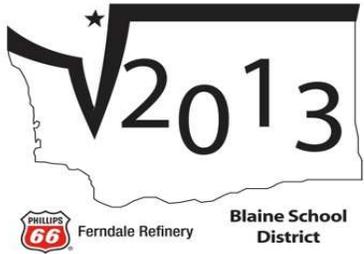


## Algebra – 6<sup>th</sup> Grade

Bubble in your answers on the answer sheet. Be sure to erase all mistakes completely. You do not need to bubble in leading zeros – the answer of “7” does not need to be answered as “007”. If your answer is a fraction like  $\frac{3}{16}$ , bubble in 316.

1. **2 points:** Suppose that you run a doll-making business, and have just determined your cost to make one zombie doll is \$2.99. Someone who initially invested in your product gets \$0.49 for every doll that is sold as well as 20% of the total sales. If you sold 500 zombie dolls at \$4.99 each during your first month, how much money in profit will you have made during that month? **Give your answer to the nearest dollar.**
2. **2 points:** In your grandma’s world-famous “pi pie”, the ratio of sugar to flour is 3 : 5. If a total of 48 cups of the two ingredients are used, how many cups of sugar were used?
3. **2 points:** On Monday, quite a few people slept in and skipped their college math class, so only  $\frac{7}{12}$  of the class was there. The next day, 5 more students came to class than the previous day, which meant that  $\frac{2}{3}$  of the class was there. How many students are enrolled in the class in all?
4. **3 points:** Unbelievably, George perfected a fruit-growing system where there was never any variation in the weight of each particular fruit. He weighed 3 apples and 2 oranges and found that together they weighed 38 ounces. To double check, he weighed 5 apples and 3 oranges and found that together they weighed 60 ounces – exactly what he expected. How many ounces does each orange weigh?
5. **3 points:** A fair initially pre-sold 1000 tickets when it had them priced at \$30 each. On the day of the fair, the price was raised by \$20, and the total money earned from that day’s ticket sales was 10% less than the total money earned from the pre-sale. How many tickets were sold on the day of the fair?
6. **3 points:** If a pound of strawberries costs \$3.20, and a grocer wants to price a 12-ounce container of strawberries at a 25% higher per-ounce price than the pound, how much would that 12-ounce container of strawberries cost? **Express your answer as a number of cents.**
7. **3 points:** At *Math Books R Us*, when you buy two books at full price, you can purchase a third book for half the full price. If you were to buy seven books that all had the same original price, and it cost \$72, what was the cost, in dollars, of one of the books?

8. **4 points:** Mary was offered two jobs: a math teaching job that had a starting annual salary of \$30,000 and a yearly 5% raise, and a traveling circus manager job that had a starting annual salary of \$35,000 and a yearly \$600 raise. How many full years would she have to work as a math teacher for her annual salary to exceed the annual salary she would have earned in the same number of years as a traveling circus manager?
9. **4 points:** On a rather difficult test, a class of 25 math students scored an average of 65%. Shocked at the results, the teacher offered for students to do test corrections to slightly raise their grades. The test corrections raised 10 students' grades by 5%, 5 students' grades by 10%, 5 students' grades by 20%, and left 5 students' grades unchanged. What is the class's new average score? **Express your answer as a percent.**
10. **4 points:** Mrs. Itsamess has her chemistry class create a mixture that is rather messy because of how it grows. The volume of the mixture increases directly proportionally to the volume of the chemical being added. The mixture begins with a volume of 20 milliliters. You are told that if 2 milliliters of the chemical were used, then the volume of the mixture would increase to 30 milliliters. If 10 milliliters of the chemical is used, what will be the volume, in milliliters, of the resulting mixture?

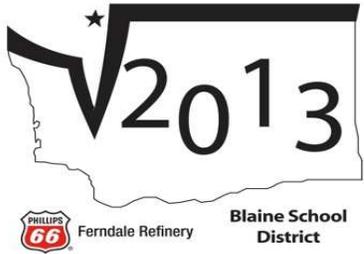


## Algebra – 7<sup>th</sup> Grade

Bubble in your answers on the answer sheet. Be sure to erase all mistakes completely. You do not need to bubble in leading zeros – the answer of “7” does not need to be answered as “007”. If your answer is a fraction like  $\frac{3}{16}$ , bubble in 316.

- 2 points:** Unbelievably, George perfected a fruit-growing system where there was never any variation in the weight of each particular fruit. He weighed 3 apples and 2 oranges and found that together they weighed 38 ounces. To double check, he weighed 5 apples and 3 oranges and found that together they weighed 60 ounces – exactly what he expected. How many ounces does each orange weigh?
- 2 points:** A fair initially pre-sold 1000 tickets when it had them priced at \$30 each. On the day of the fair, the price was raised by \$20, and the total money earned from that day’s ticket sales was 10% less than the total money earned from the pre-sale. How many tickets were sold on the day of the fair?
- 2 points:** If a pound of strawberries costs \$3.20, and a grocer wants to price a 12-ounce container of strawberries at a 25% higher per-ounce price than the pound, how much would that 12-ounce container of strawberries cost? **Express your answer as a number of cents.**
- 3 points:** At *Math Books R Us*, when you buy two books at full price, you can purchase a third book for half the full price. If you were to buy seven books that all had the same original price, and it cost \$72, what was the cost, in dollars, of one of the books?
- 3 points:** Mary was offered two jobs: a math teaching job that had a starting annual salary of \$30,000 and a yearly 5% raise, and a traveling circus manager job that had a starting annual salary of \$35,000 and a yearly \$600 raise. How many full years would she have to work as a math teacher for her annual salary to exceed the annual salary she would have earned in the same number of years as a traveling circus manager?
- 3 points:** On a rather difficult test, a class of 25 math students scored an average of 65%. Shocked at the results, the teacher offered for students to do test corrections to slightly raise their grades. The test corrections raised 10 students’ grades by 5%, 5 students’ grades by 10%, 5 students’ grades by 20%, and left 5 students’ grades unchanged. What is the class’s new average score? **Express your answer as a percent.**

7. **3 points:** Mrs. Itsamess has her chemistry class create a mixture that is rather messy because of how it grows. The volume of the mixture increases directly proportionally to the volume of the chemical being added. The mixture begins with a volume of 20 milliliters. You are told that if 2 milliliters of the chemical were used, then the volume of the mixture would increase to 30 milliliters. If 10 milliliters of the chemical is used, what will be the volume, in milliliters, of the resulting mixture?
8. **4 points:** Two swimmers, one who can swim the length of a pool in 120 seconds, and the other who can swim the length of a pool in 40 seconds, set out swimming at the exact same time. How many seconds after they first take off will they be at the same point in the pool again?
9. **4 points:** Suppose that you were to draw the line perpendicular to the line  $y = 2x + 6$  through the point with coordinates  $(0, 6)$ . What is the  $x$ -coordinate of the  $x$ -intercept of the line that you are drawing?
10. **4 points:** Even though Bobby lives 1000 miles away, he is determined to get to this math competition. He began by flying on an airplane that traveled at 300 miles per hour. Then, he hopped into his personal limo and was driven the rest of the way to the competition at a speed of 60 miles per hour. Assuming his 400 minute long trip is in a straight line to the competition and there is no break in between the forms of transportation, how many miles did Bobby travel in the car?



## Algebra – 8<sup>th</sup> Grade

Bubble in your answers on the answer sheet. Be sure to erase all mistakes completely. You do not need to bubble in leading zeros – the answer of “7” does not need to be answered as “007”. If your answer is a fraction like  $\frac{3}{16}$ , bubble in 316.

1. **2 points:** At *Math Books R Us*, when you buy two books at full price, you can purchase a third book for half the full price. If you were to buy seven books that all had the same original price, and it cost \$72, what was the cost, in dollars, of one of the books?
2. **2 points:** Mary was offered two jobs: a math teaching job that had a starting annual salary of \$30,000 and a yearly 5% raise, and a traveling circus manager job that had a starting annual salary of \$35,000 and a yearly \$600 raise. How many full years would she have to work as a math teacher for her annual salary to exceed the annual salary she would have earned in the same number of years as a traveling circus manager?
3. **2 points:** On a rather difficult test, a class of 25 math students scored an average of 65%. Shocked at the results, the teacher offered for students to do test corrections to slightly raise their grades. The test corrections raised 10 students' grades by 5%, 5 students' grades by 10%, 5 students' grades by 20%, and left 5 students' grades unchanged. What is the class's new average score? **Express your answer as a percent.**
4. **3 points:** Mrs. Itsamess has her chemistry class create a mixture that is rather messy because of how it grows. The volume of the mixture increases directly proportionally to the volume of the chemical being added. The mixture begins with a volume of 20 milliliters. You are told that if 2 milliliters of the chemical were used, then the volume of the mixture would increase to 30 milliliters. If 10 milliliters of the chemical is used, what will be the volume, in milliliters, of the resulting mixture?
5. **3 points:** Two swimmers, one who can swim the length of a pool in 120 seconds, and the other who can swim the length of a pool in 40 seconds, set out swimming at the exact same time. How many seconds after they first take off will they be at the same point in the pool again?
6. **3 points:** Suppose that you were to draw the line perpendicular to the line  $y = 2x + 6$  through the point with coordinates  $(0, 6)$ . What is the  $x$ -coordinate of the  $x$ -intercept of the line that you are drawing?

7. **3 points:** Even though Bobby lives 1000 miles away, he is determined to get to this math competition. He began by flying on an airplane that traveled at 300 miles per hour. Then, he hopped into his personal limo and was driven the rest of the way to the competition at a speed of 60 miles per hour. Assuming his 400 minute long trip is in a straight line to the competition and there is no break in between the forms of transportation, how many miles did Bobby travel in the car?
8. **4 points:** Three kids were at the candy store buying their favorite candies, each spending different amounts of money. Willy bought 3 gold coins, 5 lollipops, and 4 lemon drops, spending a total of 81¢. Charlie bought 1 of each candy, spending a total of 19¢. Finally, Veronica bought 2 gold coins, 3 lollipops, and 10 lemon drops, spending a total of 80¢. How much does one lollipop cost? **Express your answer as a number of cents.**
9. **4 points:** How many integer values of  $x$  satisfy the inequality:  $|x - 3|^3 < 27$ ?
10. **4 points:** What is the sum of all integers,  $y$ , that satisfy the inequality:  $3y^2 - 2 \leq y$ ?