Document C

Source: From a speech by Claudius, Emperor of Rome, 48 CE and other varied sources.

In Athens, once citizenship was granted, citizens enjoyed equal rights and full political participation. In the Roman Republic, not all citizens received the same rights or the same political participation. But there is a reason for this. Hear first the words of Emperor Claudius responding to criticism for giving citizenship to the people of Gaul (modern-day France) soon after conquering them:

"What was the ruin of Sparta and Athens, but this, that mighty as they were in war, they spurned from them as aliens [foreigners] those whom they had conquered? Our founder Romulus, on the other hand, was so wise that he fought as enemies and then hailed as fellow-citizens several nations on the very same day."

In other words, the Athenians were more stingy with their citizenship. The Romans more freely gave it away. But they gave it away in measured amounts.

For example:

1. *Latini* – people from regions outside Rome but on the Italian peninsula – were granted a class of citizenship with the right to do business and to travel and live within the Empire but not to an official Roman marriage.
2. *Foederati* – citizens of states with treaty obligations with Rome – were given limited rights in return for performing military service.
3. *Peregrini* – foreigners in conquered lands – could be given full or partial citizenship. Claudius did give citizenship to the people of Gaul after he conquered them.

Document Analysis

1. According to Claudius, what was the ruin of Athens?

2. How might Claudius argue that giving citizenship and high office to conquered Gauls would be good for Rome?

3. The document says that the Romans sometimes gave away citizenship rights in measured amounts. Use an example to explain what this means.

4. How could you use this document to argue that Rome had a better system of citizenship than Athens?

5. How could you use this document to argue that Athens had a better system of citizenship than Rome?

Document D

Source: Diodorus Siculus, *History, Book XI*, written between 60 and 30 BCE.

> And the law is as follows: Each citizen wrote the name of the man who in his opinion had the greatest power to destroy the democracy; and the man who got the largest number of ostraka was obliged to go into exile from his native land for a period of ten years.
>
> The Athenians, it appears, passed such a law, not for the purpose of punishing wrongdoing, but in order to lower through exile the [position] of men who had risen too high. Now Themiostocles, having been ostracized in the manner we have described, fled as an exile from his native city to Argos....
>
> **Note:** Only one ostraka, or ostracism, was permitted in Athens per year.

Source: Peter Walsh, "In the Realm of the Censors: From the Coliseum to Capitol Hill," *Boston Review*, February 1991.

> In conducting the census of the Roman population, the censors (they were elected in pairs) not only counted Rome's citizens but ... ranked them into distinct classes.... The censors' ranking, based on wealth, heritage [family standing], administrative competence, marital status, and physical and moral fitness, determined the citizen's political privileges, his level of taxation, and his military service. Anyone who didn't meet the standards of the censors could be demoted in rank. If the offender was a senator, this meant expulsion from the Senate.
>
> **Note:** The Roman census was conducted every five years.

Document Analysis

1. What did it mean when Athenians ostracized a fellow citizen? What was the purpose?

2. Do you think ostracism was a good idea? Explain.

3. How did Rome control the privileges and benefits of citizenship?

4. Do you think giving the censors the power to rank and re-rank citizens into different classes was a good idea? Explain.

5. Judging from the two passages in this document, who had the better system of citizenship, the Athenians or the Romans? Explain.

Name _____ Class _____ Date _____

Practice 11-1

Unit Rates

1. A box of dried fruit has 36 calories in 3 servings. How many calories are there per serving?

2. In a week, 20 hens laid 80 eggs. What is the unit rate for eggs per hen?

3. A 15-pound bag of wildflower seed covers 40 square feet. How many pounds of seed does it take to cover 1 square foot?

4. An animal gained 6 pounds steadily over 12 years. What is the unit rate of pounds per year?

5. A plant grew 19 inches over 5 months. The plant grows the same amount each month. Use this rate to complete the table.

Month	Growth (inches)
1	_____
2	_____
3	_____
4	_____
5	19
6	_____

6. A migrating bird flies 420 miles in 14 hours. How many miles does it fly in 5 hours?

7. a) **Writing** Exactly 240 years ago, students planted a tree in front of their school. Since then, the tree has grown 30 meters taller, and the distance around the trunk has increased by 3 meters. Describe how you can use this information to find at least two different unit rates.

b) Find the unit rate for the increase in the tree's trunk.

8. **Multiple Representations** A vehicle uses 7 gallons of gasoline to travel 252 miles. The vehicle uses gasoline at a steady rate.

   a) Draw a picture that models the situation.

   b) Complete the table of equivalent ratios.

Gallons	Miles
1	_____
2	_____
3	_____
7	252
14	_____
21	_____

   c) Use the table to find the number of gallons of gasoline the vehicle uses to travel 108 miles.

9. **Error Analysis** Adrianne and Burt are in the same keyboarding class. The teacher says they both type at 72 words per minute. Adrianne writes this unit rate as $\frac{1\text{minute}}{72\text{ words}}$. Burt writes it as $\frac{72\text{ words}}{1\text{minute}}$. Which ratio does not correspond to the unit rate 72 words per minute? What is the mistake?

10. **Air Travel** An airplane on autopilot took 7 hours to travel 4,851 kilometers. What is the unit rate for kilometers per hour?

11. **Estimation** A stalactite grows 30 millimeters in 149 years. Estimate the unit rate of growth per year.

12. **Reasoning** The table shows how much fertilizer to use on lawns of different sizes.

Square Feet	Pounds
50	32
100	64
150	96
200	128

   a) Describe at least three ways to use the table to find how much fertilizer to use on 500 square feet of lawn.

   b) How much fertilizer should be used on 500 square feet of lawn?

13. The 173 workers at a factory together produce 21,452 items per day. What is the daily rate of items per worker?

14. **Challenge** A mine produces 37,700 tons of ore during an 8-hour shift. There are 316 miners working during each shift. Each mining cart holds 5 tons of ore. For every 200 tons of ore, there are 3 kilograms of valuable minerals. Assume the valuable minerals are spread evenly in the ore. How many kilograms of valuable minerals are in 1 mining cart full of ore?

15. **Challenge** A breakfast bar comes in two sizes. The 3-ounce bars come in a box of 10. A box of the 7-ounce bars has 6 bars. The 3-ounce bar contains 12 grams of dietary fiber. How many grams of dietary fiber are in one box of the 7-ounce bars?

*Practice 11-1: **Unit Rates***

1. 12

2. 4

3. 0.375

4. 0.5

5. 3.8
7.6
11.4
15.2
22.8

6. 150

7. a) Answers will vary

b) 0.0125 m/yr

8. a) Answers will vary

b) 36
72
108
504
756

c) 3 gallons

9. $\frac{1 \text{ minute}}{72 \text{ words}}$

The order of the terms are reversed compared to the given rate.

10. 693

11. 0.2 mm per year

12. a) Answers will vary

b) 320 lbs

13. 124

14. 0.075

15. 168

Name _____ Class _____ Date _____

Practice 11-2

Unit Prices

1. If 7 model cars cost $28 what is the unit price of the model cars?

2. A store sells 4 cans of beans for $9. What is the price of 7 cans of beans?

3. If 7 notepads cost $3.15, what is the unit price of the notepads?

4. The price of an 8-minute phone call is $1.20. What is the price of a 17-minute phone call?

5. A 25-pound bag of bird food costs $19.50. A 30-pound bag of the same bird food costs $22.80. Which bag of bird food is the better buy?

6. You want to buy some rice. A 6-ounce package costs $2.28. A 14-ounce package costs $5.18. A 26-ounce package costs $10.40. Which package is the best buy?

7. **Writing** At a home improvement store, you find two ways to buy the kind of roofing nail you need. The 2-pound box sells for $3.72. The 17-pound box sells for $31.96. Find the better buy. Give at least three reasons why a customer might not care which box is the better buy.

8. **Reasoning** A store sells a package of 15 trading cards for $4.20.
   a) Explain how you can tell that the unit price per card is less than $1.
   b) What is the unit price per card?

9. **Error Analysis** A contractor purchases 4 dozen pairs of padded work gloves for $54.24. She incorrectly calculates the unit price as $13.56 per pair for the expense report.
   a) What is the correct unit price?
   b) Why is the contractor's unit price incorrect?
   - ❍ A. The contractor uses subtraction rather than division to find the unit price.
   - ❍ B. The contractor's unit price is per dozen pairs, not per pair of gloves.
   - ❍ C. The contractor uses multiplication rather than division to find the unit price.
   - ❍ D. The contractor's unit price is per glove, not per pair of gloves.

10. **Fundraising** The ski team needs new uniforms. The students plan to sell plush toy hawks (the school mascot) for $5 each. The students find three companies online that sell stuffed mascots. Company A sells 15 hawks for $42.72. Company B sells 16 hawks for $45.12. Company C charges $34.56 for 12 hawks. Which company is the best buy?

11. **Mental Math** A teacher pays $79 for 10 magazines. What is the unit price per magazine?

12. A nursery owner buys 7 panes of glass to fix some damage to his greenhouse. The 7 panes cost $15.05. Unfortunately, he breaks 2 more panes while repairing the damage. What is the cost of another 2 panes of glass?

13. A restaurant owner buys 9 bolts to install an awning. The 9 bolts cost $8.55. The awning looks so nice, she decides to install another one, but needs 2 more bolts. How much do another 2 bolts cost?

14. **Challenge** A warehouse store sells 8-ounce cans of soup in cases of 12. A case of the 8-ounce cans costs $27.84. The store also sells 10-ounce cans of the same soup in cases of 16. A case of the 10-ounce cans costs $44.80. Which case is the better buy?

15. **Challenge** A warehouse store sells 6.5-ounce cans of tuna in packages of 6. A package of 6 cans costs $14.04. The store also sells 4.5-ounce cans of the same tuna in packages of 8. A package of 8 cans costs $13.68. The store sells 5.5-ounce cans in packages of 3 cans for $5.61. Which package is the best buy?

*Practice 11-2: **Unit Prices***

1. $4
2. $15.75
3. $0.45
4. $2.55
5. 30-lbs. bag
6. 14-oz package
7. 2-lb box, reasons will vary
8. **a)** Answers will vary
   b) $0.28
9. **a)** $1.13
   b) B
10. Company B
11. $7.90
12. $4.30
13. $1.90
14. 10-oz can
15. 5.5-oz can

Name _____ Class _____ Date _____

Practice 11-3

Constant Speed

1. A delivery truck drove 32 miles per hour. It took 2 hours to travel between two towns. What is the distance between the two towns? Use the equation d = rt, where d is distance, r is rate, and t is time.

2. Every morning Jenna runs for 20 minutes. If Jenna runs 6 miles per hour, how far does she travel? Use the equation d = rt, where d is distance, r is rate, and t is time.

3. An airplane flies 2,951 miles in 6.5 hours. What is the speed of the airplane in miles per hour? Use the equation d = rt, where d is distance, r is rate, and t is time.

4. On a school field trip, the bus travels 23 miles in 30 minutes. Find the speed of the bus in miles per hour. Use the equation d = rt, where d is distance, r is rate, and t is time.

5. Ian and his brother are driving from city A to city B. The two cities are 330 miles apart. Ian drives at 55 miles per hour. How long does it take them to make the trip? Use the equation d = rt, where d is distance, r is rate, and t is time.

6. A horseback rider travels 2 miles in 12 minutes. At this speed, how long does it take to travel 5 miles? Use the equation d = rt, where d is distance, r is rate, and t is time.

7. **Writing** One lap of a high-speed automobile race is 2.60 miles. A driver completes 35 laps traveling at 182 miles per hour.

a) Explain how you can use the equation d = rt to find the time it takes to complete 35 laps.

b) How long does it take to complete 35 laps?

❍ A. 2 hours

❍ B. 0.5 hour

❍ C. 1 hour

❍ D. 0.25 hour

8. **Reasoning** Cheryl biked two days in a row. On the first day, Cheryl biked 7 miles at a steady pace for 15 minutes. On the second day, she biked 14 miles in 30 minutes. Cheryl claims that she rode at the same speed on both days. Is it possible to have the same speed with different distances and times?

❍ A. It is not possible. There is only one speed that corresponds to each distance and time.

❍ B. It is not possible. Cheryl was faster on the second day.

❍ C. It is possible. For both days, Cheryl's speed was 28 miles per hour.

❍ D. It is possible. For both days, Cheryl's speed was 16 miles per hour.

9. **Error Analysis** At soccer training, the team ran for 30 minutes at 6 miles per hour. Your friend incorrectly says that the team ran a distance of 180 miles.

   a) What is the correct distance?

   b) What error did your friend most likely make?

   ❍ A. Your friend divided the rate by the time.

   ❍ B. Your friend did not rewrite the rate in terms of miles per hour.

   ❍ C. Your friend divided the time by the rate.

   ❍ D. Your friend did not rewrite the time in terms of hours.

10. **Snakes** A black racer snake travels 6.9 kilometers in 3 hours. What is the snake's speed in kilometers per hour? Use the equation d = rt.

11. **a)** **Open-Ended** Write a problem using the values 10 meters per second and 50 seconds. Require that the solver use the equation d = rt.

    b) What is the correct unit for the value the solver will find?

    ❍ A. meters per second

    ❍ B. meters

    ❍ C. seconds

    ❍ D. hours

12. Two cyclists start at the same place. The first travels east at 20 miles per hour. The second travels west. They are 22 miles apart after 30 minutes. How fast is the second cyclist traveling? Use the equation d = rt.

13. On a Saturday, Peter and Carin agree to leave their homes at the same time, drive toward each other, and have lunch when they meet. They both drive for 2 hours. Carin drives 5 miles per hour faster than Peter. Peter drives a total of 82 miles. How fast does each person drive? Use the equation d = rt.

14. **Challenge** A circus performer is riding a unicycle in a circle. He is riding 2.5 meters per second. He can go 10 times around the circle in 2 minutes. What is the distance around the circle? Use the equation d = rt.

15. **Challenge** You and a friend begin hiking a 20-mile trail at noon. You hike 6 miles in 3 hours.

    a) Continuing at this rate, how long will it take to hike the entire trail?

    b) Will you reach the end of the trail before 8 P.M.?

    ❍ A. Yes

    ❍ B. No

Practice 11-3: ***Constant Speed***

1. 64 mi
2. 2 mph
3. 454
4. 46
5. 6 hr
6. 30 min
7. **a)** Answers will vary
   b) B
8. C
9. **a)** 3 mi
   b) D
10. 2.3
11. **a)** Answers will vary
    b) B
12. 24 mph
13. Peter drives 41 mi/hr
    Carin drives 46 m/hr
14. 30 m
15. **a)** 10 hr
    b) B

Name _____ Class _____ Date _____

Practice 11-4

Measurements and Ratios

1. Convert 16 yards to feet. Use the rate suggested by the equation 3 feet = 1 yard.

2. Convert 10 pints to quarts. Use the rate suggested by the equation 1 quart = 2 pints.

3. Convert 13 inches to centimeters. Use the rate, or conversion factor, $\frac{2.54 \text{ centimeters}}{1 \text{ inch}}$.

4. Convert 33 centimeters to inches. Use the rate, or conversion factor, $\frac{1 \text{ inch}}{2.54 \text{ centimeters}}$.

5. A chef at a restaurant uses 12 pounds of butter each day. About how many grams of butter does the chef use each day? Use the conversion factors $\frac{16 \text{ ounces}}{1 \text{ pound}}$ and $\frac{28.4 \text{ grams}}{1 \text{ ounce}}$.

6. A cake recipe calls for 550 grams of flour. About how many pounds of flour do you need? Use the conversion factors $\frac{1 \text{ ounce}}{28.4 \text{ grams}}$ and $\frac{1 \text{ pound}}{16 \text{ ounces}}$.

7. **Writing** Paul's car holds at most 19 gallons of gas. Now it has 9 gallons.

a) Explain how to find the amount of gas he needs, in liters, to fill the gas tank. Use the conversion factors $\frac{4 \text{ quarts}}{1 \text{ gallon}}$ and $\frac{0.94 \text{ liters}}{1 \text{ quart}}$.

b) How many liters of gas does Paul need to fill his gas tank?

8. **Reasoning** Simone wants to know if a new chest of drawers will fit next to her bed. The chest she would like to buy is 73 centimeters wide. She knows that her room is 86 inches wide. The bed is 76 inches wide.

Will the chest fit next to her bed? Use the conversion factor $\frac{2.54 \text{ centimters}}{1 \text{ inch}}$.

❍ A. No, the room needs to be 47.6 centimeters wider in order for the chest to fit.

❍ B. Yes, the chest fits with 47.6 centimeters of wall space remaining.

❍ C. No, the room needs to be 69.06 centimeters wider in order for the chest to fit.

❍ D. Yes, the chest fits with 69.06 centimeters of wall space remaining.

9. **Error Analysis** Two students, Stella and Vladimir, complete the conversion statement 12 feet 8 inches = _____ inches.

Stella	12 feet 8 inches = 152 inches
Vladimir	12 feet 8 inches = 9 inches

a) Which student is correct?

❍ A. Vladimir ❍ B. Stella

b) What is the likely cause of the other student's error? Use the conversion factor $\frac{12 \text{ inches}}{1 \text{ foot}}$.

❍ A. The student used multiplication instead of division.

❍ B. The student used the conversion factor $\frac{1 \text{ inch}}{12 \text{ feet}}$.

❍ C. The student used the conversion factor $\frac{1 \text{ foot}}{12 \text{ inches}}$.

❍ D. The student used addition instead of multiplication.

10. **Plumbing** A school custodian discovered a leak in a water pipe. The custodian found that 1,920 fluid ounces of water had leaked out. How many gallons of water is this? Use the conversion factor $\frac{1 \text{ gallon}}{128 \text{ fluid ounces}}$.

11. **Estimation** You need 29 liters of water for a party. You can buy water in containers holding 4, 6, 8, or 10 gallons.

a) Estimate the amount of water you need in gallons. Use the conversion factor $\frac{1 \text{ gallon}}{4 \text{ liters}}$.

b) What size container should you buy to get an amount greater than but closest to 29 liters?

❍ A. 10-gallon ❍ C. 6-gallon

❍ B. 8-gallon ❍ D. 4-gallon

12. The hole for a support needs to be 6 feet deep. It is currently 1 foot 8 inches deep. How much deeper must the hole be? Use the conversion factor $\frac{12 \text{ inches}}{1 \text{ foot}}$.

13. Aidan needs 15 liters of cleaning solution. He can buy a 2-gallon jug ($4.28), a 3-gallon jug ($5.92), a 4-gallon jug ($6.56), or a 7-gallon jug ($12.98). Which jug should he purchase to get at least 15 liters of cleaning solution and spend the least amount of money? Use the conversion factors $\frac{1 \text{ quart}}{0.94 \text{ liters}}$ and $\frac{1 \text{ gallon}}{4 \text{ quarts}}$.

14. **Challenge** A car is traveling at 25 miles per hour. What is the car's speed in feet per second? Use the conversion factors $\frac{5,280 \text{ feet}}{1 \text{ mile}}$ and $\frac{1 \text{ hour}}{3,600 \text{ seconds}}$.

15. **Challenge** Kate is driving to visit a friend. Her gas tank is full with 56 liters at the start. Each time the tank is down to 3 liters, she refills it. She does this two times. After the last refill, Kate uses all of the gas in the tank. Her car gets 8 kilometers per liter. What is the distance that Kate drives in miles? Use the conversion factors $\frac{100,000 \text{ centimeters}}{1 \text{ kilometer}}$, $\frac{1 \text{ inch}}{2.54 \text{ centimeters}}$, and $\frac{1 \text{ mile}}{63,360 \text{ inches}}$.

Practice 11-4: Measurements and Ratios

1. 48
2. 5
3. 33.02
4. 12.99
5. 5,453
6. 1.2
7. **a)** Answers will vary
   b) 38 liters
8. A
9. **a)** B
   b) B
10. 15 gallons
11. **a)** Answers will vary
    b) B
12. 52 in.
13. 4-gallon
14. 36.67 ft/sec
15. 805 mi