

11. Tonya has a rectangular rug with an area of 21 square feet. The rug is 4 feet longer than it is wide.

Part A

Create an equation that can be used to determine the length and the width of the rug. Justify your answer.

Enter your equation and your justification in the space provided.



- ▶ Math symbols
- ▶ Relations
- ▶ Geometry
- ▶ Groups
- ▶ Trigonometry
- ▶ Statistics
- ▶ Greek

Part B

Tonya adds a 1.5-foot border all the way around the rug. What is the area of the enlarged rug? Show all your work.

Enter your answer and your work in the space provided.



- ▶ Math symbols
- ▶ Relations
- ▶ Geometry
- ▶ Groups
- ▶ Trigonometry
- ▶ Statistics
- ▶ Greek

12. A school is holding a raffle to earn money. This list shows all the prizes in the school's raffle.

- A computer that costs \$349
- A book collection that costs \$42
- A gift certificate that costs \$25
- A pair of movie tickets that costs \$18
- A gift basket that costs \$16

The raffle ticket price is set so that 75 raffle tickets will pay for all of the prizes.

Part A

Create a function that can be used to find the total amount of money the school earns by selling x tickets. Show your work used to create this function.

Enter your function and your work in the space provided.



- ▶ Math symbols
- ▶ Relations
- ▶ Geometry
- ▶ Groups
- ▶ Trigonometry
- ▶ Statistics
- ▶ Greek

Part B

The school's goal is to raise at least \$850 more than the total cost of the prizes. What is the minimum number of raffle tickets that have to be sold in order for the school to reach its goal?

Enter your answer in the box.

tickets

13. Two real numbers are defined as

$$a = 0.444444444444 \dots$$

$$b = 0.354355435554 \dots$$

Determine whether each number is rational or irrational. Is the product of a and b rational or irrational?

Justify your answers.

Enter your answers and your justifications in the space provided.



- ▶ Math symbols
- ▶ Relations
- ▶ Geometry
- ▶ Groups
- ▶ Trigonometry
- ▶ Statistics
- ▶ Greek

Marcella wants a job as a sales representative. She receives two job offers from companies that sell office machines to businesses.

- *Office Essentials* offers Marcella a salary of \$2,500 per month, plus a commission of \$125 for every office machine she sells.
- *Everything Office* offers her a salary of \$2,000 per month, plus a commission of \$150 for every office machine she sells.

Let M represent the total monthly earnings, in dollars, and let n represent the number of office machines sold in a month. For each company, write an equation that represents the relationship between M and n .

Enter your equations in the space provided.



- ▶ Main symbols
- ▶ Relations
- ▶ Geometry
- ▶ Groups
- ▶ Trigonometry
- ▶ Statistics
- ▶ Greek

Part B

Marcella wants to earn a total of at least \$4,000 per month. For each company, find the least number of office machines she would need to sell each month in order to meet this goal. Show your work.

Enter your answers and your work in the space provided.



- ▶ Main symbols
- ▶ Relations
- ▶ Geometry
- ▶ Groups
- ▶ Trigonometry
- ▶ Statistics
- ▶ Greek

Part C

Compare Marcella's possible earnings at *Office Essentials* to her possible earnings at *Everything Office*. How many machines would Marcella have to sell for the earnings at both companies to be the same? Find the interval of machines sold for which the total earnings at *Everything Office* are greater than the total earnings at *Office Essentials*. Show your work.

Enter your answers and your work in the space provided.



- ▶ Main symbols
- ▶ Relations
- ▶ Geometry
- ▶ Groups
- ▶ Trigonometry
- ▶ Statistics
- ▶ Greek

15. Two Web sites launched on the same day. At the end of the first week, the number of visitors to each Web site was 25. For the first eight weeks, the number of visitors to each Web site increased according to the corresponding rules

Web site A: The number of visitors doubled each week.

Web site B: The number of visitors increased by 150 each week.

Part A

Complete the table to show the number of visitors to each Web site for the first eight weeks.

Enter your answers in the table.

Web Site A Web Site B

Week 1:	25	25
Week 2:	<input type="checkbox"/>	<input type="checkbox"/>
Week 3:	<input type="checkbox"/>	<input type="checkbox"/>
Week 4:	<input type="checkbox"/>	<input type="checkbox"/>
Week 5:	<input type="checkbox"/>	<input type="checkbox"/>
Week 6:	<input type="checkbox"/>	<input type="checkbox"/>
Week 7:	<input type="checkbox"/>	<input type="checkbox"/>
Week 8:	<input type="checkbox"/>	<input type="checkbox"/>

Part B

Based on the data for the first eight weeks, Jose claims that the number of visitors to each Web site can be modeled as a linear function of the number of weeks online. For each Web site, decide if Jose's claim is correct. If it is correct, explain why. If it is not correct, explain why and describe a more appropriate model.

Enter your answers and your explanations in the space provided.

- ▶ Math symbols
- ▶ Fractions
- ▶ Geometry
- ▶ Groups
- ▶ Trigonometry
- ▶ Statistics
- ▶ Greek

16. Part A

Suppose that $y = 2x - 3$. The following points lie on the graph of this equation:

$$A(a, 2a - 3) \quad B(b, 2b - 3) \quad C(c, 2c - 3)$$

Amy claims that the slopes of \overline{AB} , \overline{BC} and \overline{AC} are equal. Prove that Amy's claim is correct. Show your work and explain your reasoning.

Enter your answer, your work, and your explanation in the space provided.



- ▶ Math symbols
- ▶ Relations
- ▶ Geometry
- ▶ Groups
- ▶ Trigonometry
- ▶ Statistics
- ▶ Greek

Part B

Are the points $(-1, 1)$ and $(1, -1)$ on the graph of $y = 2x - 3$?

Show your work and explain your reasoning.

Enter your answer, your work, and your explanation in the space provided.



- ▶ Math symbols
- ▶ Relations
- ▶ Geometry
- ▶ Groups
- ▶ Trigonometry
- ▶ Statistics
- ▶ Greek

17. Part A

List the steps to solve the equation $x^2 + 12x - 28 = 0$ by completing the square, and give the solution or solutions.

Enter your work and your answers in the space provided



- ▶ Math symbols
- ▶ Relations
- ▶ Geometry
- ▶ Groups
- ▶ Trigonometry
- ▶ Statistics
- ▶ Greek

Part B

Explain what value or values of c make the equation $x^2 + 12x + c = 0$ have one and only one solution. Justify your answer.

Enter your answer and your justification in the space provided



- ▶ Main symbols
- ▶ Relations
- ▶ Geometry
- ▶ Groups
- ▶ Trigonometry
- ▶ Statistics
- ▶ Greek

18. A quality-control technician at a candle factory tested eight 16-ounce candles, each 3 inches in diameter. These candles came from the same production run. The table shows the decrease in weight of each candle after burning for 3 hours. Candle makers believe that the rate at which the candles burn is constant.

Candle	1	2	3	4	5	6	7	8
Weight Loss (ounces)	0.5	0.6	0.5	0.7	0.7	0.5	0.5	0.6

- Write an equation that can be used to model the weight, w , of such a candle as a function of the number, h , of hours burning. Then, explain how the equation can be used to predict the weight of a candle that has burned for 5 hours.

Enter your equation and your explanation in the space provided.



- ▶ Math symbols
- ▶ Relations
- ▶ Geometry
- ▶ Groups
- ▶ Trigonometry
- ▶ Statistics
- ▶ Greek