1999 Released Items

Antibody Attack

1. Case Study 1

A scientist's research involves studying how well new medicines affect the production of antibodies i bloodstream. The research includes a number of different case studies. A partially completed table for Case 1 is shown below.

Case Study 1: Begin with 100 antibodies; increase by 20 each day

End of Day (d)	Number of Antibodies (n)
0	100
1	
2	
3	
4	
5	
6	
7	

In Case Study 1, the researcher begins with 100 antibodies, adds a medicine, and finds that the number of antibodies increases by 20 each day. If n = the number of antibodies and d = the number of days, write an equ that describes the number of antibodies (n) at the end of each day (d) for this case study. Then, assuming the growth continues at the same rate, predict the number of antibodies at the end of the 25th day.

Antibody Attack (continued)

2. Case Study 2

A different case study, Case Study 2, also begins with 100 antibodies, but the number of antibodies increases
40 each day. A partially completed table of Case Study 2 is shown below.

Case Study 2: Begin with 100 antibodies; increase by 40 each day

End of Day (d)	Number of Antibodies (n)
0	100
1	140
2	180
3	
4	
5	
6	
7	

At the end of how many days will there first be more than 1000 antibodies present in the bloodstream? Explain h
you arrived at your answer. (The grid is provided for your use, but you are not required to draw a graph to solve t
problem.)

Antibody Attack (continued)

3. Case Study 3

The researcher also studies cases where the number of antibodies increases by a given percent each day. Case Study 3 is an example of this type of growth where the study begins with 100 antibodies and the number of antibodies increases by 20% each day.

Complete the table in your answer booklet and use the grid to sketch a graph of Case Study 3 for 7 days. Label the axes, identify the scales, and title the graph.

Case Study 3: Begin with 100 antibodies; increase by 20% each day

End of Day (d)	Number of Antibodies (n)
0	100
1	120
2	144
3	
4	
5	
6	
7	

4. Case Studies 4 and 5

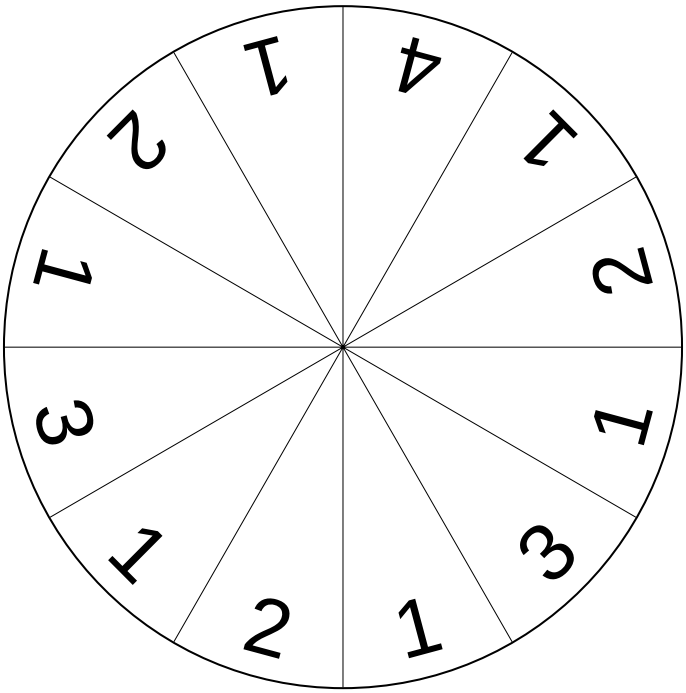
Two other case studies were both started on the same day. Descriptions of the two case studies are given bel

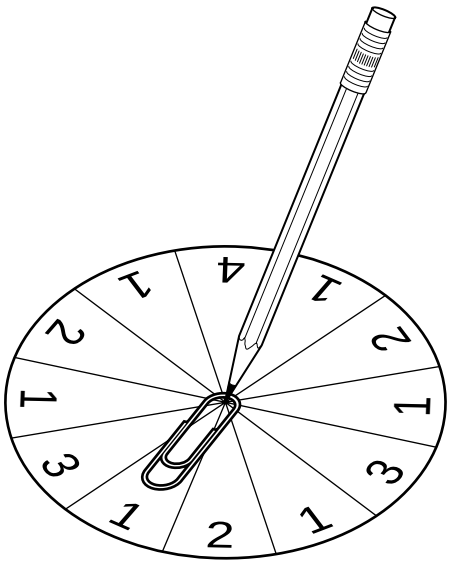
Case Study 4: Begin with 90 antibodies; increase by 30 each day
Case Study 5: Begin with 60 antibodies; increase by 25% each day

At the end of which day will there first be more antibodies in Case Study 5 than in Case Study 4? Explain ho you arrived at your answer. (The grid in your answer booklet is provided for your use, but you do not have to draw a graph to solve the problem.)

Spinner Explorations

You've been asked to take charge of a game at the school carnival that uses a spinner like the one below. The questions that follow involve the use of this spinner.





Spinner Explorations (continued)

1. **Expectations**
   Examine the numbers on the spinner. Assuming that the twelve sections are equal in size, how many 1's, 2's, 3's, and 4's would you expect mathematically if you spin the clip 20 times? Explain the mathematics you used to determine your answer.

2. **The Experiment**
   Now try out the spinner on the previous page using a paper clip and pencil (see the diagram below the spinner). Spin the clip 20 times and create a chart of your results. (If the clip lands on a line between two numbers, spin it again.) Then plot those results on the graph in your answer booklet.

3. **The Comparison**
   Write a paragraph to compare your expectations with your experimental results. You may want to compare the two frequency distributions, their means, or their medians.

Spinner Explorations (continued)

Use the information below to answer question 4.

For their annual fund raiser the school carnival committee wants to use this spinner in a game that works like this:

1 spin **25¢**	Win with every spin	If you spin	Then you win
		4	Grand prize
		3	1st prize
		2	2nd prize
		1	Consolation prize

You are responsible for selecting the prizes. A novelty sales representative recommends prizes for each outcome that would cost the committee the following amounts:

Outcome	**Wholesale cost of each prize**
4 (Grand Prize)	60¢
3 (1st prize)	30¢
2 (2nd prize)	20¢
1 (Consolation)	10¢

4. The Annual Fundraiser

About 1000 people are expected to play this game, and all unused prizes can be returned for a refund. Explain how much money will probably be made or lost for the carnival by this game if the sales representative's suggestion is followed.

A Trip To The Deli

Use the deli price list shown below to answer questions 1-4.

Prices per Pound	
Bologna	*$2.59*
Salami	*$2.29*
Turkey Breast	*$3.49*
Ham	*$3.70*
Roast Beef	*$4.25*
American Cheese	*$1.59*
Vermont Cheddar Cheese	*$1.90*
Swiss Cheese	*$1.89*
Provolone Cheese	*$2.10*

NO TAX ON DELI ITEMS

1. How much will it cost to purchase ½ pound of bologna and ¾ pound of turkey breast?

2. At the deli counter you order 2 ¾ pounds of salami, 5 ½ pounds of turkey breast and 1 pound of bologna for a family picnic. To the nearest 100^{th} of a pound, what is the total weight of the sandwich meat?

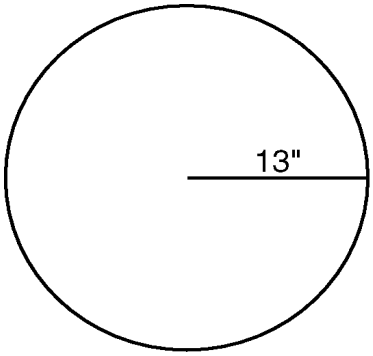
3. There are 20 slices of American cheese per pound (1 pound equals 16 ounces). How many ounces does a slice of American cheese weigh (to the nearest tenth of an ounce)?

4. The deli was forced to increase prices by 15%. What will a pound of roast beef cost after the increase?

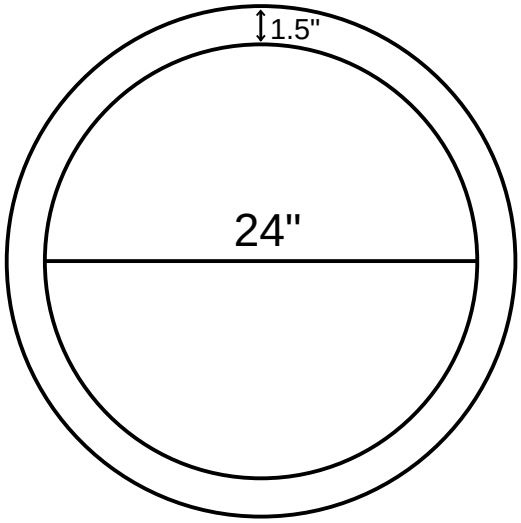
Bicycle Wheels

To solve the problems in Bicycle Wheels, you need to know that the circumference (C) of a circle can be calculated using the formulas **C = 2πr** or **C = πd**, where **r** is the length of the radius, **d** is the length of the diameter and **π** is approximately 3.14. You will also need to know that one mile = 5,280 feet.

1. The rim of the bicycle wheel shown below has a radius of 13 inches. What is the circumference of the rim of the wheel to the nearest tenth of an inch?



2. The rim of the bicycle wheel below has a diameter of 24 inches. When the tire is mounted on the wheel, the diameter of the wheel increases as shown.



To the nearest tenth of an inch, how much does the circumference of the bicycle wheel increase after the tire is mounted?

Bicycle Wheels (continued)

3. The distance that a wheel rolls in one revolution is equal to its circumference. Dylan knows that the wheels on his younger brother's bike have a circumference of 4.7 feet. How many feet will this bicycle travel when a wheel makes 400 revolutions?

4. The bicycle wheel shown below has a diameter of 2 feet. To the nearest whole number, how many revolutions will the wheel make when it rolls one mile?

5. A racer's bicycle wheel has a diameter of 2 feet 4 inches and makes 360 revolutions per minute. To the nearest tenth of a mile, how far will the bicycle travel in 5 minutes?