

Warm Up

10/30

Linear or not? If linear write the equation of the line.



x	3	9	30	36
y	4	2	-5	-7

Handwritten annotations: Above the x-values, blue arrows indicate differences: +6 (between 3 and 9), +21 (between 9 and 30), and +6 (between 30 and 36). Below the y-values, blue arrows indicate differences: -2 (between 4 and 2), -7 (between 2 and -5), and -2 (between -5 and -7). A red circle highlights the first data point (3, 4).



$$\frac{\Delta y}{\Delta x} = \frac{-2}{6} = \frac{-7}{21} = \frac{-2}{6} = -\frac{1}{3}$$

Slopes all equal,
data is linear

$$y = -\frac{1}{3}x + b$$

$$4 = -\frac{1}{3}(3) + b$$

$$4 = -1 + b$$

$$\begin{array}{r} +1 \quad +1 \\ \hline 5 = b \end{array}$$

$$y = -1/3x + 5$$



Problem 5.2

Recap

There are different ways to answer the question about political preferences of girls and boys in the sampled class.

- A** Use the table on the previous page. Do you think each statement is *true* or *false*? Justify your answers.

F
T
T
F

1. Girls and boys are equally likely to be Democrats.

G: $\frac{8}{16} = \frac{1}{2}$ B: $\frac{8}{24} = \frac{1}{3}$

2. Boys are more likely than girls to be Independents.

B: $\frac{4}{24} = \frac{1}{6}$ G: $\frac{2}{16} = \frac{1}{8}$

3. Boys are more likely than girls to be Republicans.

B: $\frac{12}{24} = \frac{1}{2} = \frac{4}{8}$ G: $\frac{6}{16} = \frac{3}{8}$

4. Girls are only half as likely as boys to be Republicans.

- B** Study the table of party choices and claims about differences between boys and girls. Notice that there are 24 boys and 16 girls in the class.

1. Copy and complete this extended table.

	Democrat	Independent	Republican	Totals
Boys	8	4	12	24
Girls	8	2	6	16
Totals	16	6	18	■

2. Do the totals of political party choices change your answers to Question A? Explain your reasoning.

- C** One way to compare groups with unequal numbers of members is to compute percents.

1. Copy and complete the table below to show the fractions or percents of boys and girls with each preference.

	Democrat	Independent	Republican
Boys	$\frac{8}{24} = \frac{1}{3} = 33\frac{1}{3}\%$	$\frac{4}{24} = 16.7\%$	$\frac{12}{24} = 50\%$
Girls	$\frac{8}{16} = 50\%$	$\frac{2}{16} = 12.5\%$	$\frac{6}{16} = 37.5\%$

Totals
24
16

2. Do the percent calculations change your answers to Question A? Explain your reasoning.

Do you think younger and older people have the same preferences for type of roller coaster? Wood or Steel?



5.1 Wood or Steel? That's the Question

Relationships in Categorical Data

To plan a new amusement park, a team of coaster designers asked customers, "Do you prefer wood or steel frames in roller coasters?" The table shows the preferences by age group.

		Prefer Wood	Prefer Steel
<i>Younger</i> <i>Older</i>	Age \leq 40 years	45	60
	Age $>$ 40 years	15	20



Does it look like younger and older riders have the same preferences in roller coaster type?

Problem 5.1

Study the roller coaster survey data by age of rider. Make a recommendation about the type of coaster that should be installed in the new park.

- A** Use the survey data. Is each statement *true* or *false*? Explain.
1. Younger riders are three times as likely as older riders to prefer wood-frame coasters.
 2. Younger riders are three times as likely as older riders to prefer steel-frame coasters.
 3. The number of riders who prefer wood-frame coasters is about three quarters of the number who prefer steel-frame coasters.
 4. Younger riders are more likely than older riders to prefer steel-frame coasters.
 5. Older riders are more likely than younger riders to prefer wood-frame coasters.

	Prefer Wood	Prefer Steel
Age \leq 40 years	45	60
Age $>$ 40 years	15	20

Problem 5.1 *continued*

B Suppose that a park installed one of each type of roller coaster. One day there were 210 riders over the age of 40 and 420 riders under the age of 40. Use the survey data from Question A.

1. How many riders would you expect on the wood-frame coaster and how many on the steel-frame coaster?
2. How would you expect those riders to be distributed by age and coaster type in the following table?

	Prefer Wood	Prefer Steel	Total
Age \leq 40 years	■	■	420
Age $>$ 40 years	■	■	210
Total	■	■	■

C If only one roller coaster type could be installed in the park, which would you recommend? Explain your choice.

	Prefer Wood	Prefer Steel	<u>Total</u>
Age \leq 40 years	45	60	<u>105</u>
Age $>$ 40 years	15	20	35

Homework

Finish Classwork.