

## Warm Up

10/31

Get out Problem 5.1 and be prepared to explain your work.

## Problem 5.1

# Recap

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.

Likely ~ Probably

we will need ratios

	Prefer Wood	Prefer Steel	Total
Age ≤ 40 years	45	60	105
Age > 40 years	15	20	35

younger  
older

How likely is it that a younger person will choose a wooden roller coaster?

$$\frac{45 \text{ (choose wood)}}{105 \text{ (total \# of young people)}} \approx 43\%$$

$$\frac{45}{105} = \frac{3}{7}$$

How likely is it for an older person?

$$\frac{15}{35} \approx 43\%$$

$$\frac{15}{35} = \frac{3}{7}$$

**FALSE** they have equal likelihood.

2. Younger riders are three times as likely as older riders to prefer steel-frame coasters.

		Prefer Wood	Prefer Steel	Total
Young	Age ≤ 40 years	45	60	105
Old	Age > 40 years	15	20	35

Young:  $\frac{60}{105} = \frac{4}{7}$

Old:  $\frac{20}{35} = \frac{4}{7}$

equal!

FALSE

3. The number of riders who prefer wood-frame coasters is about three quarters of the number who prefer steel-frame coasters.

		Prefer Wood	Prefer Steel	Total
Young	Age ≤ 40 years	45	60	105
Old	Age > 40 years	15	20	35
Totals		60	80	

$$\frac{60 \text{ prefer wood}}{80 \text{ prefer steel}} = \frac{3}{4}$$

TRUE

4. Younger riders are more likely than older riders to prefer steel-frame coasters.

		Prefer Wood	Prefer Steel	Total
Young	Age ≤ 40 years	45	60	105
Old	Age > 40 years	15	20	35

younger  $\frac{60}{105} \sim 57\%$   $\frac{4}{7}$

older  $\frac{20}{35} \sim 57\%$   $\frac{4}{7}$

**FALSE**

5. Older riders are more likely than younger riders to prefer wood-frame coasters.

		Prefer Wood	Prefer Steel	Total
Young	Age ≤ 40 years	45	60	<u>105</u>
Old	Age > 40 years	15	20	35

$\frac{45}{105}$  ?  $\frac{15}{35}$   
 young      older

**FALSE**

$\frac{45}{105}$        $\frac{15}{35}$   
 $\times 3$        $\times 3$

These are equivalent

**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.

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

	Prefer Wood	Prefer Steel	Total
Age ≤ 40 years	180	240	420
Age > 40 years	90	120	210
Total	■	■	■

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

Why do we need this table?

	Prefer Wood	Prefer Steel	Total
Age ≤ 40 years	45	60	105
Age > 40 years	15	20	35

	Wood	Steel	
≤ 40	$\frac{45}{105} = 43\%$	$\frac{60}{105} \approx 57\%$	Total = 420
	$0.43 \cdot 420$	$0.57 \cdot 420$	
	~ 180	~ 240	

	Wood	Steel	
> 40	$\frac{15}{35} = 43\%$	$\frac{20}{35} = 57\%$	Total = 210
	$0.43 \cdot 210$	$0.57 \cdot 210$	
	~ 90	~ 120	

**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.

Why do we need this table?

	Prefer Wood	Prefer Steel	Total
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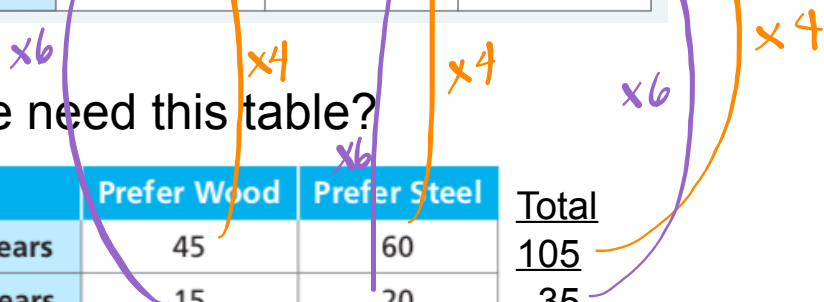
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Total			

Why do we need this table?

	Prefer Wood	Prefer Steel	Total
Age ≤ 40 years	45	60	105
Age > 40 years	15	20	35



2. How would you expect those riders to be distributed by age and coaster type in the following table?

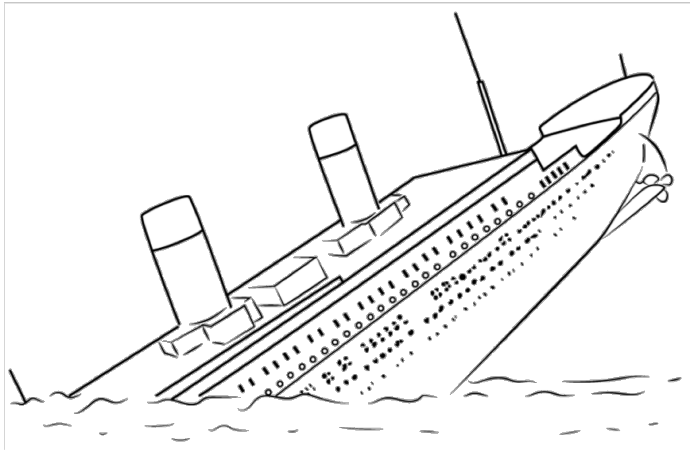
	Prefer Wood	Prefer Steel	Total
Age $\leq$ 40 years	■	■	420
Age $>$ 40 years	■	■	210
Total	■	■	■

Why do we need this table?

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

# Classwork

Page 121, #'s 16 and 17



Exercises 16 and 17 use the survival rate data of men, women, and children on the *Titanic*. Page 121

Passenger Category	Saved	Lost	Totals
Men	338	1,352	1690
Women	316	109	425
Children	56	53	109

16. Which of these claims about survival rates on the *Titanic* are true? Explain your reasoning.
- a. More men than women were saved.
  - b. Women were more likely than children to be lost.
  - c. Men were about six times as likely to be saved as children.

Passenger Category	Saved	Lost
Men	338	1,352
Women	316	109
Children	56	53

Total  
1690

17. Another way to see whether men, women, and children were lost at the same rate is to find the overall survival rate for all *Titanic* passengers. Use the overall rate to find expected survival counts for each passenger category. Overall, 32% of passengers were saved and 68% lost their lives.
- a. Use the total numbers of men, women, and children on board the *Titanic* and use the overall survival rates. Copy and complete the table below.

Passenger Category	Expected Saved	Expected Lost
Men	540.8	1149.2
Women	■	■
Children	■	■

- b. Compare the table in part (a) with the data table. Which passenger categories had greater numbers of survivors than you would expect if all categories had the same proportion? Explain.

$$32\% \text{ of } 1690 = 0.32 \cdot 1690$$

# Homework

Finish classwork