winma+h
Career Infused Capstone Projects

Name:

Building a Better Bike

The following questions show the adjustments that you will make to the weight of several important bike parts. The starting weight is provided. You will add or subtract the amount shown in the adjustment column by changing the equivalent fractions. Answers should be reduced to simplest terms.

Question 1

This table shows adjustments to the weight of the wheels for each type of bike. Use ONLY the information in the row for the type of bike you designed.

Type of Bike	Starting Weight (in ounces)	Adjustment	New Weight (in ounces)
Faster	$73\frac{1}{2}$	Subtract $25\frac{5}{16}$	
Freestyle	$73\frac{1}{2}$	Add $15\frac{3}{16}$	
More Comfortable	$73\frac{1}{2}$	Add $21\frac{3}{8}$	

What is the new wheel weight for the type of bike you designed? Show or explain how you found the answer.

Question 2

This table shows adjustments to the weight of the handlebars for each type of bike. Use ONLY the information in the row for the type of bike you designed.

Type of Bike	Starting Weight (in ounces)	Adjustment	New Weight (in ounces)
Faster	$10\frac{5}{16}$	Subtract $2\frac{3}{4}$	
Freestyle	$10\frac{5}{16}$	Add $\frac{3}{8}$	
More Comfortable	$10\frac{5}{16}$	Add $3\frac{1}{8}$	

What is the new weight for the handlebars for type of bike you designed? Show or explain how you found the answer.

Question 3

This table shows adjustments to the weight of the seat for each type of bike. Use ONLY the information in the row for the type of bike you designed.

Type of Bike	Starting Weight (in ounces)	Adjustment	New Weight (in ounces)
Faster	$18\frac{7}{8}$	Subtract $11\frac{3}{4}$	
Freestyle	$18\frac{7}{8}$	Add $1\frac{1}{4}$	
More Comfortable	$18\frac{7}{8}$	Subtract $8\frac{7}{16}$	

What is the new weight for the seat for type of bike you designed? Show or explain how you found the answer.

Question 4

This table shows adjustments to the weight of the pedals for each type of bike. Use ONLY the information in the row for the type of bike you designed.

Type of Bike	Starting Weight (in ounces)	Adjustment	New Weight (in ounces)
Faster	$11\frac{7}{8}$	Subtract $9\frac{1}{4}$	
Freestyle	$11\frac{7}{8}$	Add $3\frac{1}{2}$	
More Comfortable	$11\frac{7}{8}$	Add $5\frac{3}{4}$	

What is the new weight for the pedals for type of bike you designed? Show or explain how you found the answer.

Question 5

This table shows the changes made to each style of bike.

	Faster Bike	Freestyle Bike	More Comfortable Bike
Wheels	Subtract $25\frac{5}{16}$	Add $15\frac{3}{16}$	Add $21\frac{3}{8}$
Handlebars	Subtract $2\frac{3}{4}$	Add $15\frac{3}{8}$	Add $3\frac{1}{8}$
Seat	Subtract $11\frac{3}{4}$	Add $1\frac{1}{4}$	Add $8\frac{7}{16}$
Pedals	Subtract $9\frac{1}{4}$	Add $3\frac{3}{2}$	Add $5\frac{3}{4}$

Round the fractions so they are easier to add or subtract in your head. Use rounding to estimate the total amount of weight that you added to or subtracted from the generic bike to make the bike you designed. Explain your thinking.

Question 6

After building a model of your bike, you want to have it tested by several different riders. Each rider rates the bike by giving it between one or four starts (four starts is the highest rating). The results are show in the table.

How Riders Rate Your bike.

Factor	One Star ★	Two Stars ★ ★	Three Stars ★ ★ ★	Four Stars ★★★★
Fun to Ride	$\dfrac{2}{9}$	$\dfrac{1}{5}$	$\dfrac{1}{3}$	$\dfrac{11}{45}$
Comfortable	$\dfrac{1}{6}$	$\dfrac{13}{16}$	$\dfrac{3}{20}$	$\dfrac{6}{15}$
Looks Cool	$\dfrac{1}{12}$	$\dfrac{2}{5}$	$\dfrac{7}{30}$	$\dfrac{6}{15}$

Is it reasonable to say that more riders gave the bike model four starts than gave the bike one start for being fun to ride? Explain your thinking.

Question 7

How Riders Rate Your bike.

Factor	One Star ★	Two Stars ★ ★	Three Stars ★ ★ ★	Four Stars ★ ★ ★ ★
Fun to Ride	$\dfrac{2}{9}$	$\dfrac{1}{5}$	$\dfrac{1}{3}$	$\dfrac{11}{45}$
Comfortable	$\dfrac{1}{6}$	$\dfrac{13}{16}$	$\dfrac{3}{20}$	$\dfrac{6}{15}$
Looks Cool	$\dfrac{1}{12}$	$\dfrac{2}{5}$	$\dfrac{7}{30}$	$\dfrac{6}{15}$

Is it reasonable to say that over half of the riders gave the bike three stars or more for being comfortable? Explain your thinking.

Question 8

How Riders Rate Your Bike.

Factor	One Star ★	Two Stars ★ ★	Three Stars ★ ★ ★	Four Stars ★ ★ ★ ★
Fun to Ride	$\dfrac{2}{9}$	$\dfrac{1}{5}$	$\dfrac{1}{3}$	$\dfrac{11}{45}$
Comfortable	$\dfrac{1}{6}$	$\dfrac{13}{16}$	$\dfrac{3}{20}$	$\dfrac{6}{15}$
Looks Cool	$\dfrac{1}{12}$	$\dfrac{2}{5}$	$\dfrac{7}{30}$	$\dfrac{6}{15}$

Is it reasonable to say that over $\frac{3}{4}$ of the riders gave the bike three stars or more for looking cool? Explain your thinking.

Question 9

When asked if they would like to buy the bike, $\frac{1}{8}$ of the riders said "no," and $\frac{3}{7}$ of the riders said "maybe." The remaining riders said they would "definitely" buy this bike.

a) Without doing the math, estimate the fraction of riders who said they would definitely buy your bike. Explain how you found your estimate.

b) Convert the results to fractions with equivalent denominators to determine exactly what fraction of the riders answered "definitely." Show or explain how you found the answer. How accurate was your estimate?