

## Comparing Percentages of Iditarod Finishers

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**Discipline / Subject:** Math

**Topic:** Analyze and Solve Percent Problems

**Grade Level:** 6, 7, 8

**Resources / References / Materials Teacher Needs:**

- Race data which outlines the number of Iditarod mushers and Iditarod finishers from each year

**Lesson Summary:** Students will analyze data which outlines the total number of mushers and finishers from every Iditarod Race since 1973. Students will write ratios in which the numerator represents the number of finishers and the denominator represents the total number of mushers. They will convert the ratios into percents and decimals, and then they will compare the percentage of finishers from each year and each decade.

**Standard's Addressed: (Local, State, or National)**

**MP.1** - Make sense of problems and persevere in solving them.

**MP.2** - Reason abstractly and quantitatively.

**MP.4** - Model with mathematics.

**MP.6** - Attend to precision.

**CCSS. MATH. CONTENT.7.RP.A.3** - Use proportional relationships to solve multi-step ratio, rate, and percent problems.

**CCSS.MATH.CONTENT.7.NS.2.d.-** Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats

**CCSS.MATH.CONTENT.6.RP.A.3-** Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

**CCSS.MATH.CONTENT.6.RP.A.3.C-** Find a percent of a quantity as a rate per 100

**CCSS.MATH.CONTENT.6.SP.A.1-** Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.

**CCSS.MATH.CONTENT.6.SP.B.4-** Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

**CCSS.MATH.CONTENT.7.RP.A.1-** Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.

**Learning Objectives:**

1. Students will calculate percents using data from the Iditarod race archives.
2. Students will analyze percents of a number in a real-world context.
3. Students will interpret percents and make comparisons.

**Method of assessment for learning:**

Students have successfully written ratios of Iditarod finishers to overall mushers, they have converted those ratios to percents and decimals, and they have compared their findings in order to determine which year(s) had the highest percentage of Iditarod finishers.

**Procedural Activities**

1. Ensure that students know how to write a ratio, convert ratios to percents, convert ratios to decimals, and round decimals to the nearest hundredth.
2. Engage in a classroom discussion and generate a list of where we see ratios, decimals, and percents in our everyday lives. Discuss how and why percents are used in sports. What are the benefits of comparing sets of data?
3. Model for students how to write a ratio, convert it to a percent and convert it to a decimal (rounded to the nearest hundredth).
4. Give each student a copy of the assignment and review the directions.

5. Instruct the students to complete the first problem. Check for understanding by reviewing as a class.

6. Have students complete the rest of the assignment. Circulate around the room to check for understanding and provide assistance.

*-You may decide to have students complete this assignment with a partner for some or all of the assignment.*

7. For problem 26, review what a histogram is and remind students that they need to consider the *frequency* of percentages before they create their histograms. [Click here](#) for a resource which shares key information about histograms.

8. When students have finished, share the results as a class.

**Materials Students Need:**

- Each student must have a copy of the assignment which shows the number of mushers and finishers of each Iditarod race
- Chart paper to create a histogram
- Access to Microsoft Excel in order to create a histogram (optional)

**Technology Utilized to Enhance Learning:**

- [Iditarod race archives](#)
- Technology to access Microsoft Excel in order to create a histogram

**Other Information:**

- This lesson opens up a tremendous opportunity to discuss all of the different factors and elements which cause a musher to scratch from the Iditarod

**Modifications for Special Learners/ Enrichment Opportunities:**

- Allow students the use of a calculator and math reference sheet
- Reduce the number of problems
- Do not provide students with the data; have them research the data and create their own tables
- Students can research how the Iditarod has evolved from its start
- Students can conduct research in order to develop an understanding about why certain years and/or decades had more mushers and finishers compared to others

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Comparing Percentages of Iditarod Finishers

**Directions:** Look at the following set of data which shows the total number of mushers and finishers for each year the Iditarod ran during the 1970s. Use the data to help you answer 1-4.

Year of Race	Total # of Mushers	Total # of Finishers
1973	34	22
1974	44	26
1975	41	25
1976	47	34
1977	47	36
1978	39	34
1979	55	47

1. For each year, write a ratio in which the *numerator* reflects the number of finishers and the *denominator* reflects the total number of mushers for that particular year. Then, convert each ratio to calculate the percent of mushers who finished the Iditarod. You must also convert the ratio into a decimal and round to the nearest hundredth. Show ALL of your work on a separate sheet of paper. Record your answers below.

Year of Race	Ratio	Percent	Decimal
1973			
1974			
1975			
1976			
1977			
1978			
1979			

2. Which year had the highest percentage of finishers? \_\_\_\_\_

3. Which year had the lowest percentage of finishers? \_\_\_\_\_

4. Overall, including all of the years, what percent of mushers finished the Iditarod in the 1970s? You must show you work. \_\_\_\_\_

**Directions:** Look at the following set of data which shows the total number of mushers and finishers for each year the Iditarod ran during the 1980s. Use the data to help you answer 5-8.

<b>Year of Race</b>	<b>Total # of Mushers</b>	<b>Total # of Finishers</b>
1980	60	36
1981	53	38
1982	54	46
1983	68	54
1984	67	45
1985	61	40
1986	73	55
1987	63	50
1988	52	45
1989	49	38

5. **REFER** to the **DIRECTIONS** from number one.

<b>Year of Race</b>	<b>Ratio</b>	<b>Percent</b>	<b>Decimal</b>
1980			
1981			
1982			
1983			
1984			
1985			
1986			
1987			
1988			
1989			

6. Which year had the highest percentage of finishers? \_\_\_\_\_

7. Which year had the lowest percentage of finishers? \_\_\_\_\_

8. Overall, including all of the years, what percent of mushers finished the Iditarod in the 1980s? You must show you work. \_\_\_\_\_

**Directions:** Look at the following set of data which shows the total number of mushers and finishers for each year the Iditarod ran during the 1990s. Use the data to help you answer 9-12.

Year of Race	Total # of Mushers	Total # of Finishers
1990	70	61
1991	76	60
1992	76	63
1993	68	54
1994	58	50
1995	59	49
1996	60	49
1997	53	44
1998	63	51
1999	56	47

9. **REFER** to the **DIRECTIONS** from number one.

Year of Race	Ratio	Percent	Decimal
1990			
1991			
1992			
1993			
1994			
1995			
1996			
1997			
1998			
1999			

10. Which year had the highest percentage of finishers? \_\_\_\_\_

11. Which year had the lowest percentage of finishers? \_\_\_\_\_

12. Overall, including all of the years, what percent of mushers finished the Iditarod in the 1990s? You must show you work. \_\_\_\_\_

**Directions:** Look at the following set of data which shows the total number of mushers and finishers for each year the Iditarod ran during the 2000s. Use the data to help you answer 13-16.

Year of Race	Total # of Mushers	Total # of Finishers
2000	81	68
2001	68	57
2002	64	55
2003	64	44
2004	87	77
2005	79	63
2006	83	71
2007	82	58
2008	96	78
2009	67	52

13. **REFER** to the **DIRECTIONS** from number one.

Year of Race	Ratio	Percent	Decimal
2000			
2001			
2002			
2003			
2004			
2005			
2006			
2007			
2008			
2009			

14. Which year had the highest percentage of finishers? \_\_\_\_\_

15. Which year had the lowest percentage of finishers? \_\_\_\_\_

16. Overall, including all of the years, what percent of mushers finished the Iditarod in the 2000s? You must show you work. \_\_\_\_\_

**Directions:** Look at the following set of data which shows the total number of mushers and finishers for each year the Iditarod ran during the 2010s. Use the data to help you answer 17-20.

<b>Year of Race</b>	<b>Total # of Mushers</b>	<b>Total # of Finishers</b>
2010	71	55
2011	62	47
2012	66	52
2013	66	54
2014	69	49
2015	78	66
2016	85	71
2017	72	64
2018	67	52

17. **REFER** to the **DIRECTIONS** from number one.

<b>Year of Race</b>	<b>Ratio</b>	<b>Percent</b>	<b>Decimal</b>
2010			
2011			
2012			
2013			
2014			
2015			
2016			
2017			
2018			
2019			

18. Which year had the highest percentage of finishers? \_\_\_\_\_

19. Which year had the lowest percentage of finishers? \_\_\_\_\_

20. Overall, including all of the years, what percent of mushers finished the Iditarod in the 2010s? You must show you work. \_\_\_\_\_

21.	Which <u>decade</u> had the highest percentage of Iditarod finishers?	
	What was the percent?	
22.	Which <u>decade</u> had the lowest percentage of Iditarod finishers?	
	What was the percent?	
23.	Which <u>year</u> had the highest percentage of Iditarod finishers?	
	What was the percent?	
24.	Which <u>year</u> had the lowest percentage of Iditarod finishers?	
	What was the percent?	
25.	What percent of mushers have finished the Iditarod between 1973 and 2018?	

26. Now that you have calculated the percent of mushers who have finished the Iditarod each year, create a histogram in which you graph the percent of mushers who finished the Iditarod during each decade (1970s, 1980s, 1990s, 2000s, and 2010s). You can graph your histogram on chart paper or you can make it using Microsoft Excel. Use the table on the next page to help you determine the frequency of Iditarod finishers.

<b>Percents</b>	<b>Frequency</b>	<b>Percents Included in this Interval</b>
20-29		
30-39		
40-49		
50-59		
60-69		
70-79		
80-89		
90-100		