**Main Problem #2**

Topic: *Comparing and Ordering Fractions*

Problem: You are representing your school, *Newton Academy,* at the national cross country meet, and this year you will be competing against 4 other schools for the title of “National Champion”. After years of training, you are confident that you can run the full 24 miles. You line up against the other 4 competitors and, after the referee gives the start signal, the five of you start running. Below are the names of the schools competing and the fraction of the total distance they covered every 30 minutes.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| SCHOOL/MINUTES | 30 | 60 | 90 | 150 |
| Newton Academy | $$\frac{1}{6}$$ | $$\frac{3}{8}$$ | $$\frac{5}{6}$$ | $$\frac{23}{24}$$ |
| Xavier’s School | $$\frac{5}{24}$$ | $$\frac{3}{6}$$ | $$\frac{20}{24}$$ | $$\frac{7}{8}$$ |
| Hogwarts School | $$\frac{1}{8}$$ | $$\frac{4}{8}$$ | $$\frac{6}{8}$$ | $$\frac{11}{12}$$ |
| Pi Academy | $$\frac{6}{24}$$ | $$\frac{11}{24}$$ | $$\frac{3}{4}$$ | $$\frac{4}{4}$$ |
| Ivy League School | $$\frac{3}{24}$$ | $$\frac{2}{4}$$ | $$\frac{7}{8}$$ | $$\frac{22}{24}$$ |

Q. For every 30 minutes, list the schools, according to their fractions, from least to greatest. If the fraction for two schools are equal, write “(School 1 = School 2)”.

**Note:** Students will have to apply their knowledge of the Least Common Multiple and the Greatest Common Factor in order to list the fractions in increasing order. For some fractions, the conversion process is not necessary but strongly encouraged.

**Key:** Let*x* represents any whole number:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| $$\frac{x}{24}⋅\frac{1}{1}=\frac{x}{24}$$ | $$\frac{x}{12}⋅\frac{2}{2}=\frac{2x}{24}$$ | $$\frac{x}{8}⋅\frac{3}{3}=\frac{3x}{24}$$ | $$\frac{x}{6}⋅\frac{4}{4}=\frac{4x}{24}$$ | $$\frac{x}{4}⋅\frac{6}{6}=\frac{6x}{24}$$ | $$\frac{x}{3}⋅\frac{8}{8}=\frac{8x}{24}$$ | $$\frac{x}{2}⋅\frac{12}{12}=\frac{12x}{24}$$ |

1. For convenience, all the fractions will have 24 in their denominators.

(30 minutes)

Newton: $\frac{1}{6}⋅\frac{4}{4}=\frac{4}{24}$ Xavier: $\frac{5}{24}$ Hogwarts: $\frac{1}{8}⋅\frac{3}{3}=\frac{3}{24}$ Pi: $\frac{6}{24}$ Ivy: $\frac{3}{24}$

Answer: (Hogwarts = Ivy League), Newton, Xavier, Pi

(60 minutes)

Newton: $\frac{3}{8}⋅\frac{3}{3}=\frac{9}{24}$ Xavier: $\frac{3}{6}⋅\frac{4}{4}=\frac{12}{24}$ Hogwarts: $\frac{4}{8}⋅\frac{3}{3}=\frac{12}{24}$ Pi: $\frac{11}{24}$ Ivy: $\frac{2}{4}⋅\frac{6}{6}=\frac{12}{24}$

Answer: Newton, Pi, (Xavier = Hogwarts = Ivy)

(90 minutes)

Newton: $\frac{5}{6}⋅\frac{4}{4}=\frac{20}{24}$ Xavier: $\frac{20}{24}$ Hogwarts: $\frac{6}{8}⋅\frac{3}{3}=\frac{18}{24}$ Pi: $\frac{3}{4}⋅\frac{6}{6}=\frac{18}{24}$ Ivy: $\frac{7}{8}⋅\frac{3}{3}=\frac{21}{24}$

Answer: (Hogwarts = Pi), (Newton = Xavier), Ivy

(120 minutes)

 Newton: $\frac{23}{24}$ Xavier: $\frac{7}{8}⋅\frac{3}{3}=\frac{21}{24}$ Hogwarts: $\frac{11}{12}⋅\frac{2}{2}=\frac{22}{24}$ Pi: $\frac{4}{4}⋅\frac{6}{6}=\frac{24}{24}$ Ivy: $\frac{22}{24}$

Answer: Xavier, (Hogwarts = Ivy), Newton, Pi