

Session 3.2

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Recap of last time

1. If humans who are 6 feet tall need 9 pounds of food, then how much food does a 10 foot giant need?

$$\frac{\text{height}}{\text{food}} = \frac{6}{9} \stackrel{\div 3}{=} \frac{2}{3} \stackrel{\times 5}{=} \frac{10}{15}$$

2. If Abraham can beat 3 Pokemon gyms in 45 minutes, how much time does he need to beat all 8 Pokemon gyms and reach the elite four?

$$\frac{\text{gyms}}{\text{minutes}} = \frac{3}{45} \stackrel{\div 3}{=} \frac{1}{15} \stackrel{\times 8}{=} \frac{8}{120}$$

Main problems

1. Assortment of warm-up problems

- 6 : 15 as 14 : ?
- 10 : 15 as 25 : ?
- When Gustavo makes rice, he uses 6 cup of water for 15 cups of rice. How much rice does he need if he uses 10 cups of rice?
- Suppose Ben build 3 buildings in 7 years.
 - How long does it take to build 9 buildings? What about 10 buildings?
 - If Ben had 18 years, how many buildings can he build?
- Suppose Matthew can score 4 three-pointers in 20 seconds and Alberto can score 6 three-pointers in 32 seconds. As a team, how many complete three-pointers can they shoot in 45 seconds? What about 2 minutes?

2. Complete the following estimation problems:

- In Chicago, there are 12 McDonald's in 5 square miles. How many McDonald's would there probably be in 25 square miles? What about 100 square miles?
- If 9 out of 10 American adults have completed high school, then how high school graduates would you expect in a room full of 80 people?
- If 2 out of 3 high school graduates have gone to college, how many of the high school graduates above (from the room of 80 people) would you expect attended college?
- Suppose 3000 high school seniors applied to each of the following schools. How many would you expect to be accepted considering the acceptance rate?
 - University of Illinois at Urbana-Champaign with 66%
 - Northwestern University with 10.7%
 - University of Chicago with 7.9%
 - Yale University with 6.3%

- (e) If 15% of Americans suffer from diabetes, and the US population is 300 million, then how many Americans have diabetes?
- (f) If one diabetes doctor can treat 50 patients with diabetes, then how many diabetes doctors should the US have?
- (g) Suppose we tag 80 buffalo and then release them back into the wild. If we fly a helicopter over their grasslands and 10 out of 100 buffalo we see are tagged, what would you estimate as the size of the buffalo population?
- (h) Suppose we tag 80 buffalo and then release them back into the wild in March. Later on, in June, we tag 80 new buffalo and release them again. If we fly a helicopter over their grasslands and 20 out of 100 buffalo we see are tagged, what would you estimate as the size of the buffalo population?

Extra problems

1. Problems from 2010 AMC 8