






Completing Conversions Through Dimensional Analysis




Dimensional Analysis

 Dimensional Analysis is a useful way of completing conversion problems.


 This method of problem solving allows you to solve many problems by using the relationship of one unit to another.








Dimensional Analysis

 For example,



 1 day = 24 hours.

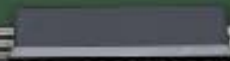
 Since these two numbers represent the same value, the fractions:


$$\frac{1 \text{ day}}{24 \text{ hours}} \text{ and } \frac{24 \text{ hours}}{1 \text{ day}} \text{ equal } \underline{\text{ONE}}$$



Dimensional Analysis

-  When you multiply a number by the number one, you do not change its value.
-  However, you may change its unit.

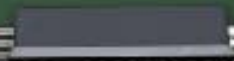





1) Convert 3 hours to days using dimensional analysis.

4. 2. ~~For the~~ ~~the~~ ~~cancel~~ ~~into~~ ~~a~~ ~~unit~~ ~~factor~~ ~~to~~ ~~by~~ ~~date~~ ~~ing~~ ~~equal~~
the quantities for the quantities with the same unit factor.
that types of units are connected.

$$3 \text{ hours} \times \frac{1 \text{ day}}{24 \text{ hour}} = \frac{3 \text{ day}}{24} = 0.125 \text{ day}$$





Dimensional Analysis




Conversion Factors


$$1 \text{ day} = \underline{24} \text{ hours}$$


$$1 \text{ hour} = \underline{60} \text{ minutes}$$


$$1 \text{ minute} = \underline{60} \text{ seconds}$$

Dimensional Analysis




Conversion Factors


$$1 \text{ mile} = \underline{5280} \text{ feet}$$


$$1 \text{ foot} = \underline{12} \text{ inches}$$


$$1 \text{ meter} = \underline{100} \text{ centimeters}$$



$$1 \text{ meter} = \underline{1000} \text{ millimeters}$$


Dimensional Analysis



Conversion Factors



1 kilometer = 1000 meters




1 inch = 2.54 centimeters




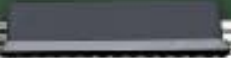

1 mile = 1.609 kilometers






Dimensional Analysis

2) 3 miles = ? inches






Dimensional Analysis

3) $852 \text{ m} = ? \text{ km}$

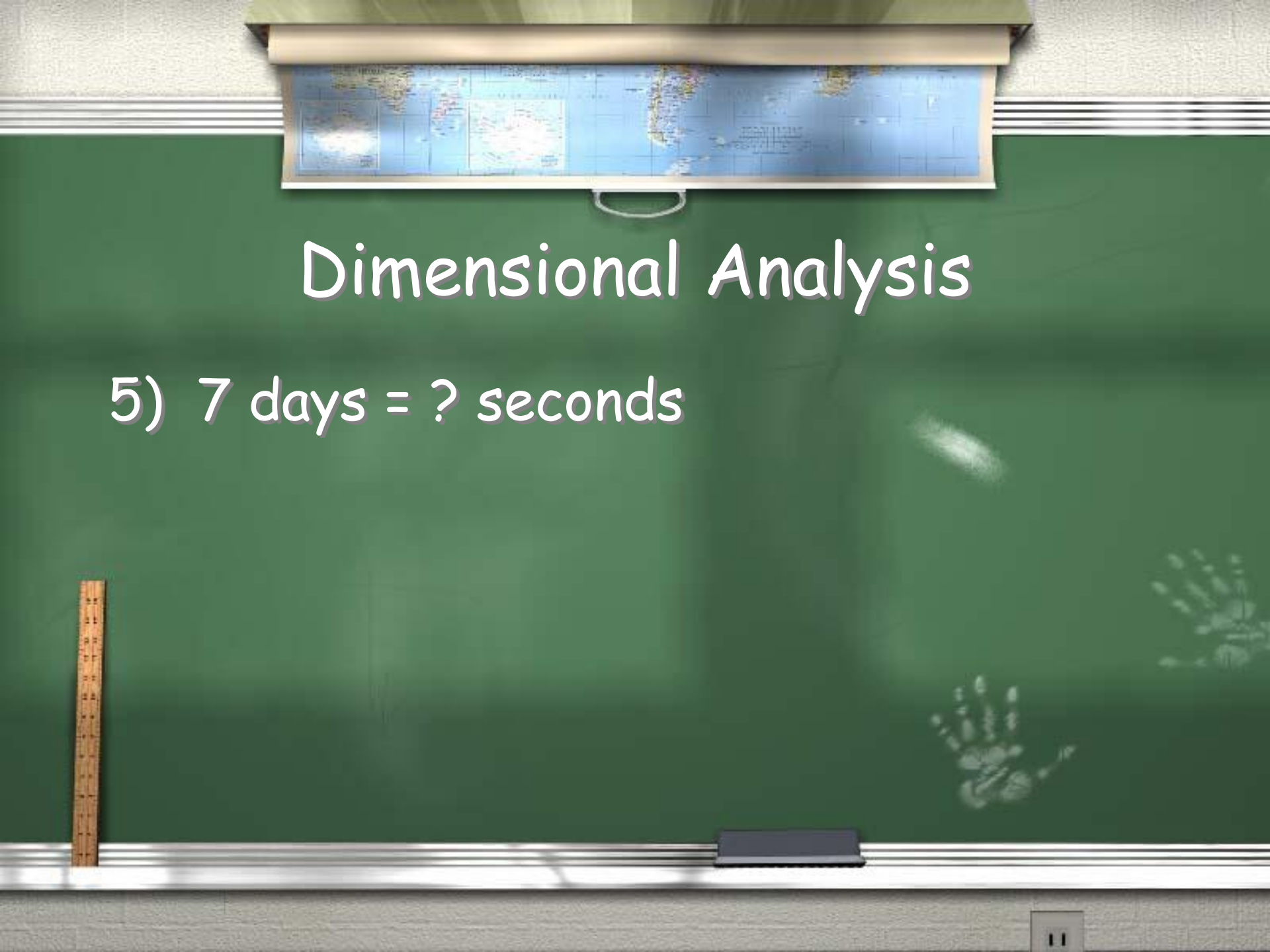




Dimensional Analysis


4) $74 \text{ km} = ? \text{ cm}$








Dimensional Analysis


5) 7 days = ? seconds



Dimensional Analysis

6) $10 \text{ km} = ? \text{ miles}$

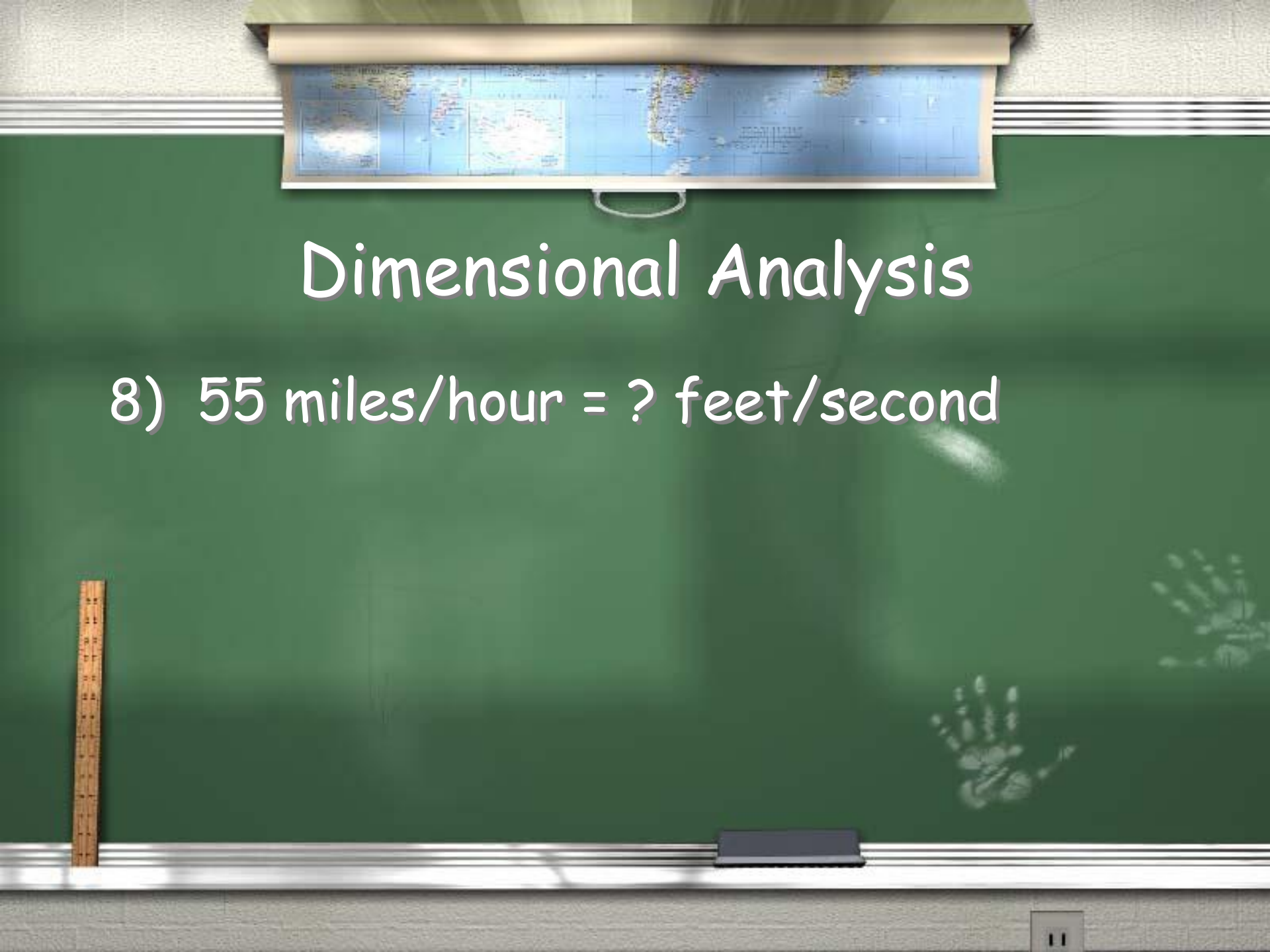




Dimensional Analysis

7) $6 \text{ km/hr} = ? \text{ km/s}$





Dimensional Analysis

8) 55 miles/hour = ? feet/second