

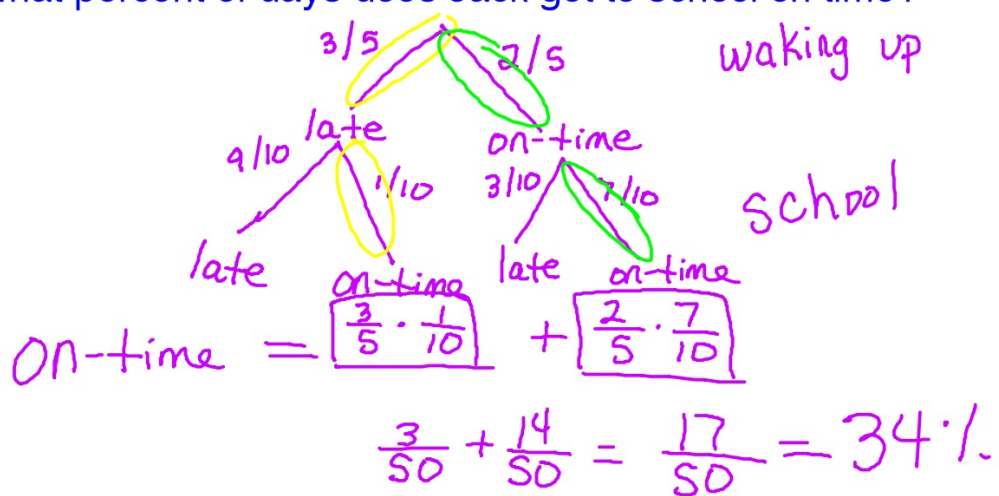
Tree Diagrams

Jack wakes up late on average 3 days in every 5.

If Jack wakes up late, the probability he's late for school is $9/10$

If Jack does not wake up late, the probability he's late for school is $3/10$

On what percent of days does Jack get to school on time?

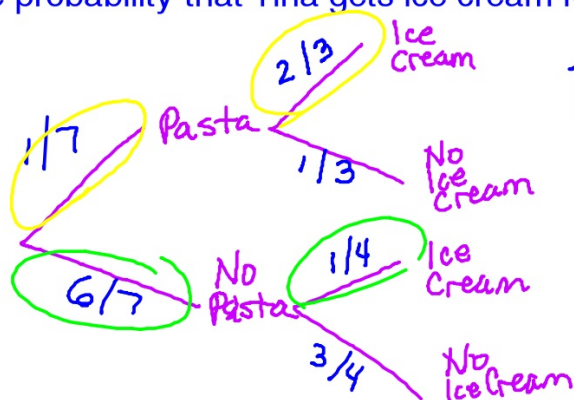


Tina's favorite meal is pasta, followed by ice cream for dessert.
Tina's mom cooks pasta once a week.

If Tina's mom cooks pasta, the probability Tina gets ice cream is $\frac{2}{3}$

If Tina's mom doesn't cook pasta, the probability Tina gets ice cream is $\frac{1}{4}$

What is the probability that Tina gets ice cream for dessert?



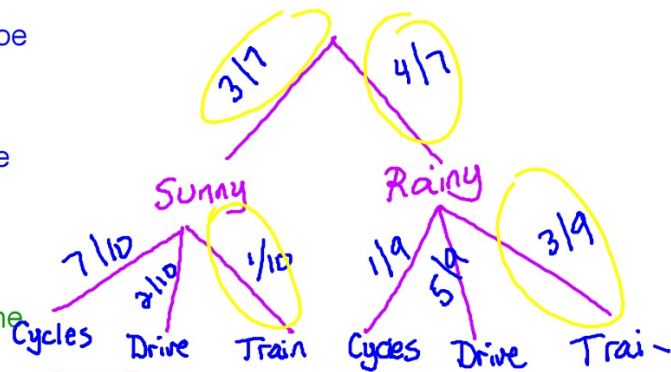
$$\begin{aligned} P(\text{ice cream}) &= \frac{1}{7} \cdot \frac{2}{3} + \frac{6}{7} \cdot \frac{1}{4} \\ &= \frac{2}{21} + \frac{6}{28} \\ &= .31 \end{aligned}$$

The probability of a sunny day is $\frac{3}{7}$ and the probability of a rainy day is $\frac{4}{7}$

Joe either cycles to work, drives to work, or takes the train to work.

If it's a sunny day, the probability that Joe cycles to work is $\frac{7}{10}$
drives to work is $\frac{2}{10}$

If it's a rainy day, the probability that Joe cycles to work is $\frac{1}{9}$
takes the train to work is $\frac{3}{9}$



1)

For a day selected at random, what's the probability that Joe takes the train?

$$P(\text{train}) = \frac{3}{7} \cdot \frac{1}{10} + \frac{4}{7} \cdot \frac{3}{9} = .233$$

2)

**If Joe took the train to work on a randomly selected day, what's the probability that it was a rainy day?

$$P(\text{rainy} | \text{train}) = \frac{\frac{4}{7} \cdot \frac{3}{9}}{\frac{3}{7} \cdot \frac{1}{10} + \frac{4}{7} \cdot \frac{3}{9}} = .816$$

