3.4 Lesson 3 Tree diagrams with Double Grim dice

1) Recall what we did last lesson. Why did we do it? What did we find?

2) We roll 2 blue dice. What are the possible outcomes? What are the possible totals of the two dice?

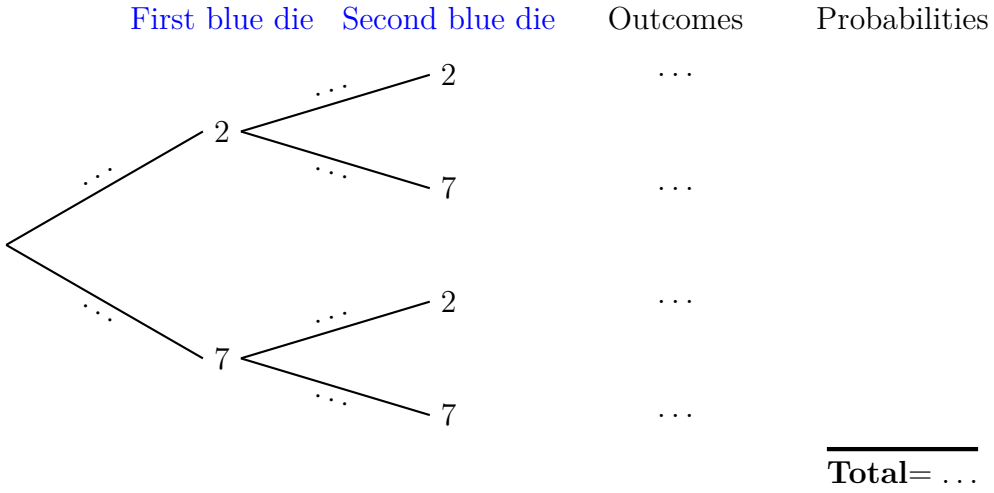
3) How can we find the chance of each outcome happening?

		Blue die					
Blue die							

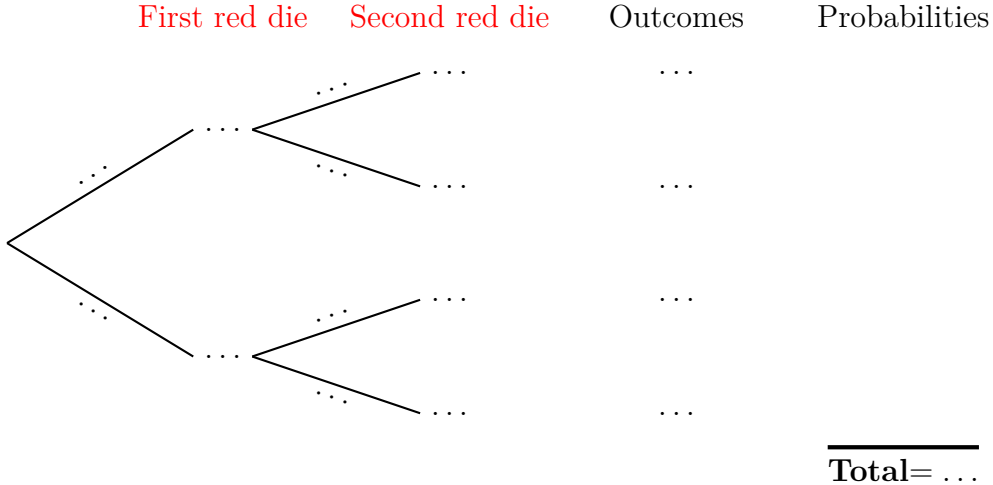
4) Do you know any other methods? Recall advantages of each.

5) Does it matter whether we roll one dice and then the other OR roll them both at once? Why?

Tree diagram is a method of solving probability questions by listing all the outcomes of an event. Probabilities are calculated by multiplying down the branches.



6) Using a tree diagram answer the following questions :
   a) What are the possible outcomes if we roll 2 red dice?
   b) What are the possible totals of the two dice?
   c) Does it matter whether we roll one dice and then the other OR roll them both at once? Why?
   d) Why might it be better to keep all the denominators the same?



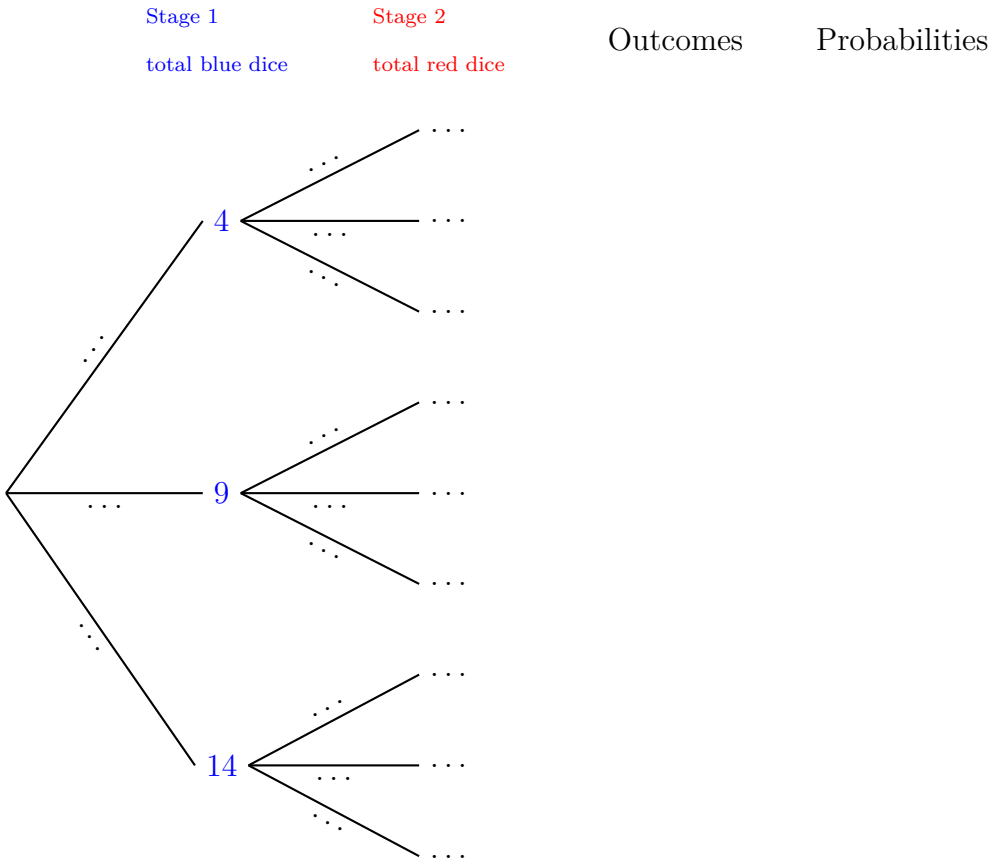
7) In a previous lesson we found that single red dice beats blue dice with a chance of $\frac{7}{12}$.
Let us add a new twist to the game :

> Each players picks two dice of the same color.
> The one that rolls the highest total wins.

a) Which do you think is better - a pair of blue dice, or a pair of red dice?
With roughly what probability?

b) Find the exact probability of double red dice beating double blue dice.

c) Does it matter whether you consider the red dice or blue dice first?



8) Repeat for a double dice pair of your choice :
   a) Hypothesis
   b) Working out, shown clearly and logically.
   c) Answer at end with a comment.

9) Using the table answers on the board, can you draw a diagram showing which dice colours beat the others? Compare it to the diagram we had for a single die.

10) Why are Red and Olive joined with a line instead of an arrow?
11) Can you devise a strategy to beat 2 other players when rolling double or single dice?