Addition and Multiplication principles

Year 11
Mathematical Methods

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Learning Objectives

By the end of the lesson, I hope that you understand and can apply the following to a range of questions from the Year 11 Mathematical Methods course.

- Understand what it means to be the “Addition Rule”
- Understand what it means by the term “The Multiplication Rule”
- Be able to apply the above concepts to a range of questions

RECAP

This is the first time this has been covered in Mathematical Methods (and I believe in courses before this). So, there is not really much I can do to recap. As is normal with any topic in this course and understanding of **WHY** is as important as **HOW**.

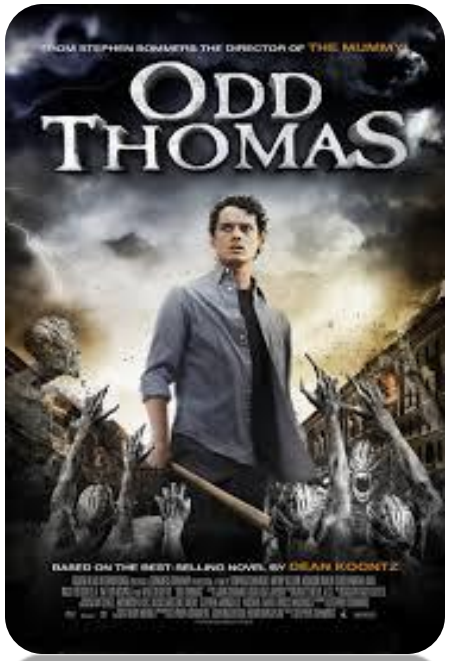
What do I wear each morning?

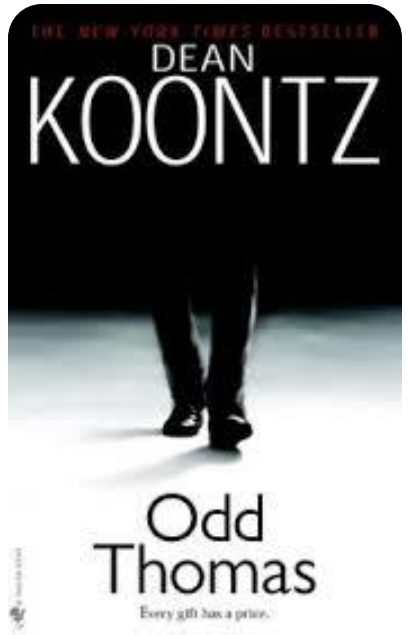
Dean Koontz has a great series of books about a gentleman called “Odd Thomas”. He can see dead people. But they can’t talk to him (unlike in the Sixth Sense).

Odd Thomas has so much going on each day with trying to find out why dead people have not moved on, he wears the same style of clothes each day.

It takes away one of many decisions he needs to make.

I don’t see dead people … and I have slightly more choice in my wardrobe, so how many ways can I get dressed?





Decision number 1: I want to wear a jacket

I can't decide though whether to wear a windcheater **or** a jacket. I have four windcheaters and two jackets. How many choices do I have?

6.

Decision number 2: jeans or shorts?

My next choice is whether to wear jeans **or** shorts. I have three pairs of jeans and four pairs of shorts. How many choices do I have?

7.

The addition rule

When I am being asked to choose between alternatives, I simply add the number of choices for each alternative.

If there are m choices for one option and n choices for another option, and the two options *cannot both be chosen*, then there is a total of $m + n$ choices.

This rule is generally associated with the use of the word 'or' in the question.

This is something to look out for in the questions.

Choice 3: I need to expand my vocabulary

At the library I am having trouble deciding which book to borrow. I have a choice of three mystery novels, three biographies or two science fiction books. How many choices of book do I have?

The multiplication rule

What happens if we have to make successive choices.

If there are m choices for the first stage and n choices for the second stage, then there is a total of $m \times n$ choices for *both stages*.

This rule is generally associated with the use of the word 'and' in the question.

This is the key to look for in questions.

Choice 4: How do I get to school?

When travelling from home to school I first takes a bus **or** walk to the main road, where I can then catch a train **or** a tram **or** another bus to my destination. How many ways do I have for travelling to school?

It might make sense to think of this in terms of a tree diagram.

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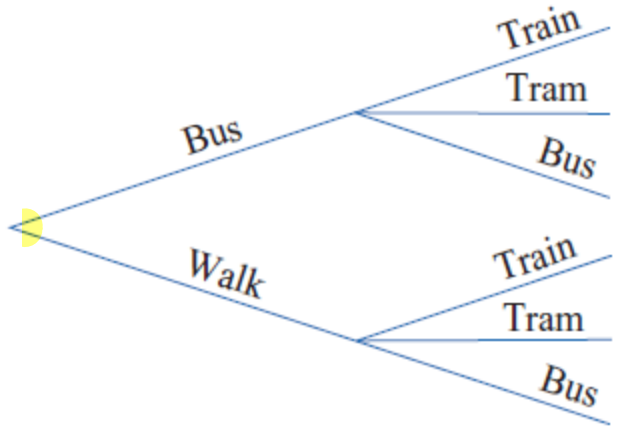


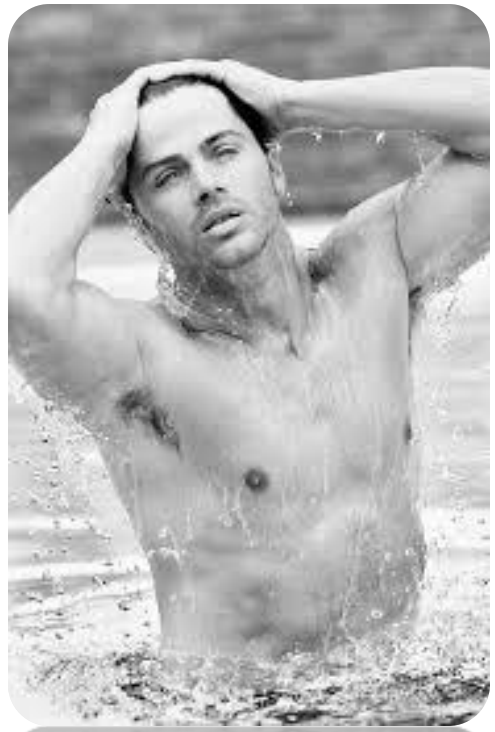
2 choices × 3 choices = 6

Choice 5: It rained, and I forgot my umbrella

Tragedy has struck and, on the way to work, I got very wet. So, I have had to return home and now need to change my clothes.

I have six choices of windcheaters or jackets, and seven choices of jeans or shorts. How many choices do I have for a complete outfit?

$6 \times 7 = 42$



Learning Objectives: Reviewed

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Questions to complete

The following are the minimum number of questions you are expected to answer. There is nothing wrong with answering more!

Ex 10A
Questions: TBA

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