

# Traversable graphs



**Year 11  
General Mathematics**

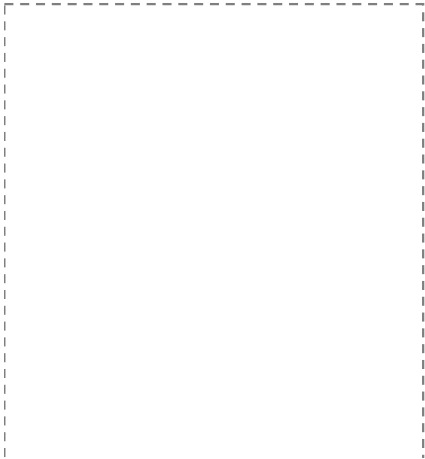
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## Learning Objectives

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By the end of the lesson I hope that you understand and can apply the following to a range of questions from the Unit 1 and 2 General Mathematics course.

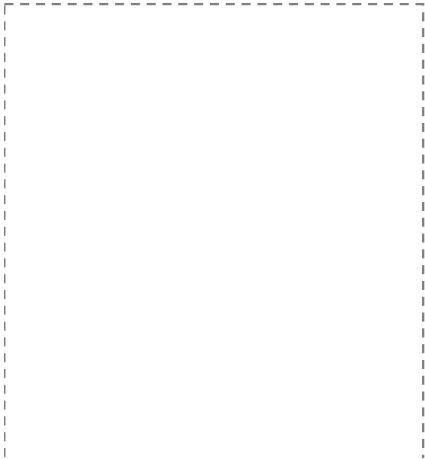
- Know what a traversable graph is



## Recap

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In previous lessons we have started to build up a bank of knowledge relating to graphs. We should, by now, have a lot of information already in our summary books. We continue with another aspect of graphs and one which took me a long time to master when I was a child!



## Leading a sheltered life ...

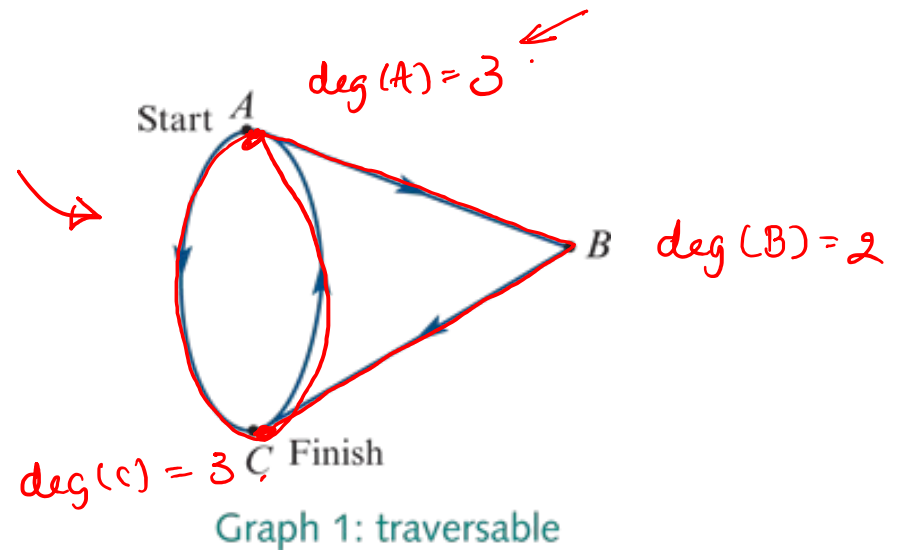
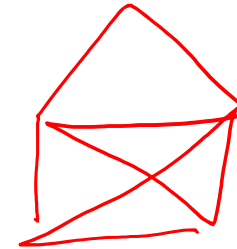
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It is pretty clear, from my previous lessons, that I led a pretty sheltered life. One of my more notable achievements is the length of time it took me to master something my three year old could do in seconds.

Notably, draw something which is traversable!

The below diagram is something which is traversable.

|| **A traversable graph has a trail that includes every edge in the graph.**

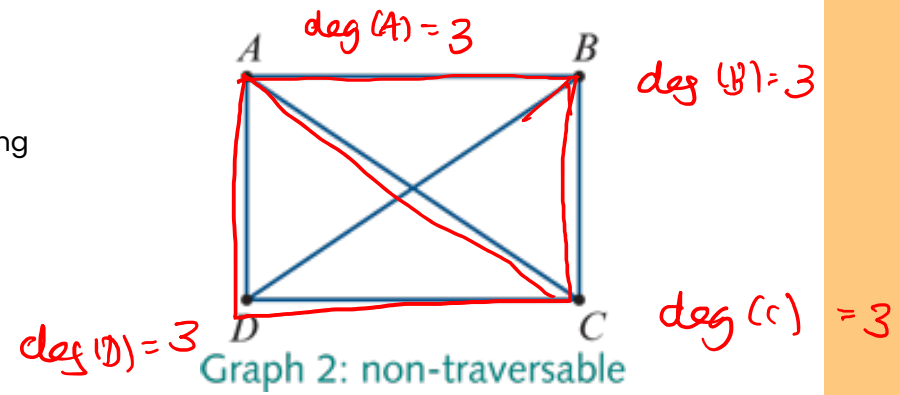


## Graphs which are not traversable

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I am sure there are many examples of graphs which are not traversable. Here is one example.

It is not possible to include every edge of a graph without repeating an edge.



## There are rules ...

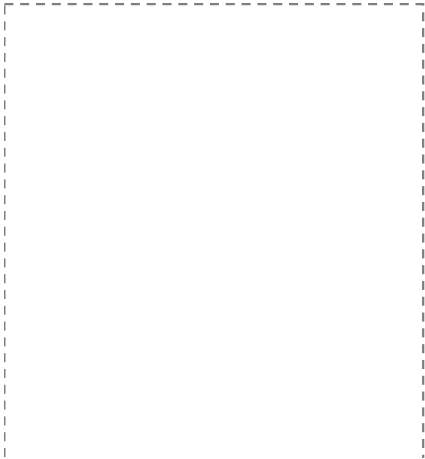
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There are rules which we can use to identify if something is going to be traversable.

1. The graph must be connected
2. All vertices **must** have an even degree, or
3. Exactly two vertices are odd and the rest are even.

So ...

|| A traversable graph will either be a **trail, a circuit or a cycle** that involves every edge in the graph.

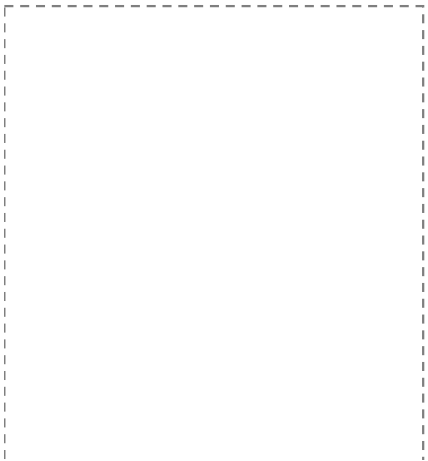
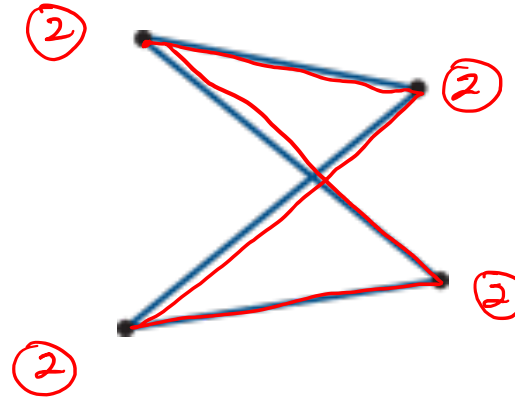


## Example: Identifying traversable graphs

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For the following graphs:

- Determine whether the graph is traversable, and state why.
- If traversable, check by identifying a trail or circuit that traverses the graph.



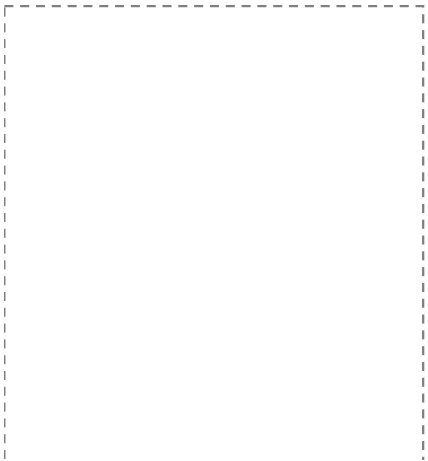
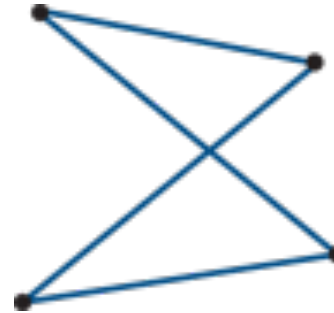
## Example: Identifying traversable graphs

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For the following graphs:

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**Traversable: all even vertices. The graph has a cycle that involves every edge.**



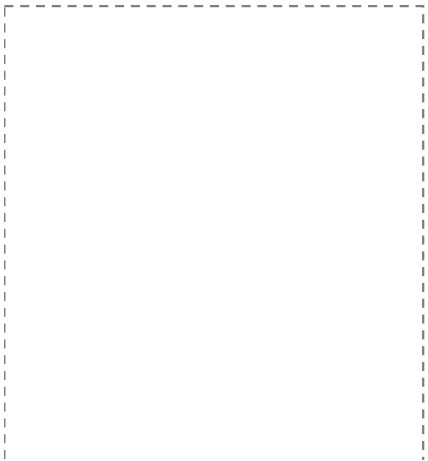
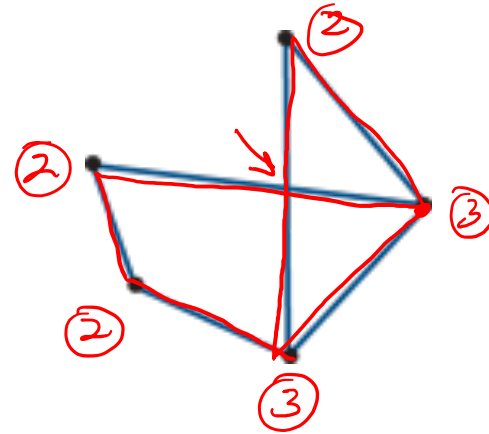


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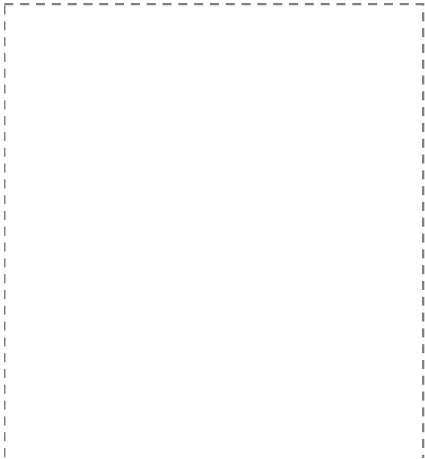
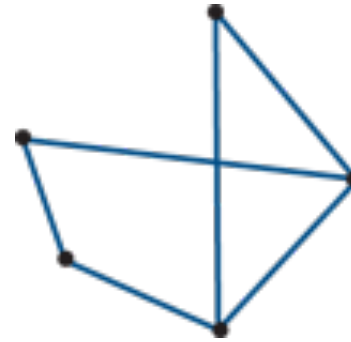
## Example: Identifying traversable graphs

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For the following graphs:

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**Traversable: two odd vertices. The graph has a trail that involves every edge.**

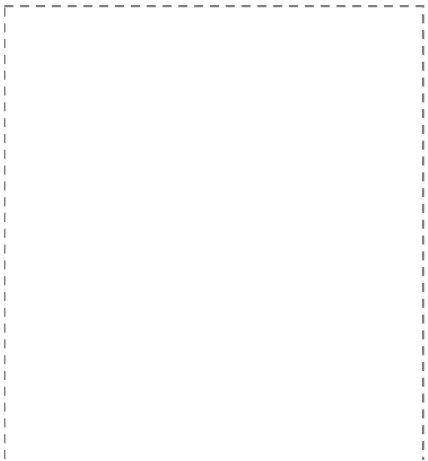
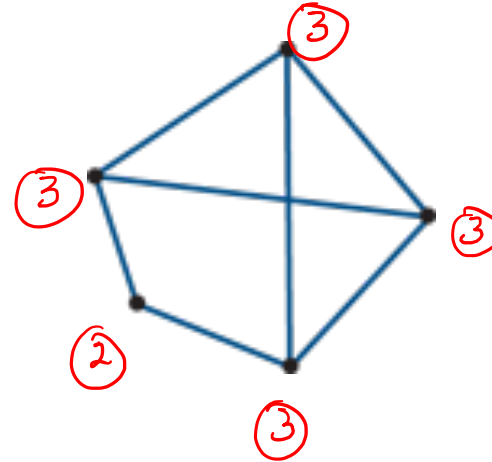


## Example: Identifying traversable graphs

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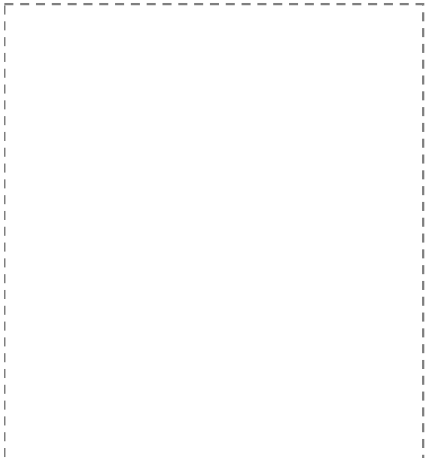
## Example: Identifying traversable graphs

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For the following graphs:

- Determine whether the graph is traversable, and state why.
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**Not traversable: more than two odd vertices**



## Work to be completed

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The following represents the minimum work which should be completed.

The more questions you answer from each exercise, chapter review and Checkpoints the better your chance of gaining an excellent study score in November.

### **General Mathematics Units 1 and 2 Textbook**

Chapter 9

Exercise 9F Traversable graphs

Questions: All

