2.4: Problems

Note: Always express angles in radians (e.g. *[Math Processing Error]*, not *[Math Processing Error]*). When expressing complex numbers in Cartesian form always finish your work until you can express them as *[Math Processing Error]*. For example, if you obtain *[Math Processing Error]*, multiply and divide the denominator by its complex conjugate to obtain *[Math Processing Error]*.

Remember: No calculators allowed!

? Problem *[Math Processing Error]*

Given *[Math Processing Error]*, *[Math Processing Error]* and *[Math Processing Error]*, obtain:

- *[Math Processing Error]*
- *[Math Processing Error]*
- *[Math Processing Error]*
- *[Math Processing Error]*
- *[Math Processing Error]*
- *[Math Processing Error]*
- Express *[Math Processing Error]* as a complex exponential
- *[Math Processing Error]*
- *[Math Processing Error]*, and express the result in cartesian form
- Display the three numbers in the same plot (real part in the *[Math Processing Error]*-axis and imaginary part in the *[Math Processing Error]*-axis)

? Problem *[Math Processing Error]*

The following family of functions are encountered in quantum mechanics:

[Math Processing Error]

Notice the difference between *[Math Processing Error]* (the name of the function), and *[Math Processing Error]* (the independent variable). The definition above defines a family of functions (one function for each value of *[Math Processing Error]*). For example, for *[Math Processing Error]*:

[Math Processing Error]

and for *[Math Processing Error]*:

[Math Processing Error]

- Obtain *[Math Processing Error]*
- Calculate *[Math Processing Error]*
- Calculate *[Math Processing Error]* for *[Math Processing Error]*
- Calculate *[Math Processing Error]* for *[Math Processing Error]*
- Calculate *[Math Processing Error]* for *[Math Processing Error]*

? Problem *[Math Processing Error]*

Given the function

[Math Processing Error]

Write down an expression for *[Math Processing Error]*