[15] 1. Answer each of the following questions by checking one or more of the corresponding boxes. Some questions may require you to check more than one box in order to create the most complete and correct statement.

(a) $\mathbb{R}$ is not the domain of which of the following?

- ☐ linear functions
- ☐ absolute value functions
- ☐ quadratic functions
- ☐ square root functions
- ☐ none of the above

(b) What type(s) of function can have no x-intercepts?

- ☐ linear functions
- ☐ absolute value functions
- ☐ quadratic functions
- ☐ square root functions
- ☐ none of the above

(c) What type(s) of function can have no y-intercepts?

- ☐ linear functions
- ☐ absolute value functions
- ☐ quadratic functions
- ☐ square root functions
- ☐ none of the above

(d) What type(s) of function can have two x-intercepts?

- ☐ linear functions
- ☐ absolute value functions
- ☐ quadratic functions
- ☐ square root functions
- ☐ none of the above

(e) Which type(s) of function can have two y-intercepts?

- ☐ linear functions
- ☐ absolute value functions
- ☐ quadratic functions
- ☐ square root functions
- ☐ none of the above

2. Consider the function $f(x) = 9x^2 - 12x - 5$.

[4] (a) Factor $f(x)$, and use this factored form to determine its x-intercepts.

[4] (b) Write $f(x)$ in standard form by completing the square, and use this form to identify the vertex of the graph.

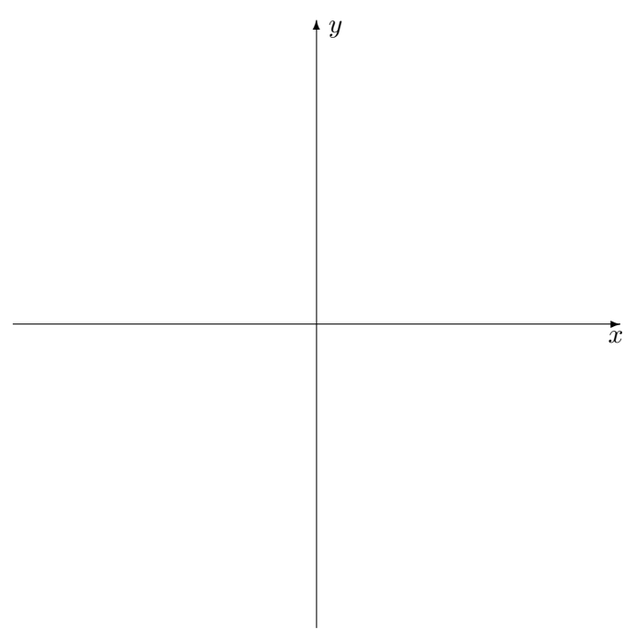
[5] 3. Solve $3x + |2x + 5| = 0$.

[4] 4. Rationalise the denominator and simplify: $\dfrac{8}{4-5\sqrt{2}}$.

[8] 5. Sketch the graph of

$$f(x) = 2 - \sqrt{x+1}$$

on the axes below. Show your workings. Label the graph carefully. Do <u>NOT</u> use a table of values. Use the graph to determine the domain and range of $f(x)$.



[40]