1. State whether each set of ordered pairs is a function.
   a) \{ (2, 4), (3, 5), (7, 9), (2, -5), (3, -7) \}
   b) \{ (5, 4), (4, 3), (3, 2), (2, 1), (1, 0) \}
   c) \{ (-1, 6), (0, -6), (1, -6), (2, -6) \}

2. State the domain and range of each relation.
   a)  
   b)  
   c)  

3. If \( f(x) = 3 - 2x^2 \), find
   a) \( f(5) \)
   b) \( f(-2) \)
   c) \( f(-5) \)
   d) \( f(0) \)
   e) \( f(7) \)
   f) \( f(-0.5) \)
   g) \( f(3a) \)
   h) \( f(2a - 1) \)

4. Describe the graph of each of the following functions.
   a) \( y = \sqrt{x} \)
   b) \( y = \frac{1}{x} \)

5. The graph of \( y = f(x) \) is shown. Sketch the following functions.
   a) \( y = f(x) + 3 \)
   b) \( y = -0.5f(x) \)
   c) \( y = f\left(-\frac{1}{2}x\right) \)
   d) \( y = -2f(-x) \)
6. Describe how the graph of each of the following functions can be obtained from the graph of \( y = f(x) \).
   a) \( y = f(x) + 4 \)  
   b) \( y = f(x - 2) - 3 \)  
   c) \( y = -f(x + 5) - 1 \)  
   d) \( y = \frac{1}{3}f(-3x) + 5 \)  
   e) \( y = -2f(2(x + 3)) + 6 \)  
   f) \( y = 2f(-x + 2) - 4 \)

7. The blue graph is a transformation of the red graph. The equation of the red graph is given. Find the equation of the blue graph, and state its domain and range.
   a)  
   b)  
   c)  

8. Find the inverse of each function. Is the inverse a function? Explain.
   a) \( y = 3x - 5 \)  
   b) \( y = x^2 - 7 \)

9. Sketch the graphs of each of the following pairs of functions on the same set of axes.
   a) \( y = x + 3 \) and \( y = -2(x + 3) \)  
   b) \( y = \sqrt{x} \) and \( y = \sqrt{x - 4} \)  
   c) \( y = \sqrt{x} \) and \( y = -\sqrt{x + 4} + 3 \)  
   d) \( y = (x + 1)^2 \) and \( y = -\frac{1}{2}(x + 1)^2 - 3 \)

10. The graph of \( y = x^2 \) is expanded vertically by a factor of 2, translated 3 units to the left, and translated 4 units upward. Write the equation of the transformed function, and state its domain and range.
11. The graph of \( f(x) = \sqrt{x} \) is compressed horizontally by a factor of 0.5, reflected in the \( x \)-axis, and translated 4 units to the left. Write the equation of the transformed function, and state its domain and range.

12. a) Given \( f(x) = x^2 - 10x \), write equations for \(-f(x)\) and \(f(-x)\).
   b) Sketch the three graphs on the same set of axes.
   c) Determine any points that are invariant for each reflection.
   d) State the domain and range of each function.

13. a) Given \( f(x) = \sqrt{x} - 3 \), write equations for \(-f(x)\) and \(f(-x)\).
   b) Sketch the three graphs on the same set of axes.
   c) Determine any points that are invariant for each reflection.
   d) State the domain and range of each function.

14. Manufacturing  A manufacturing company produces garage doors. The number of garage doors, \( g \), produced per week is related to the number of hours of labour, \( h \), required per week to produce them by the function \( g = 1.8\sqrt{h} \).
   a) How many doors can be produced per week using 500 h of labour?
   b) Write the inverse function and explain its meaning.
   c) How many hours of labour are needed each week to keep production at or above 25 doors a week?

15. Many companies pay their employees using a salary scale that depends on the number of years worked. One salary scale is modelled by the function
   \[ S(t) = 25000 + 3000t - 150t^2 \]
   for the first ten years of employment and
   \[ S(t) = 500\sqrt{t-10} + 40000 \]
   for additional years, where \( S(t) \) dollars is the annual salary and \( t \) is the number of years worked for the company. The employees’ union negotiators are asking for an increase of $1000 for each employee. The company’s negotiators are offering a 2.75% raise.
   a) Describe how the graph of \( S(t) \) is transformed by each type of increase.
   b) Write the functions that model the new salary scale for each type of increase.
   c) State a reasonable domain and range for each function in part b).
   d) If you have worked for the company for 5 years, which model of the new salary scale would be better for you? Justify your answer.
   e) If you have worked for the company for 19 years, which model of the new salary scale would be better for you? Justify your answer.