I acknowledge that the work shown on this test is my original work and I have solely taken this test without any collaboration with others. I acknowledge that in my doing so, I will be held accountable for academic misconduct.

Print Name:

Signature:

All WORK MUST BE SHOWN IN AN ORDERLY MANNER TO GET FULL MARKS !!

1. a) As a result of the transformation of the graph of $y = f(x)$ into the graph of $y = -3f(x + 2) - 5$, the

point $(2, 5)$ becomes point (x, y). Determine the value of (x, y).   (2 marks)

b) If the range of function $y = f(x)$ is $\{y \mid y \geq 4\}$, state the range of the new function $g(x) = f(x + 2) - 3$.

(1 mark)

c) A function $f(x) = x^2 - x - 2$ is multiplied by a constant value k to create a new function $g(x) = kf(x)$.

If the graph of $y = g(x)$ passes through the point $(3, 14)$, state the value of k.   (2 marks)

2. a) The graph of the function y=g(x), the dashed graph, represents a transformation of the graph of y=f(x), the solid graph. **Determine the values of a, b, h & k and write the equation of g(x).**

(2 marks)
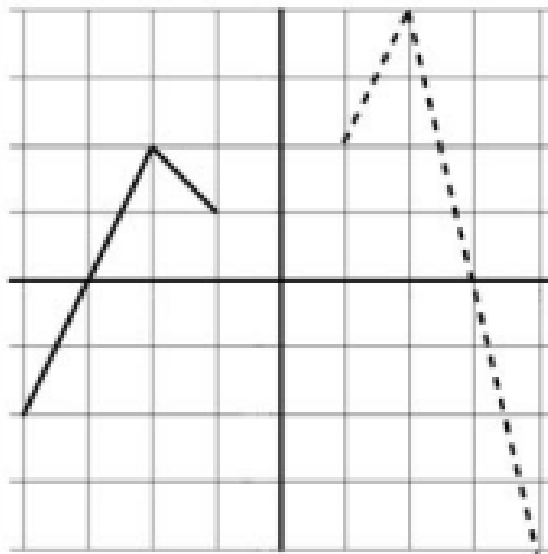
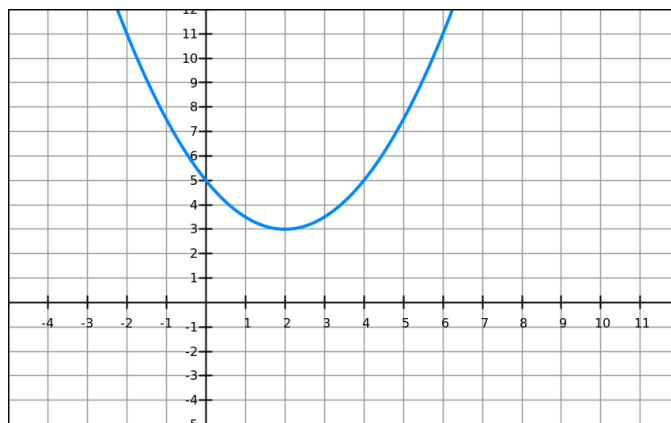b) Given the graph of $f(x) = \frac{1}{2}(x - 2)^2 + 3$ below

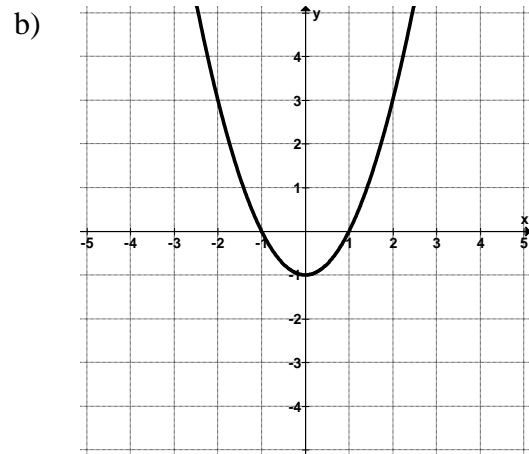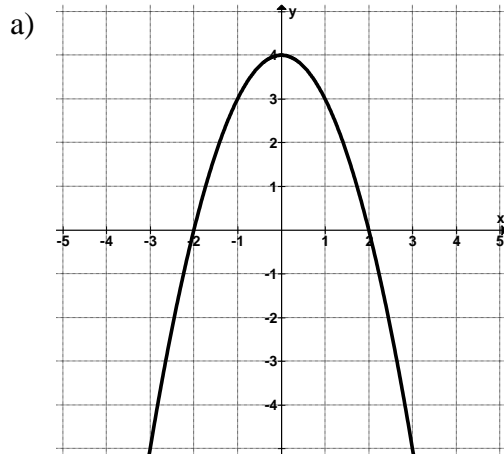Draw the inverse of the function on the grid.

(1 mark)

Is the inverse a function as well? Explain.
If it's not a function, restrict the domain of
$f(x)$ so that it is a function. (2 marks)

3. The graph of $y = f(x)$ is given. Sketch a graph of $y = \sqrt{f(x)}$. **Circle** any invariant points.
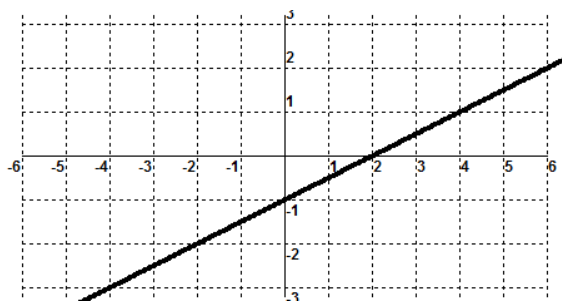(2 marks)

a)

b)

4. For each of the graphs, in question 4, write the domain of the graphs of $y = \sqrt{f(x)}$.
(2 marks)

a)

b)

5. The graph of $f(x) = 0.5x - 1$ is illustrated below

Sketch the graph of $y = \sqrt{f(x)}$ (1 mark)

The transformation of $y = f(x)$ to the graph of $y = \sqrt{f(x)}$ has two invariant points.
The coordinates of the invariant points are (**a**, **b**) and (**c**, **d**).
                                    (In any order, no work is needed here)

The values of **a**, **b**, **c**, and **d**, are _____, _____, _____, and _____ respectively.   (2 marks)

6. The point $(4, y)$ is on the graph of $f(x) = \sqrt{x}$. The graph is transformed into $g(x)$ by a horizontal stretch by a factor of 2, a reflection about the x-axis, and a translation up 3 units. Determine the coordinates of the corresponding point on the graph of $g(x)$.

(2 marks)

7. a) The partial graph of the third-degree polynomial function $P(x) = a(x - b)(x - c)(x - d)$ is shown. Determine the value of a.
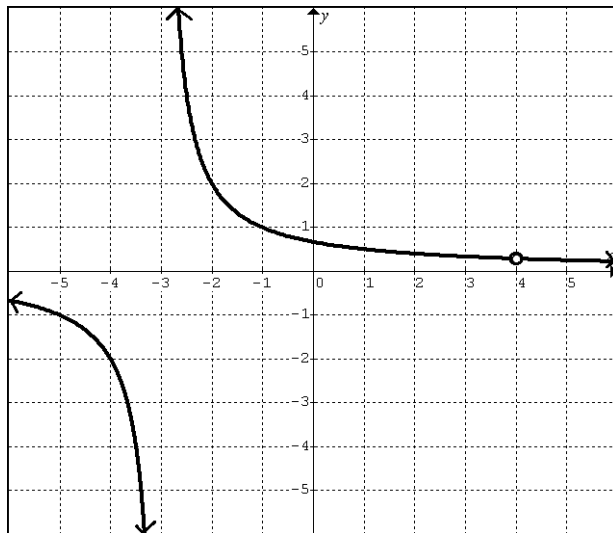
(3 marks)
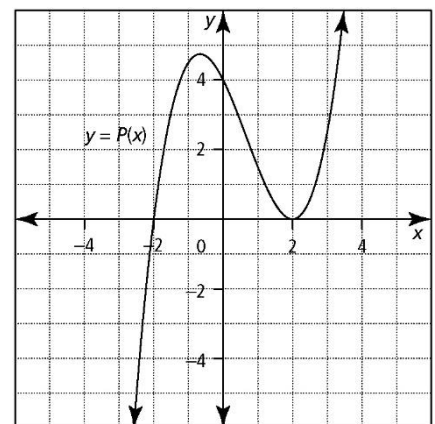
b) The graph of $y = x^3 + x^2 + cx - 4$ has an x-intercept of -1. Determine the value of c and the remaining x-intercepts

(2 marks)

c) Factor fully $2x^4 - 7x^3 - 41x^2 - 53x - 21$ by using the Integral Zero Theorem & long division/synthetic division. (4 marks)

8. The function $h(x) = \dfrac{x^2 - 8x + k}{x - 3}$ has a point of discontinuity. Find the value of k (2 marks)

9. Write the equation of the rational function shown on the graph below. Express your
answer with the numerator and denominator in factored form.   (3 marks)

10. The point (1, 5) lies on the function $f(x)=\dfrac{2}{x-3}+6$. If $f(x)$ is transformed into $g(x)$ as follows,

what is the image point of (1, 5) ? $g(x)=-3f(x+5)-1$ (2 marks)

THE END