$\overline{40+2}$

Name: _____ Date: _____

MHF4U

Test – Unit 1: Polynomial Functions

*Show all **applicable** work and express all answers in simplest form. Marks are awarded for presentation and technical correctness.*

1. State the domain of $f(x)=\sqrt{x-4}+7$. (1 mark)

2. List one odd function. (1 mark)

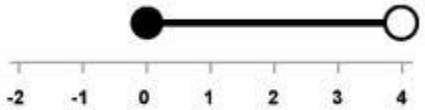
3. Given $f(x)=3^x$, what is the range of $y=-f(x)+6$. (1 mark)

4. Graph on a number line $|x|<3$. (1 mark)

5. Determine the end behaviour(s) of $f(x)=\frac{1}{x}-2$. (2 marks)

6. On what interval(s) is the function $f(x)=(x+8)^2$ decreasing? (1 mark)

7. Given the following inequality, write the range of solutions in interval notation. (1 mark)



8. If $f^{-1}(5) = -7$, state the corresponding point on $y = f(x)$. (1mark)

9. Is the following piecewise function continuous? Show your work. (3 marks)

$$f(x) = \begin{cases} |x-4| - 3, if\ x \leq 2 \\ -(x-4)^2 + 5\ , if\ x > 2 \end{cases}$$

10. Sketch a graph with the following characteristics.
    - Range is $y \in \mathcal{R}$
    - $f(-4) = 1, f(0) = 2\ and\ f(3) = 0$
    - Discontinuous at $x = -3$
    - Has end behaviours $x \to \infty\ y \to \infty$ and $x \to -\infty\ y \to 0$
    - Intervals of increase $(-\infty, -3)(-3, 1) and\ (4, \infty)$
    - Interval of decrease $(1,4)$

    (5 marks)

11. Evaluate $-|5-8|-|-10|+8|3-7|$. (2 marks)

12. State the transformations used on the parent function: $y=-5^{2x-6}+1$ (2 marks)

13. Solve and check for $|2x-6|=-4x+8$. (4 marks)

14. The point (0, -5) is on the function $y=-3f(x+2)+5$. Determine what this point is on the original function of $y=f(x)$. (3 marks)

15. You work at a job that pays you $15 an hour. If you work over 40 hours you get paid time and a half or 1.5 times your regular rate. Write a piecewise function that models this situation. (3 marks)

16. Given the function $f(x) = -2|x+4|+5$

    a. Graph the function below on the graph. (3 marks)

    b. Identify the domain and range of $f(x)$ (2 marks)

    c. Identify the intervals of increase/decrease of $f(x)$. (2 marks)

    d. Identify the end behaviours of $f(x)$. (2 marks)