REVIEW OF FUNTIONS

- THE RULE OF 4: KNOW HOW EACH CONCEPT APPLIES TO EACH OF THE 4 WAYS WE HAVE OF DEFINING FUNCTIONS

  1. GRAPHICALLY
  2. ANALYTICALLY (FORMULAS)
  3. NUMERICALLY (DATA)
  4. VERBALLY (DESCRIPTION WITH WORDS)

- IS IT A FUNCTION?

  A FUNCTION IS A RULE THAT ASSIGN TO EACH ELEMENT x IN A SET I (DOMAIN) EXACTLY ONE ELEMENT CALLED $f(x)$.

  GRAPHICALLY: USE VERTICAL LINE TEST
  NUMERICALLY AND VERBALLY: CHECK THAT EACH INPUT (x) HAS ONLY ONE OUTPUT (y OR $f(x)$) THAT GOES WITH IT.
  ANALYTICALLY: THE FORMULA CAN BE SOLVED FOR y IN ONLY ONE WAY

- IS IT INVERTIBLE?

  A FUNCTION IS ONE-TO-ONE (OR INUERTIBLE) IF IT NEVER TAKES THE SAME VALUE TWICE.

  GRAPHICALLY: HORIZONTAL LINE TEST
  NUMERICALLY AND VERBALLY: CHECK THAT EACH OUTPUT VALUE (y) HAS ONLY ONE INPUT (x) THAT GOES WITH IT.
  ANALYTICALLY: SUBSTITUTE INTO THE EQUATION $f(x_1) = f(x_2)$, WORK IT TO SHOW $x_1 = x_2$

- IS IT EVEN/ODD/NEITHER?

  GRAPHICALLY: EVEN SYMMETRY MEANS IT HAS REFLECTIVE SYMMETRY OVER THE y-AXIS. ODD MEANS IT HAS 180° ROTATIONAL SYMMETRY ABOUT THE ORIGIN.
  NUMERICALLY AND VERBALLY: EVEN MEANS EVERY OPPOSITE x-VALUE SHOULD HAVE MATCHNG y-VALUES. ODD MEANS EVERY OPPOSITE x-VALUE SHOULD HAVE OPPOSITE y-VALUES
  ANALYTICALLY: SUBSTITUTE $-x$ IN PLACE OF x. IF YOU GET $f(x)$ BACK EXACTLY, THE FUNCTION IS EVEN. IF YOU GET $-f(x)$ BACK EXACTLY THE FUNCTION IS ODD.
  NOTE: EVEN POLYNOMIALS HAVE ONLY EVEN POWERS OF x. ODD POLYNOMIALS HAVE ONLY ODD POWERS OF x.