

1. Take  $X = \{1, 3, 4\}$  and  $Y = \{0, 1\}$ . Write down all elements of  $X \times Y$ .

2. Take  $\mathbb{R}$  to be the set of real numbers. Denote by  $Y$  and  $r$  the sets

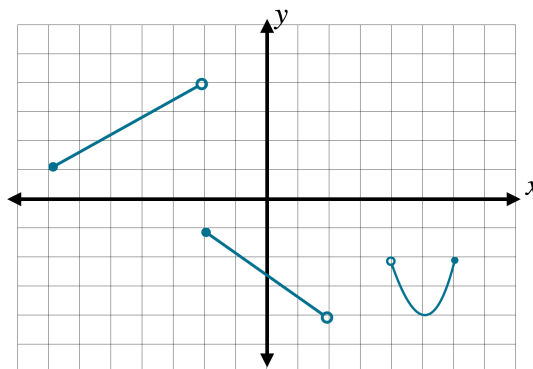
$$Y = \{-1, 2, 3\} \quad \text{and} \quad r = \{(1.5, -1), (\pi, 2), (-100, -1)\}$$

where  $r$  is a subset of  $\mathbb{R} \times Y$ . State the natural domain, co-domain, domain, and range of  $r$ .

3. Take  $X = \{1, 3, 4\}$  and  $Y = \{0, 1\}$ . Define a function from  $X$  to  $Y$ .

4. Take  $X = \{1, 3, 4\}$  and  $Y = \{0, 1\}$ . Define a relation  $X$  to  $Y$  that is not a function.

5. Take  $f$  to be a function whose graph is given below. Find the domain and range of the function and find the largest intervals on which the function is strictly increasing and strictly decreasing.



6. Find all the extremal values of the function below in the interval  $[-7, 6]$ .

