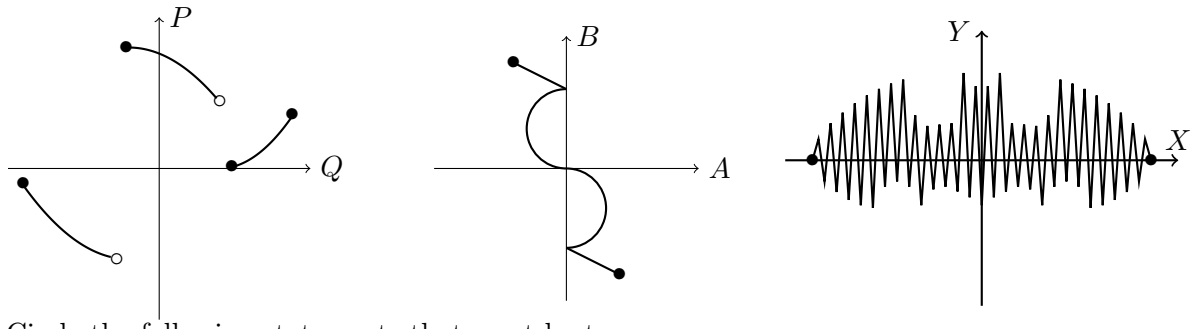
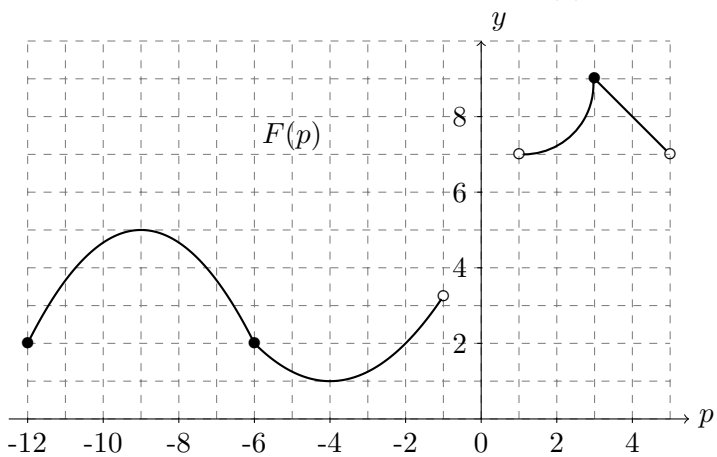
1. [5 points] Consider the three graphs given below that give relationships between the variables on their axes. Assume all information about each relationship is shown in the graphs.



Circle the following statements that must be true:

$\boxed{P \text{ is a function of } Q.}$	B is a function of A.	$\boxed{Y \text{ is a function of } X.}$
$\boxed{Q \text{ is a function of } P.}$	$\boxed{A \text{ is a function of } B.}$	X is a function of Y.

2. [8 points] The entire graph of a piecewise-defined function $F(p)$ is given below:



For both parts below, if necessary, you may estimate values that cannot be determined exactly from the graph.

a. [4 points]
Using **interval notation**, write the domain and range of $F(p)$.

Domain: $[-12, -1) \cup (1, 5)$

Range: $[1, 5] \cup (7, 9]$

b. [4 points]
Using **interval notation**, find the p-values where $F(p)$ is concave up and concave down.

Concave Up: $[-6, -1) \cup (1, 3]$

Concave Down: $[-12, -6]$

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