All About Functions

Quick Review: A *function* as a rule that connects two quantities. We say that "y is a function of x" if each value of x gives only one value of y.

The *domain* of a function is the set of all possible inputs.

With *function notation* we write $g(x) = x^2 - 3x$, for example, to stand for a function the takes the value of x as input and produces the value $x^2 - 3x$. The letter g is the name of the function and the symbol $g(x)$ names the output value.

Example: If $s(x) = 5 - 3x^2$ then (a) what is the value of $s(4)$? (b) What is the solution to $s(x) = -187$?

solution:

(a) $s(4) = 5 - 3(4)^2$ which is $5 - 3(16)$ or $5 - 48$. Therefore, $s(4) = -43$.

(b) If $s(x) = -187$ then we are trying to solve $5 - 3x^2 = -187$. Therefore, $-3x^2 = -192$ and so $x^2 = 64$. There are two solutions. Either $x = 8$ or $x = -8$.

Problems

1. Compute the value of each expression.

   a. If $g(x) = 2x^2 - x$, compute $g(1) + g(2)$.

   b. If $k(a) = 2 - 3a$, compute $k(-5)$ and $k(20-a)$.

   c. If $h(x) = \sqrt{1-x}$, compute $h(-8)$ and $h(1-p^4)$

2. What is the domain of each of the following functions?

   a. $a(x) = \dfrac{1}{2x}$ b. $b(x) = \sqrt{2x}$

   c. $c(x) = \dfrac{3x+2}{2x+3}$ d. $d(x) = 4 - \sqrt{4-x}$

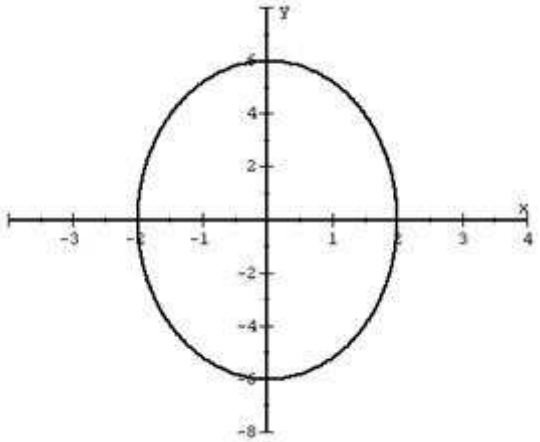
3. Which of the following define functions of x?

   a. $2x + 5y = 20$ b. $x^2 + y^2 = 25$

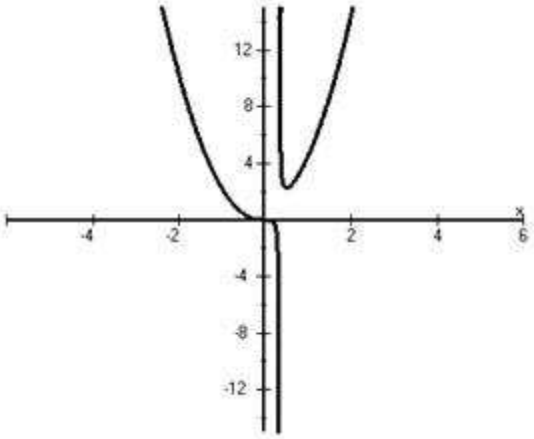
   c. $x^3 + y^3 = 25$ d. $x = y^3 + 2$

4. Which of the following are graphs of functions?

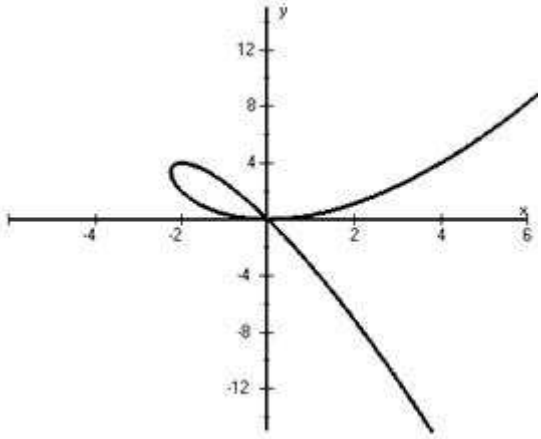
a.



b.



c



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