

MAC1105 College Algebra
3.1 Practice Problems

1. Determine if the relation is a function and find the domain and range given the set of points.

a. $\{(2,4), (4,-2), (5,8), (-4,7), (7,-8)\}$

function
D: $\{2, 4, 5, -4, 7\}$
R: $\{4, -2, 8, 7, -8\}$

b. $\{(1,-2), (-1,8), (1,4), (3,-5), (-4,1)\}$

nota function
D: $\{1, -1, 3, -4\}$
R: $\{-2, 8, 4, -5, 1\}$

2. Determine if the following equations represent functions.

a. $y = x^2 + 4$



function

b. $y = |x + 4|$



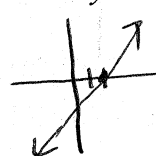
function

c. $x^2 + y^2 = 9$



nota function

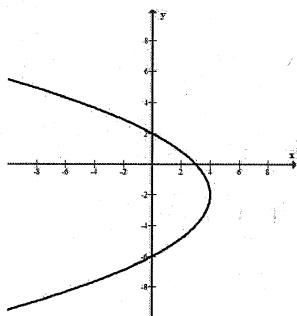
d. $3x - 4y = 6$



function

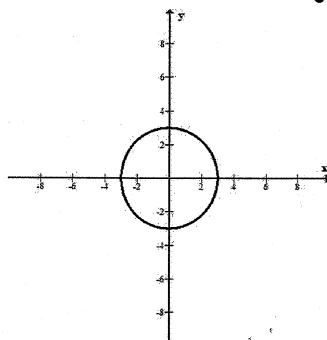
3. Determine if the following graphs represent functions.

a.



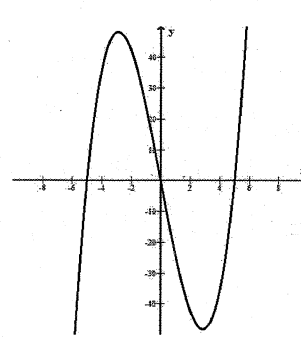
not a function

b.



not a function

c.



function

4. Find the domain of the following functions. Write the domain in interval notation.

a. $f(x) = 2x^2 - 3x + 9$

polynomial

D: $(-\infty, \infty)$

b. $g(x) = \frac{2x+3}{x-2}$

Rational

$x - 2 = 0$

$x = 2$

D: $(-\infty, 2) \cup (2, \infty)$

c. $h(x) = \sqrt{x+5}$

even root

$x + 5 \geq 0$

$-5 \leq x$

$x \geq -5$

D: $[-5, \infty)$

d. $h(x) = \sqrt[3]{2-x}$

odd root

D: $(-\infty, \infty)$

5. Let $f(x) = x^2 + 3x - 5$ and find the following.

a. $f(5)$

$$\begin{aligned} f(5) &= 5^2 + 3(5) - 5 \\ &= 25 + 15 - 5 \\ &= 25 + 10 \\ &= 35 \end{aligned}$$

b. $f(-2)$

$$\begin{aligned} f(-2) &= (-2)^2 + 3(-2) - 5 \\ &= 4 - 6 - 5 \\ &= -2 - 5 \\ &= -7 \end{aligned}$$

c. $f(a+5)$

$$\begin{aligned} &= (a+5)^2 + 3(a+5) - 5 \\ &= (a+5)(a+5) + 3a + 15 - 5 \\ &= a^2 + 5a + 5a + 25 + 3a + 10 \\ &= a^2 + 13a + 35 \end{aligned}$$

d. $f(-x)$

$$\begin{aligned} &= (-x)^2 + 3(-x) - 5 \\ &= x^2 - 3x - 5 \end{aligned}$$

e. $f(x+h)$

$$\begin{aligned} &= (x+h)^2 + 3(x+h) - 5 \\ &= (x+h)(x+h) + 3x + 3h - 5 \\ &= x^2 + xh + xh + h^2 + 3x + 3h - 5 \\ &= x^2 + 2xh + h^2 + 3x + 3h - 5 \end{aligned}$$

f. $f(x+h) - f(x)$

$$\begin{aligned} &= x^2 + 2xh + h^2 + 3x + 3h - 5 - (x^2 + 3x - 5) \\ &= \underline{x^2} + 2xh + h^2 + \underline{3x} + 3h - \underline{5} - \underline{x^2} - \underline{3x} + \underline{5} \\ &= \underline{2xh + h^2 + 3h} \end{aligned}$$

g. $\frac{f(x+h) - f(x)}{h}$

$$= \frac{2xh + h^2 + 3h}{h}$$

$$= \frac{2xh}{h} + \frac{h^2}{h} + \frac{3h}{h}$$

$$= 2x + h + 3$$