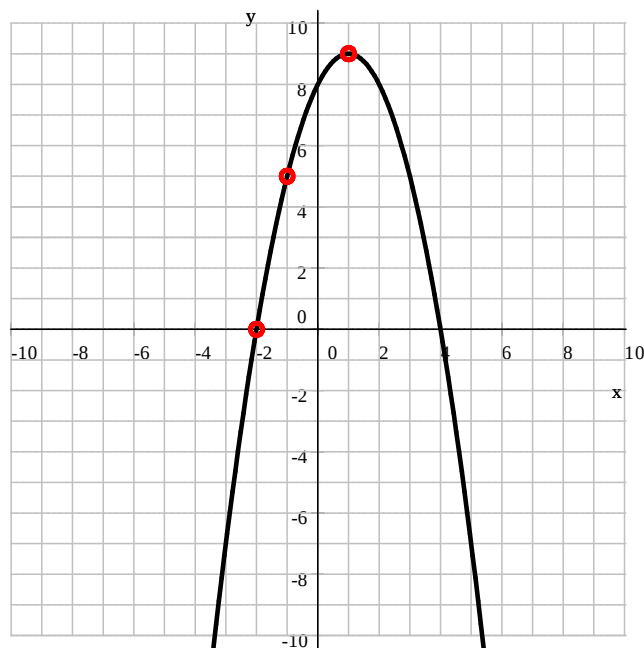


Definition: The graph of an equation in x and y is the set of all points $P(x, y)$ whose coordinates are solution of the equation.

1. Consider the graph shown below.

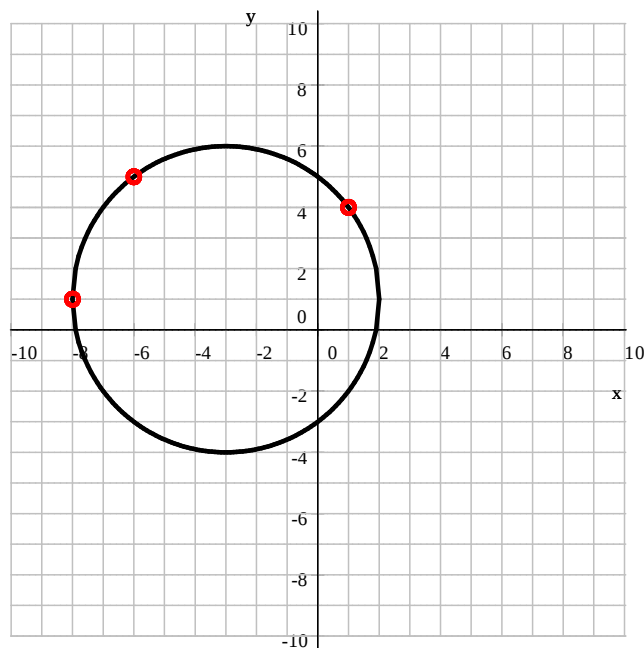


Among the many points on the graph, $A(-2, 0)$, $B(-1, 5)$, and $C(1, 9)$ are marked. We will use these points to find the equation that belongs with the graph. The equation for this graph is one of the equations listed below.

- (a) Consider the equation $y = 3x + 6$.
 - i. Is the point $A(-2, 0)$ on the graph of $y = 3x + 6$?
 - ii. Is the point $B(-1, 5)$ on the graph of $y = 3x + 6$?
 - iii. Is the point $C(1, 9)$ on the graph of $y = 3x + 6$?
 - iv. Is it possible that the graph shown on the picture above is the graph of $y = 3x + 6$?
- (b) Consider the equation $(x - 4)^2 + (y - 5)^2 = 25$
 - i. Is the point $A(-2, 0)$ on the graph of $(x - 4)^2 + (y - 5)^2 = 25$?
 - ii. Is the point $B(-1, 5)$ on the graph of $(x - 4)^2 + (y - 5)^2 = 25$?
 - iii. Is the point $C(1, 9)$ on the graph of $(x - 4)^2 + (y - 5)^2 = 25$?
 - iv. Is it possible that the graph shown on the picture above is the graph of $(x - 4)^2 + (y - 5)^2 = 25$?
- (c) Consider the equation $y = -x^2 + 2x + 8$.
 - i. Is the point $A(-2, 0)$ on the graph of $y = -x^2 + 2x + 8$?
 - ii. Is the point $B(-1, 5)$ on the graph of $y = -x^2 + 2x + 8$?
 - iii. Is the point $C(1, 9)$ on the graph of $y = -x^2 + 2x + 8$?
 - iv. Is it possible that the graph shown on the picture above is the graph of $y = -x^2 + 2x + 8$?

2. Consider the graph shown on the picture below.

Note that the points $A(-8, 1)$, $B(-6, 5)$, and $C(1, 4)$ are on the graph.



(a) Consider the equation $3y = x + 11$.

- Is the point $A(-8, 1)$ on the graph of $3y = x + 11$?
- Is the point $B(-6, 5)$ on the graph of $3y = x + 11$?
- Is the point $C(1, 4)$ on the graph of $3y = x + 11$?
- Is it possible that the graph shown on the picture above is the graph of $3y = x + 11$?

(b) Consider the equation $3y + x^2 = -8x + 3$.

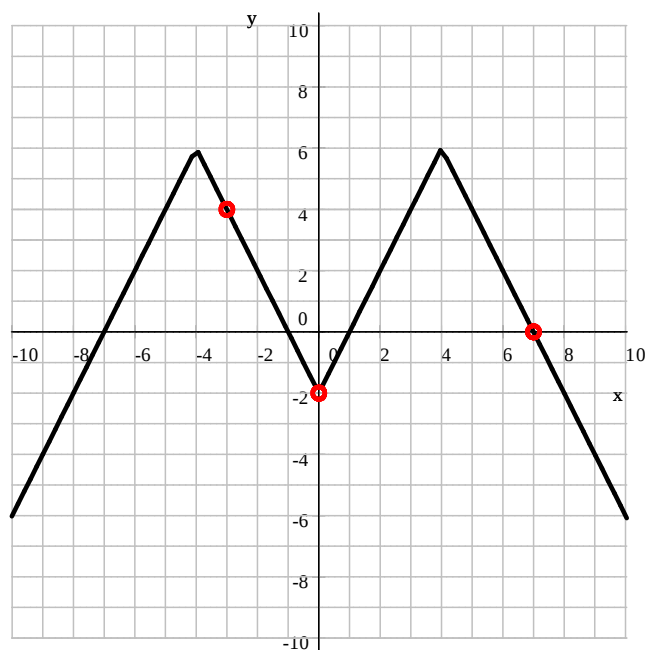
- Is the point $A(-8, 1)$ on the graph of $3y + x^2 = -8x + 3$?
- Is the point $B(-6, 5)$ on the graph of $3y + x^2 = -8x + 3$?
- Is the point $C(1, 4)$ on the graph of $3y + x^2 = -8x + 3$?
- Is it possible that the graph shown on the picture above is the graph of $3y + x^2 = -8x + 3$?

(c) Consider the equation $(x + 3)^2 + (y - 1)^2 = 25$.

- Is the point $A(-8, 1)$ on the graph of $(x + 3)^2 + (y - 1)^2 = 25$?
- Is the point $B(-6, 5)$ on the graph of $(x + 3)^2 + (y - 1)^2 = 25$?
- Is the point $C(1, 4)$ on the graph of $(x + 3)^2 + (y - 1)^2 = 25$?
- Is it possible that the graph shown on the picture above is the graph of $(x + 3)^2 + (y - 1)^2 = 25$?

3. Consider the graph shown below.

Note that the points $A(-3, 4)$, $B(0, -2)$, and $C(7, 0)$ are on the graph.



(a) Consider the equation $y + 2 = |2x|$.

- i. Is the point $A(-3, 4)$ on the graph of $y + 2 = |2x|$?
- ii. Is the point $B(0, -2)$ on the graph of $y + 2 = |2x|$?
- iii. Is the point $C(7, 0)$ on the graph of $y + 2 = |2x|$?
- iv. Is it possible that the graph shown on the picture above is the graph of $y + 2 = |2x|$?

(b) Consider the equation $6 - y = |8 - |2x||$.

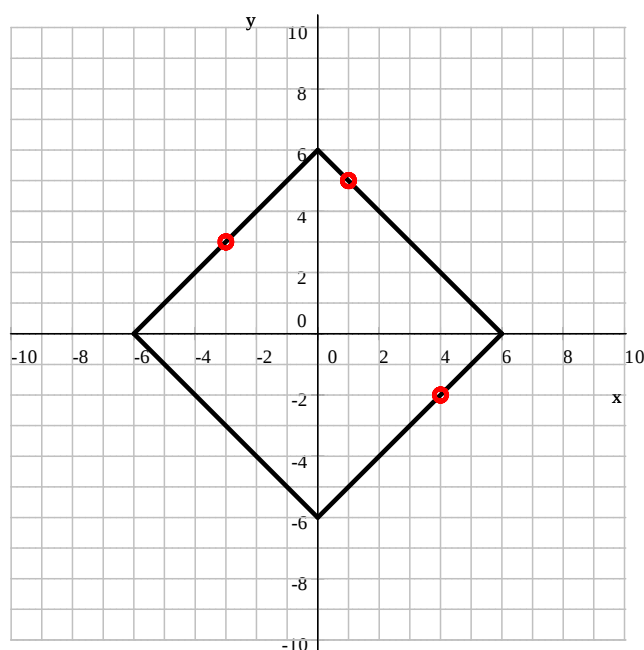
- i. Is the point $A(-3, 4)$ on the graph of $6 - y = |8 - |2x||$?
- ii. Is the point $B(0, -2)$ on the graph of $6 - y = |8 - |2x||$?
- iii. Is the point $C(7, 0)$ on the graph of $6 - y = |8 - |2x||$?
- iv. Is it possible that the graph shown on the picture above is the graph of $6 - y = |8 - |2x||$?

(c) Consider the equation $x^2 + y^2 = 1 + 4(x + y + 5)$.

- i. Is the point $A(-3, 4)$ on the graph of $x^2 + y^2 = 1 + 4(x + y + 5)$?
- ii. Is the point $B(0, -2)$ on the graph of $x^2 + y^2 = 1 + 4(x + y + 5)$?
- iii. Is the point $C(7, 0)$ on the graph of $x^2 + y^2 = 1 + 4(x + y + 5)$?
- iv. Is it possible that the graph shown on the picture above is the graph of $x^2 + y^2 = 1 + 4(x + y + 5)$?

4. Consider the graph shown on the picture below.

Note that the points $A(-3, 3)$, $B(1, 5)$, and $C(4, -2)$ are on the graph.



- (a) Consider the equation $2y = x + 9$.
- Is the point $A(-3, 3)$ on the graph of $2y = x + 9$?
 - Is the point $B(1, 5)$ on the graph of $2y = x + 9$?
 - Is the point $C(4, -2)$ on the graph of $2y = x + 9$?
 - Is it possible that the graph shown on the picture above is the graph of $2y = x + 9$?
- (b) Consider the equation $|x| + |y| = 6$.
- Is the point $A(-3, 3)$ on the graph of $|x| + |y| = 6$?
 - Is the point $B(1, 5)$ on the graph of $|x| + |y| = 6$?
 - Is the point $C(4, -2)$ on the graph of $|x| + |y| = 6$?
 - Is it possible that the graph shown on the picture above is the graph of $|x| + |y| = 6$?
- (c) Consider the equation $y + 3 = 9 - |x|$.
- Is the point $A(-3, 3)$ on the graph of $y + 3 = 9 - |x|$?
 - Is the point $B(1, 5)$ on the graph of $y + 3 = 9 - |x|$?
 - Is the point $C(4, -2)$ on the graph of $y + 3 = 9 - |x|$?
 - Is it possible that the graph shown on the picture above is the graph of $y + 3 = 9 - |x|$?

Answers

1. a) i) $0 = 0$ yes ii) $5 \neq 3$ no iii) $9 = 9$ yes iv) no
b) i) $36 \neq 25$ no ii) $25 = 25$ yes iii) $25 = 25$ yes iv) no
c) i) $0 = 0$ yes ii) $5 = 5$ yes iii) $9 = 9$ yes iv) yes
2. a) i) $3 = 3$ yes ii) $15 \neq 5$ no iii) $12 = 12$ yes iv) no
b) i) $67 = 67$ yes ii) $51 = 51$ yes iii) $13 \neq -5$ iv) no
c) i) $25 = 25$ yes ii) $25 = 25$ yes iii) $25 = 25$ yes iv) yes
3. a) i) $6 = 6$ yes ii) $2 = 2$ yes iii) $2 \neq 14$ no iv) no
b) i) $2 = 2$ yes ii) $8 = 8$ yes iii) $6 = 6$ yes iv) yes
c) i) $25 = 25$ yes ii) $4 \neq 13$ no iii) $49 = 49$ yes iv) no
4. a) i) $6 = 6$ yes ii) $10 = 10$ yes iii) $-4 \neq 13$ no iv) no
b) i) $6 = 6$ yes ii) $6 = 6$ yes iii) $6 = 6$ yes iv) yes
c) i) $6 = 6$ yes ii) $8 = 8$ yes iii) $1 \neq 5$ no iv) no