Solutions for Practice of Section 1.2

Sketch these graphs using intercepts, symmetry and a table if necessary.	$y = \sqrt{3x-2}$ $y^2 = 2x+1$
Determine the x and y intercepts and the symmetry of each of these	$x^3 - y^3 = 2$ $x^3 + xy = 3$ $x^2 - y^2 = 4$
Write an equation of a circle such that the endpoints of a diameter segment are at (-2,3) and (4,5)	

Sketch these graphs using intercepts, symmetry and a table if necessary.

a) $y = \sqrt{3x-2}$

b) $y^2 = 2x+1$

a)
Intercepts:

y: $x = 0$ $\quad y = \sqrt{3 \cdot 0 - 2} = \sqrt{-2}$ not a real number, so there is no y-intercept

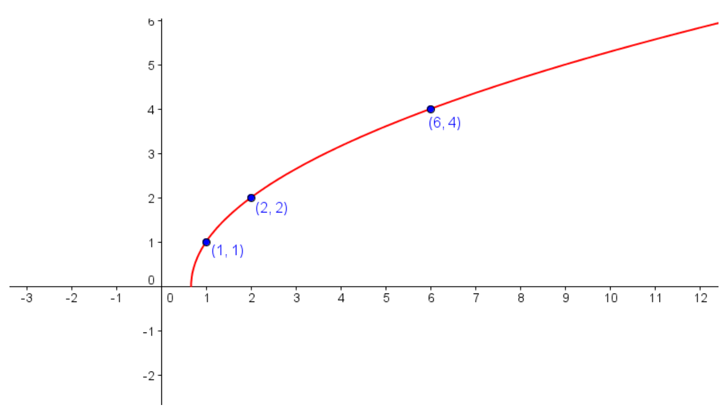
x: $y = 0$

$$0 = \sqrt{3x-2}$$
$$0 = 3x-2$$
$$3x = 2$$
$$x = \frac{2}{3}$$

x-intercept: $\left(\frac{2}{3}, 0\right)$

There are no symmetries that can help us, so we need to make a table:

x	y
1	1
2	2
6	4



Sketch these graphs using intercepts, symmetry and a table if necessary.

a) $y = \sqrt{3x-2}$

b) $y^2 = 2x+1$

b)

Intercepts:

x: $y=0$ $\quad 0 = 2x+1 \quad / -1$

$-1 = 2x \quad / \div 2$

$-\frac{1}{2} = x$

x-intercept: (-1/2, 0)

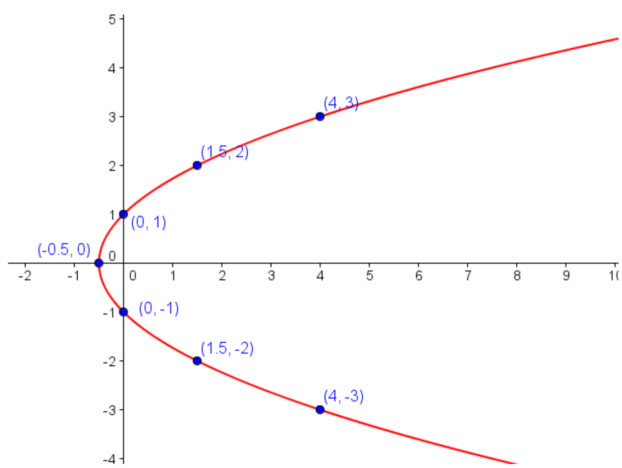
y: $x=0$ $\quad y^2 = 1$

$y = \pm 1$

y-intercept: (0,1), (0, -1)

The y-intercept seems to indicate that there may be a symmetry with respect to the x-axis. In fact what would happen to the equation if y was replaced by (-y)? Since $(-y)^2 = y^2$, the equation remains unchanged. Therefore there is a symmetry with respect to the x-axis.

x	y
1.5	2
4	3



Determine the x and y intercepts and the symmetry of each of these

a) $x^3 - y^3 = 2$

b) $x^3 + xy = 3$

c) $x^2 - y^2 = 4$

a) x-intercept, y=0

$x^3 = 2$

$x = \sqrt[3]{2}$

$(\sqrt[3]{2}, 0)$

y-intercept, x=0

$-y^3 = 2$

$y^3 = -2$

$y = -\sqrt[3]{2}$

$(0, -\sqrt[3]{2})$

Replace x by -x:

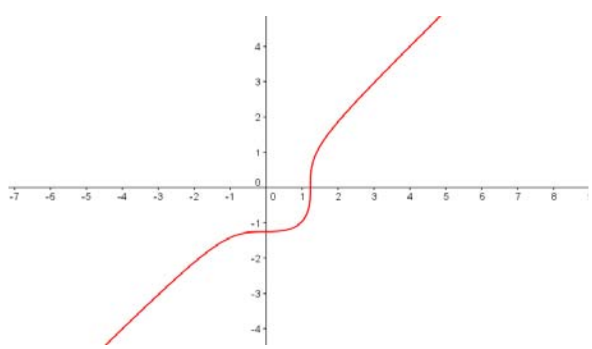
$(-x)^3 - y^3 = -x^3 - y^3 \neq x^3 - y^3$ not symmetric with respect to y-axis

Replace y by -y:

$x^3 - (-y)^3 = x^3 - (-y^3) = x^3 + y^3 \neq x^3 - y^3$ not symmetric with respect to x-axis

Replace x by -x and y by -y:

$(-x)^3 - (-y)^3 = -x^3 + y^3 \neq x^3 - y^3$ not symmetric with respect to the origin



Determine the x and y intercepts and the symmetry of each of these

a) $x^3 - y^3 = 2$

b) $x^3 + xy = 3$

c) $x^2 - y^2 = 4$

b) y-intercept, x=0 $\quad 0 = 3$ This clearly is not true, so there can't be y-intercept, and 0 is not in the domain of our expression.

x-intercept, y=0 $\quad x^3 = 3$, $x = \sqrt[3]{3}$ $\quad (\sqrt[3]{3}, 0)$

Replace x by -x: $(-x)^3 + (-x)y = -x^3 - xy = -(x^3 + xy) \neq$
$\neq x^3 + xy$ no symmetry with respect to y-axis

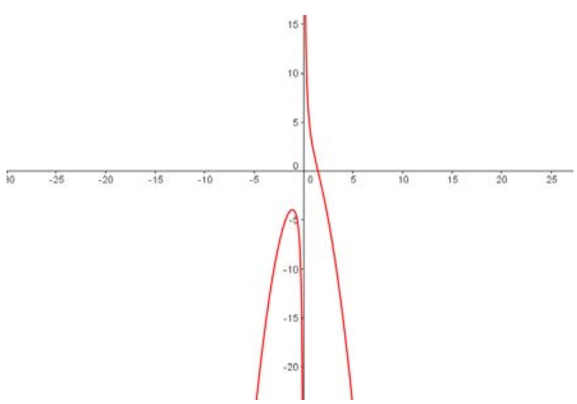
Replace y by -y: $x^3 + x\cdot(-y) = x^3 - xy \neq x^3 + xy$

no symmetry with respect to x-axis

Replace x by -x and y by -y:

$(-x)^3 + (-x)(-y) = -x^3 + xy \neq x^3 - xy$

no symmetry with respect to the origin



Determine the x and y intercepts and the symmetry of each of these

a) $x^3 - y^3 = 2$

b) $x^3 + xy = 3$

c) $x^2 - y^2 = 4$

b) y-intercept, x=0

$-y^2 = 4$

$y^2 = -4$

There is no real number whose square is -4, so there is no y-intercept

x-intercept, y=0

$x^2 = 4$

$x = \pm 2$

$(2,0)$, $(-2,0)$

Replace x by -x: $(-x)^2 - y^2 = x^2 - y^2$

symmetry with respect to y-axis

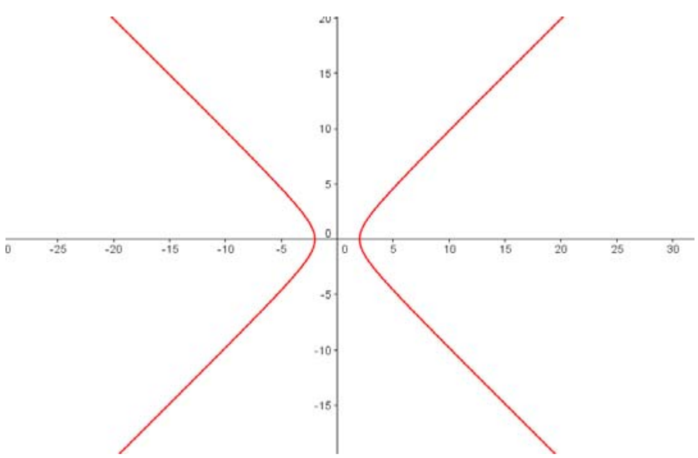
Replace y by -y: $x^2 - (-y)^2 = x^2 - y^2$

symmetry with respect to x-axis

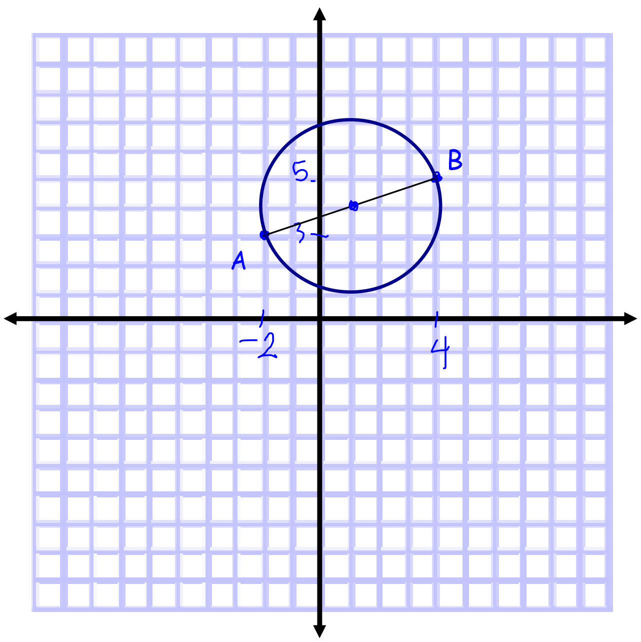
Replace x by -x and y by -y:

$(-x)^2 - (-y)^2 = x^2 - y^2$

symmetry with respect to the origin



Write an equation of a circle such that the endpoints of a diameter segment are at (-2,3) and (4,5)



Center of the circle is midpoint between A and B and its coordinates are:

$$\left(\frac{-2+4}{2}, \frac{3+5}{2}\right) = (1, 4)$$

Radius of the circle is the distance between A and the center (or the distance between B and the center, or half the distance between A and B).

$$r^2 = (1-(-2))^2 + (4-3)^2 =$$

$$= 3^2 + 1^2 = 9 + 1 = 10$$

The equation of the circle is:

$$(x-1)^2 + (y-4)^2 = 10$$