

1. 2次関数のグラフについて、グラフとx軸との共有点のx座標、x軸との共有点の個数、x軸との位置関係を求めなさい。

Find the x-coordinate of common points, the number of common points, the positional relationship between the graph of the following quadratic function and the x-axis.

例題	問題
<p>① $y = -0.5x^2$</p> <p>$-0.5x^2 = 0$</p> <p>$x^2 = 0$ ÷(-0.5)</p> <p><u>$x = 0$</u></p> <p><u>共有点は1個</u></p> <p><u>1点で接する</u></p>	<p>① $y = 0.25x^2$</p>
<p>② $y = x^2 + 3x + 2$</p> <p>$x^2 + 3x + 2 = 0$</p> <p>1+2 1×2</p> <p>$(x+1)(x+2) = 0$</p> <p><u>$x = -1, -2$</u></p> <p><u>共有点は2個</u></p> <p><u>2点で交わる</u></p>	<p>② $y = x^2 + 5x + 4$</p>
<p>③ $y = x^2 + 4x + 4$</p> <p>$x^2 + 4x + 4 = 0$</p> <p>2+2 2×2</p> <p>$(x+2)^2 = 0$</p> <p><u>$x = -2$</u></p> <p><u>共有点は1個</u></p> <p><u>1点で接する</u></p>	<p>③ $y = x^2 + 6x + 9$</p>
<p>⑤ $y = x^2 - 16$</p> <p>$x^2 - 16 = 0$</p> <p>$(x+4)(x-4) = 0$</p> <p><u>$x = -4, 4$</u></p> <p><u>共有点は2個</u></p> <p><u>2点で交わる</u></p>	<p>⑤ $y = x^2 - 1$</p>

2. 判別式Dを用いて、2次関数のグラフとx軸との共有点の個数、x軸との位置関係を求めよ。

※ $ax^2 + bx + c$ のとき $D = b^2 - 4ac$ $\begin{cases} D > 0 \cdots 2\text{個} \\ D = 0 \cdots 1\text{個} \\ D < 0 \cdots 0\text{個} \end{cases}$

Find the x-coordinate of common points, the number of common points, the positional relationship between the graph of the following quadratic function and the x-axis using the discriminant D.

例題	問題
<p>① $y = x^2 + 4x + 3$</p> <p>$a = 1, b = 4, c = 3$</p> <p>$D = 4^2 - 4 \times 1 \times 3$</p> <p>$= 4 > 0$</p> <p><u>共有点は2個</u></p> <p><u>2点で交わる</u></p>	<p>① $y = x^2 + 5x + 6$</p>
<p>② $y = x^2 - 6x + 9$</p> <p>$a = 1, b = -6, c = 9$</p> <p>$D = (-6)^2 - 4 \times 1 \times 9$</p> <p>$= 0$</p> <p><u>共有点は1個</u></p> <p><u>1点で接する</u></p>	<p>② $y = x^2 - 4x + 4$</p>
<p>③ $y = x^2 + 4x + 5$</p> <p>$a = 1, b = 4, c = 5$</p> <p>$D = 4^2 - 4 \times 1 \times 5$</p> <p>$= -4 < 0$</p> <p><u>共有点は0個</u></p> <p><u>共有点をもたない</u></p>	<p>③ $y = x^2 + 6x + 10$</p>
<p>④ $y = x^2 - 4$</p> <p>$a = 1, b = 0, c = -4$</p> <p>$D = 0^2 - 4 \times 1 \times (-4)$</p> <p>$= 16 > 0$</p> <p><u>共有点は2個</u></p> <p><u>2点で交わる</u></p>	<p>④ $y = x^2 - 25$</p>
<p>⑤ $y = 3x^2 - 4x + 1$</p> <p>$a = 3, b = -4, c = 1$</p> <p>$D = (-4)^2 - 4 \times 3 \times 1$</p> <p>$= 4 > 0$</p> <p><u>共有点は2個</u></p> <p><u>2点で交わる</u></p>	<p>⑤ $y = 2x^2 - 3x + 1$</p>

1. 2次関数のグラフについて、グラフとx軸との共有点のx座標，x軸との共有点の個数，x軸との位置関係を求めなさい。

Find the x-coordinate of common points, the number of common points, the positional relationship between the graph of the following quadratic function and the x-axis.

例題	問題
<p>① $y = x^2 + 4x + 3$</p> <p>$x^2 + 4x + 3 = 0$ 1+3 1×3</p> <p>$(x + 1)(x + 3) = 0$</p> <p><u>$x = -1, -3$</u></p> <p><u>共有点は2個</u></p> <p><u>2点で交わる</u></p>	<p>① $y = x^2 + 6x + 5$</p>
<p>② $y = x^2 + 10x + 25$</p> <p>$x^2 + 10x + 25 = 0$ 5+5 5×5</p> <p>$(x + 5)^2 = 0$</p> <p><u>$x = -5$</u></p> <p><u>共有点は1個</u></p> <p><u>1点で接する</u></p>	<p>② $y = x^2 + 2x + 1$</p>
<p>③ $y = x^2 - 2x$</p> <p><u>$x^2 - 2x = 0$</u></p> <p>$x(x - 2) = 0$</p> <p><u>$x = 0, 2$</u></p> <p><u>共有点は2個</u></p> <p><u>2点で交わる</u></p>	<p>③ $y = x^2 - 4x$</p>
<p>④ $y = x^2 - 36$</p> <p>$x^2 - 36 = 0$</p> <p>$(x + 6)(x - 6) = 0$</p> <p><u>$x = -6, 6$</u></p> <p><u>共有点は2個</u></p> <p><u>2点で交わる</u></p>	<p>④ $y = x^2 - 25$</p>

2. 判別式Dを用いて、2次関数のグラフとx軸との共有点の個数，x軸との位置関係を求めよ。

※ $a x^2 + b x + c$ のとき $D = b^2 - 4 a c$

$$\left\{ \begin{array}{l} D > 0 \cdots 2 \text{ 個} \\ D = 0 \cdots 1 \text{ 個} \\ D < 0 \cdots 0 \text{ 個} \end{array} \right.$$

Find the x-coordinate of common points, the number of common points, the positional relationship between the graph of the following quadratic function and the x-axis using the discriminant D.

例題	問題
<p>① $y = x^2 + 5x + 4$ $a = 1, b = 5, c = 4$</p> <p>$D = 5^2 - 4 \times 1 \times 4$</p> <p>$= 9 > 0$</p> <p><u>共有点は2個</u></p> <p><u>2点で交わる</u></p>	<p>① $y = x^2 + 3x + 2$</p>
<p>② $y = x^2 - 8x + 16$ $a = 1, b = -8, c = 16$</p> <p>$D = (-8)^2 - 4 \times 1 \times 16$</p> <p>$= 0$</p> <p><u>共有点は1個</u></p> <p><u>1点で接する</u></p>	<p>② $y = x^2 - 6x + 9$</p>
<p>③ $y = x^2 + 6x + 10$ $a = 1, b = 6, c = 10$</p> <p>$D = 6^2 - 4 \times 1 \times 10$</p> <p>$= -4 < 0$</p> <p><u>共有点は0個</u></p> <p><u>共有点をもたない</u></p>	<p>③ $y = x^2 + 4x + 6$</p>
<p>④ $y = x^2 - 9$ $a = 1, b = 0, c = -9$</p> <p>$D = 0^2 - 4 \times 1 \times (-9)$</p> <p>$= 36 > 0$</p> <p><u>共有点は2個</u></p> <p><u>2点で交わる</u></p>	<p>④ $y = x^2 - 1$</p>
<p>⑤ $y = 2x^2 - 5x + 2$ $a = 2, b = -5, c = 2$</p> <p>$D = (-5)^2 - 4 \times 2 \times 2$</p> <p>$= 9 > 0$</p> <p><u>共有点は2個</u></p> <p><u>2点で交わる</u></p>	<p>⑤ $y = 3x^2 - 10x + 3$</p>

1. 次の2次関数のグラフとx軸との共有点の個数を求めよ。
※0個, 1個, 2個

Find the number of common points between the graph of the following quadratic function and the x-axis.

例題	問題
① $y = 2x^2$ $2x^2 = 0$ $x = 0$ より <u>1個</u>	① $y = 3x^2$
② $y = x^2 + 4x$ $x^2 + 4x = 0$ $x(x + 4) = 0$ $x = 0, -4$ より <u>2個</u>	② $y = x^2 + 2x$
③ $y = x^2 + 4x + 3$ $x^2 + 4x + 3 = 0$ $(x + 1)(x + 3) = 0$ $x = -1, -3$ より <u>2個</u>	③ $y = x^2 + 2x - 3$
④ $y = x^2 + 4x + 4$ $x^2 + 4x + 4 = 0$ $(x + 2)^2 = 0$ $x = -2$ より <u>1個</u>	④ $y = x^2 + 2x + 1$
⑤ $y = x^2 + 4x + 5$ $x^2 + 4x + 5 = 0$ $(x + 2)^2 + 1 = 0$ 解なし より <u>0個</u> 別解 $D = 4^2 - 4 \times 1 \times 5$ $= -4 < 0$ 解なし より <u>0個</u>	⑤ $y = x^2 + 2x + 3$

2. 次の2次関数のグラフとx軸との位置関係を求めよ。
※異なる2点で交わる, 1点で接する, 共有点なし

Find the positional relationship between the graph of the following quadratic function and the x-axis.

例題	問題
① $y = 4x^2$ $4x^2 = 0$ $x = 0$ より <u>1点で接する</u>	① $y = -x^2$
② $y = x^2 - 3x$ $x^2 - 3x = 0$ $x(x - 3) = 0$ $x = 0, 3$ より <u>異なる2点で交わる</u>	② $y = x^2 - 5x$
③ $y = x^2 + 3x + 1$ $x^2 + 3x + 1 = 0$ $D = 3^2 - 4 \times 1 \times 1$ $= 5 > 0$ より <u>異なる2点で交わる</u>	③ $y = x^2 + 5x + 4$
④ $y = x^2 + 6x + 9$ $x^2 + 6x + 9 = 0$ $(x + 3)^2 = 0$ $x = -3$ より <u>1点で接する</u>	④ $y = x^2 - 10x + 25$
⑤ $y = x^2 + 6x + 10$ $x^2 + 6x + 10 = 0$ $(x + 3)^2 + 1 = 0$ 解なしより <u>共有点なし</u> 別解 $D = 6^2 - 4 \times 1 \times 10$ $= -4 < 0$ 解なしより <u>共有点なし</u>	⑤ $y = x^2 - 4x + 6$

1. 次の2次関数のグラフとx軸との共有点のx座標を求めなさい。

※x軸はy=0

Find the x-coordinate of the common point between the graph of the following quadratic function and the x-axis.

例題	問題
① $y = 2x^2$ $2x^2 = 0$ $x^2 = 0$ <u>$x = 0$</u>	① $y = 3x^2$
② $y = (x - 1)(x - 2)$ $(x - 1)(x - 2) = 0$ <u>$x = 1, 2$</u>	② $y = (x - 1)(x - 3)$
③ $y = (x + 3)(x - 2)$ $(x + 3)(x - 2) = 0$ <u>$x = -3, 2$</u>	③ $y = (x + 1)(x - 3)$
④ $y = (x + 3)(x + 2)$ $(x + 3)(x + 2) = 0$ <u>$x = -3, -2$</u>	④ $y = (x + 1)(x + 4)$
⑤ $y = 2(x + 1)(x + 3)$ $2(x + 1)(x + 3) = 0$ <u>$x = -1, -3$</u>	⑤ $y = 3(x + 2)(x - 1)$
⑥ $y = x(x + 2)$ $x(x + 2) = 0$ <u>$x = 0, -2$</u>	⑥ $y = x(x + 4)$
⑦ $y = x(x - 4)$ $x(x - 4) = 0$ <u>$x = 0, 4$</u>	⑦ $y = x(x - 1)$
⑧ $y = -x(x - 3)$ $-x(x - 3) = 0$ <u>$x = 0, 3$</u>	⑧ $y = -x(x - 6)$
⑨ $y = (2x - 1)(x + 1)$ $(2x - 1)(x + 1) = 0$ <u>$x = \frac{1}{2}, -1$</u>	⑨ $y = (2x - 1)(x + 2)$
⑩ $y = (2x - 3)(x + 1)$ $(2x - 3)(x + 1) = 0$ <u>$x = \frac{3}{2}, -1$</u>	⑩ $y = (2x + 3)(x + 2)$

2. 次の2次関数のグラフとx軸との共有点のx座標を求めなさい。

※x軸はy=0


Find the x-coordinate of the common point between the graph of the following quadratic function and the x-axis.

例題	問題
① $y = x^2 + 4x + 3$ $x^2 + 4x + 3 = 0$ $(x + 1)(x + 3) = 0$ <u>$x = -1, -3$</u>	① $y = x^2 + 6x + 5$
② $y = x^2 - 5x + 4$ $x^2 - 5x + 4 = 0$ $(x - 1)(x - 4) = 0$ <u>$x = 1, 4$</u>	② $y = x^2 - 4x + 3$
③ $y = x^2 - 3x - 4$ $x^2 - 3x - 4 = 0$ $(x - 4)(x + 1) = 0$ <u>$x = 4, -1$</u>	③ $y = x^2 - 2x - 3$
④ $y = x^2 + 4x + 4$ $x^2 + 4x + 4 = 0$ $(x + 2)^2 = 0$ <u>$x = -2$</u>	④ $y = x^2 + 2x + 1$
⑤ $y = x^2 + 3x$ $x^2 + 3x = 0$ $x(x + 3) = 0$ <u>$x = 0, -3$</u>	⑤ $y = x^2 + 2x$

3. 次の放物線のグラフとx軸との共有点がないことを示せ。

※ $ax^2 + bx + c$ のとき $D = b^2 - 4ac$

Show that there is no intersection of the following parabola with the x-axis.

例題	問題
① $y = x^2 - 2x + 3$ $= (x - 1)^2 + 2$ 頂点(1, 2) 	① $y = x^2 - 4x + 5$
② $y = x^2 + 2x + 3$ $D = 2^2 - 4 \times 1 \times 3 = -8 < 0$ 解なし	② $y = x^2 + 4x + 5$

1. 次の2次関数のグラフとx軸との共有点のx座標を求めなさい。

※x軸はy=0

Find the x-coordinate of the common point between the graph of the following quadratic function and the x-axis.

例題	問題
① $y = -2x^2$ $-2x^2 = 0$ $x^2 = 0$ <u>$x = 0$</u>	① $y = -4x^2$
② $y = (x - 2)(x - 3)$ $(x - 2)(x - 3) = 0$ <u>$x = 2, 3$</u>	② $y = (x - 2)(x - 4)$
③ $y = (x + 2)(x - 3)$ $(x + 2)(x - 3) = 0$ <u>$x = -2, 3$</u>	③ $y = (x + 1)(x - 4)$
④ $y = (x + 2)(x + 3)$ $(x + 2)(x + 3) = 0$ <u>$x = -2, -3$</u>	④ $y = (x + 1)(x + 5)$
⑤ $y = 2(x + 1)(x + 2)$ $2(x + 1)(x + 2) = 0$ <u>$x = -1, -2$</u>	⑤ $y = 3(x + 3)(x - 1)$
⑥ $y = x(x + 5)$ $x(x + 5) = 0$ <u>$x = 0, -5$</u>	⑥ $y = x(x + 6)$
⑦ $y = x(x - 6)$ $x(x - 6) = 0$ <u>$x = 0, 6$</u>	⑦ $y = x(x - 2)$
⑧ $y = -x(x + 3)$ $-x(x + 3) = 0$ <u>$x = 0, -3$</u>	⑧ $y = -x(x + 6)$
⑨ $y = (2x - 1)(x + 2)$ $(2x - 1)(x + 2) = 0$ <u>$x = \frac{1}{2}, -2$</u>	⑨ $y = (2x - 1)(x + 3)$
⑩ $y = (2x - 3)(x - 2)$ $(2x - 3)(x - 2) = 0$ <u>$x = \frac{3}{2}, 2$</u>	⑩ $y = (2x + 3)(x - 2)$

2. 次の2次関数のグラフとx軸との共有点のx座標を求めなさい。

※x軸はy=0


Find the x-coordinate of the common point between the graph of the following quadratic function and the x-axis.

例題	問題
① $y = x^2 + 6x + 5$ $x^2 + 6x + 5 = 0$ $(x + 1)(x + 5) = 0$ <u>$x = -1, -5$</u>	① $y = x^2 + 7x + 6$
② $y = x^2 - 4x + 3$ $x^2 - 4x + 3 = 0$ $(x - 1)(x - 3) = 0$ <u>$x = 1, 3$</u>	② $y = x^2 - 3x + 2$
③ $y = x^2 + 3x - 4$ $x^2 + 3x - 4 = 0$ $(x - 1)(x + 4) = 0$ <u>$x = 1, -4$</u>	③ $y = x^2 + 2x - 3$
④ $y = x^2 + 14x + 49$ $x^2 + 14x + 49 = 0$ $(x + 7)^2 = 0$ <u>$x = -7$</u>	④ $y = x^2 + 4x + 4$
⑤ $y = x^2 + 6x$ $x^2 + 6x = 0$ $x(x + 6) = 0$ <u>$x = 0, -6$</u>	⑤ $y = x^2 + 3x$

3. 次の放物線のグラフとx軸との共有点がないことを示せ。

※ $ax^2 + bx + c$ のとき $D = b^2 - 4ac$

Show that there is no intersection of the following parabola with the x-axis.

例題	問題
① $y = x^2 - 4x + 7$ $= (x - 2)^2 + 3$ 頂点(2, 3) 	① $y = x^2 - 2x + 3$
② $y = x^2 + x + 1$ $D = 1^2 - 4 \times 1 \times 1$ $= -3 < 0$ 解なし	② $y = x^2 + x + 2$

1. 次の2次関数のグラフとx軸との共有点の個数を求めなさい。

※ x軸は $y = 0$

Find the number of common points between the graph of the following quadratic function and the x-axis.

例題	問題
<p>① $y = -x^2$</p> <p>$-x^2 = 0$</p> <p>$x^2 = 0$</p> <p>$x = 0$</p> <p>共有点は1個</p>	<p>① $y = -4x^2$</p>
<p>② $y = x^2 + 5x + 6$</p> <p>$x^2 + 5x + 6 = 0$</p> <p>$(x + 2)(x + 3) = 0$</p> <p>$x = -2, -3$</p> <p>共有点は2個</p>	<p>② $y = x^2 + 6x + 8$</p>
<p>③ $y = x^2 + 7x + 6$</p> <p>$x^2 + 7x + 6 = 0$</p> <p>$(x + 1)(x + 6) = 0$</p> <p>$x = -1, -6$</p> <p>共有点は2個</p>	<p>③ $y = x^2 + 8x + 7$</p>
<p>④ $y = x^2 + 10x + 25$</p> <p>$x^2 + 10x + 25 = 0$</p> <p>$(x + 5)^2 = 0$</p> <p>$x = -5$</p> <p>共有点は1個</p>	<p>④ $y = x^2 - 6x + 9$</p>
<p>⑤ $y = x^2 + 6x$</p> <p>$x^2 + 6x = 0$</p> <p>$x(x + 6) = 0$</p> <p>$x = 0, -6$</p> <p>共有点は2個</p>	<p>⑤ $y = x^2 + 2x$</p>
<p>⑥ $y = x^2 - 49$</p> <p>$x^2 - 49 = 0$</p> <p>$(x + 7)(x - 7) = 0$</p> <p>$x = -7, 7$</p> <p>共有点は2個</p>	<p>⑥ $y = x^2 - 1$</p>

2. 判別式 D を用いて、2次関数のグラフとx軸との共有点の個数を求めなさい。

※ $ax^2 + bx + c$ のとき $D = b^2 - 4ac$

$$\begin{cases} D > 0 \cdots 2 \text{ 個} \\ D = 0 \cdots 1 \text{ 個} \\ D < 0 \cdots 0 \text{ 個} \end{cases}$$

Find the number of common points between the graph of the following quadratic function and the x-axis using the discriminant D .

例題	問題
<p>① $y = x^2 + 6x + 5$ $a = 1, b = 6, c = 5$</p> <p>$D = 6^2 - 4 \times 1 \times 5$</p> <p>$= 16 > 0$</p> <p>共有点は2個</p>	<p>① $y = x^2 + 4x + 3$</p>
<p>② $y = x^2 - 6x + 9$ $a = 1, b = -6, c = 9$</p> <p>$D = (-6)^2 - 4 \times 1 \times 9$</p> <p>$= 0$</p> <p>共有点は1個</p>	<p>② $y = x^2 - 4x + 4$</p>
<p>③ $y = x^2 + 2x + 3$ $a = 1, b = 2, c = 3$</p> <p>$D = 2^2 - 4 \times 1 \times 3$</p> <p>$= -8 < 0$</p> <p>共有点は0個</p>	<p>③ $y = x^2 + 4x + 6$</p>
<p>④ $y = 2x^2 + 3x + 1$ $a = 2, b = 3, c = 1$</p> <p>$D = 3^2 - 4 \times 2 \times 1$</p> <p>$= 1 > 0$</p> <p>共有点は2個</p>	<p>④ $y = 3x^2 + 4x + 1$</p>
<p>⑤ $y = x^2 - 1$ $a = 1, b = 0, c = -1$</p> <p>$D = 0^2 - 4 \times 1 \times (-1)$</p> <p>$= 4 > 0$</p> <p>共有点は2個</p>	<p>⑤ $y = x^2 - 9$</p>
<p>⑥ $y = 2x^2 - 4x + 2$ $a = 2, b = -4, c = 2$</p> <p>$D = (-4)^2 - 4 \times 2 \times 2$</p> <p>$= 0$</p> <p>共有点は1個</p>	<p>⑥ $y = 2x^2 - 8x + 8$</p>
<p>⑦ $y = 2x^2 - 4x + 3$ $a = 2, b = -4, c = 3$</p> <p>$D = (-4)^2 - 4 \times 2 \times 3$</p> <p>$= -8 < 0$</p> <p>共有点は0個</p>	<p>⑦ $y = 2x^2 - 5x + 3$</p>

1. 次の2次関数のグラフとx軸との共有点の個数を求めなさい。

※ x軸は $y = 0$

Find the number of common points between the graph of the following quadratic function and the x-axis.

例題	問題
<p>① $y = -2x^2$</p> <p>$-2x^2 = 0$</p> <p>$x^2 = 0$</p> <p>$x = 0$</p> <p>共有点は1個</p>	<p>① $y = -3x^2$</p>
<p>② $y = x^2 + 6x + 5$</p> <p>$x^2 + 6x + 5 = 0$</p> <p>$(x + 1)(x + 5) = 0$</p> <p>$x = -1, -5$</p> <p>共有点は2個</p>	<p>② $y = x^2 + 7x + 10$</p>
<p>③ $y = x^2 - 5x + 6$</p> <p>$x^2 - 5x + 6 = 0$</p> <p>$(x - 2)(x - 3) = 0$</p> <p>$x = 2, 3$</p> <p>共有点は2個</p>	<p>③ $y = x^2 - 3x + 2$</p>
<p>④ $y = x^2 - 12x + 36$</p> <p>$x^2 - 12x + 36 = 0$</p> <p>$(x - 6)^2 = 0$</p> <p>$x = 6$</p> <p>共有点は1個</p>	<p>④ $y = x^2 - 6x + 9$</p>
<p>⑤ $y = x^2 - 2x$</p> <p>$x^2 - 2x = 0$</p> <p>$x(x - 2) = 0$</p> <p>$x = 0, 2$</p> <p>共有点は2個</p>	<p>⑤ $y = x^2 - 6x$</p>
<p>⑥ $y = x^2 - 49$</p> <p>$x^2 - 49 = 0$</p> <p>$(x + 7)(x - 7) = 0$</p> <p>$x = -7, 7$</p> <p>共有点は2個</p>	<p>⑥ $y = x^2 - 4$</p>

2. 判別式Dを用いて、2次関数のグラフとx軸との共有点の個数を求めなさい。

※ $ax^2 + bx + c$ のとき $D = b^2 - 4ac$

$D > 0 \cdots 2 \text{ 個}$ $D = 0 \cdots 1 \text{ 個}$ $D < 0 \cdots 0 \text{ 個}$

Find the number of common points between the graph of the following quadratic function and the x-axis using the discriminant D.

例題	問題
<p>① $y = x^2 - 6x + 5$</p> <p>$a = 1, b = -6, c = 5$</p> <p>$D = (-6)^2 - 4 \times 1 \times 5$</p> <p>$= 16 > 0$</p> <p>共有点は2個</p>	<p>① $y = x^2 - 5x + 4$</p>
<p>② $y = x^2 - 2x + 1$</p> <p>$a = 1, b = -2, c = 1$</p> <p>$D = (-2)^2 - 4 \times 1 \times 1$</p> <p>$= 0$</p> <p>共有点は1個</p>	<p>② $y = x^2 - 8x + 16$</p>
<p>③ $y = x^2 - 2x + 3$</p> <p>$a = 1, b = -2, c = 3$</p> <p>$D = (-2)^2 - 4 \times 1 \times 3$</p> <p>$= -8 < 0$</p> <p>共有点は0個</p>	<p>③ $y = x^2 - 4x + 5$</p>
<p>④ $y = 5x^2 + 6x + 1$</p> <p>$a = 5, b = 6, c = 1$</p> <p>$D = 6^2 - 4 \times 5 \times 1$</p> <p>$= 16 > 0$</p> <p>共有点は2個</p>	<p>④ $y = 4x^2 + 5x + 1$</p>
<p>⑤ $y = 9x^2 - 1$</p> <p>$a = 9, b = 0, c = -1$</p> <p>$D = 0^2 - 4 \times 9 \times (-1)$</p> <p>$= 36 > 0$</p> <p>共有点は2個</p>	<p>⑤ $y = 4x^2 - 1$</p>
<p>⑥ $y = 3x^2 - 4x + 2$</p> <p>$a = 3, b = -4, c = 2$</p> <p>$D = (-4)^2 - 4 \times 3 \times 2$</p> <p>$= -8 < 0$</p> <p>共有点は0個</p>	<p>⑥ $y = 3x^2 - 2x + 1$</p>
<p>⑦ $y = -x^2 + 2x - 1$</p> <p>$a = -1, b = 2, c = -1$</p> <p>$D = 2^2 - 4 \times (-1) \times (-1)$</p> <p>$= 0$</p> <p>共有点は1個</p>	<p>⑦ $y = -x^2 - 4x - 4$</p>

1. 次の2次関数のグラフとx軸との位置関係を求めなさい。
※ x軸はy = 0
Find the positional relationship between the graph of the following quadratic function and the x-axis.
2. 判別式Dを用いて、2次関数のグラフとx軸との位置関係を求めなさい。
※ $ax^2 + bx + c$ のとき $D = b^2 - 4ac$
 $\begin{cases} D > 0 \cdots 2 \text{点で交わる} \\ D = 0 \cdots 1 \text{点で接する} \\ D < 0 \cdots \text{共有点なし} \end{cases}$
Find the positional relationship between the graph of the following quadratic function and the x-axis using the discriminant D.

例題	問題
<p>① $y = 2x^2$</p> $2x^2 = 0$ $x^2 = 0$ $x = 0$ <p><u>1点で接する</u></p>	<p>① $y = -2x^2$</p>
<p>② $y = x^2 + 4x + 3$</p> $x^2 + 4x + 3 = 0$ $(x + 1)(x + 3) = 0$ $x = -1, -3$ <p><u>2点で交わる</u></p>	<p>② $y = x^2 + 6x + 5$</p>
<p>③ $y = x^2 - 2x - 3$</p> $x^2 - 2x - 3 = 0$ $(x + 1)(x - 3) = 0$ $x = -1, 3$ <p><u>2点で交わる</u></p>	<p>③ $y = x^2 - 4x - 5$</p>
<p>④ $y = x^2 + 6x + 9$</p> $x^2 + 6x + 9 = 0$ $(x + 3)^2 = 0$ $x = -3$ <p><u>1点で接する</u></p>	<p>④ $y = x^2 + 8x + 16$</p>
<p>⑤ $y = x^2 - 4x$</p> $x^2 - 4x = 0$ $x(x - 4) = 0$ $x = 0, 4$ <p><u>2点で交わる</u></p>	<p>⑤ $y = x^2 - 5x$</p>
<p>⑥ $y = x^2 - 64$</p> $x^2 - 64 = 0$ $(x + 8)(x - 8) = 0$ $x = -8, 8$ <p><u>2点で交わる</u></p>	<p>⑥ $y = x^2 - 49$</p>

例題	問題
<p>① $y = x^2 + 4x + 3$ $a = 1, b = 4, c = 3$</p> $D = 4^2 - 4 \times 1 \times 3$ $= 4 > 0$ <p><u>2点で交わる</u></p>	<p>① $y = x^2 + 5x + 4$</p>
<p>② $y = x^2 - 2x + 1$ $a = 1, b = -2, c = 1$</p> $D = (-2)^2 - 4 \times 1 \times 1$ $= 0$ <p><u>1点で接する</u></p>	<p>② $y = x^2 - 6x + 9$</p>
<p>③ $y = x^2 + 4x + 5$ $a = 1, b = 4, c = 5$</p> $D = 4^2 - 4 \times 1 \times 5$ $= -4 < 0$ <p><u>共有点をもたない</u></p>	<p>③ $y = x^2 + 2x + 3$</p>
<p>④ $y = 3x^2 + 4x + 1$ $a = 3, b = 4, c = 1$</p> $D = 4^2 - 4 \times 3 \times 1$ $= 4 > 0$ <p><u>2点で交わる</u></p>	<p>④ $y = 4x^2 + 5x + 1$</p>
<p>⑤ $y = x^2 - 4$ $a = 1, b = 0, c = -4$</p> $D = 0^2 - 4 \times 1 \times (-4)$ $= 16 > 0$ <p><u>2点で交わる</u></p>	<p>⑤ $y = x^2 - 1$</p>
<p>⑥ $y = 3x^2 - 6x + 3$ $a = 3, b = -6, c = 3$</p> $D = (-6)^2 - 4 \times 3 \times 3$ $= 0$ <p><u>1点で接する</u></p>	<p>⑥ $y = 2x^2 - 8x + 8$</p>
<p>⑦ $y = 3x^2 - 4x + 2$ $a = 3, b = -4, c = 2$</p> $D = (-4)^2 - 4 \times 3 \times 2$ $= -8 < 0$ <p><u>共有点をもたない</u></p>	<p>⑦ $y = 2x^2 - 4x + 3$</p>

1. 次の2次関数のグラフとx軸との位置関係を求めなさい。

2. 判別式Dを用いて、2次関数のグラフとx軸との位置関係を求めなさい。

※ x軸は y = 0

Find the positional relationship between the graph of the following quadratic function and the x-axis.

$\begin{cases} D > 0 \cdots 2 \text{ 点で交わる} \\ D = 0 \cdots 1 \text{ 点で接する} \\ D < 0 \cdots \text{共有点なし} \end{cases}$

Find the positional relationship between the graph of the following quadratic function and the x-axis using the discriminant D.

例題	問題
<p>① $y = 2x^2$</p> <p>$2x^2 = 0$</p> <p>$x^2 = 0$</p> <p>$x = 0$</p> <p><u>1点で接する</u></p>	<p>① $y = -2x^2$</p>
<p>② $y = x^2 + 5x + 6$</p> <p>$x^2 + 5x + 6 = 0$</p> <p>$(x + 2)(x + 3) = 0$</p> <p>$x = -2, -3$</p> <p><u>2点で交わる</u></p>	<p>② $y = x^2 + 5x + 4$</p>
<p>③ $y = x^2 - 4x + 3$</p> <p>$x^2 - 4x + 3 = 0$</p> <p>$(x - 1)(x - 3) = 0$</p> <p>$x = 1, 3$</p> <p><u>2点で交わる</u></p>	<p>③ $y = x^2 - 7x + 6$</p>
<p>④ $y = x^2 - 2x + 1$</p> <p>$x^2 - 2x + 1 = 0$</p> <p>$(x - 1)^2 = 0$</p> <p>$x = 1$</p> <p><u>1点で接する</u></p>	<p>④ $y = x^2 - 4x + 4$</p>
<p>⑤ $y = x^2 + x$</p> <p>$x^2 + x = 0$</p> <p>$x(x + 1) = 0$</p> <p>$x = 0, -1$</p> <p><u>2点で交わる</u></p>	<p>⑤ $y = x^2 - x$</p>
<p>⑥ $y = x^2 - 64$</p> <p>$x^2 - 64 = 0$</p> <p>$(x + 8)(x - 8) = 0$</p> <p>$x = -8, 8$</p> <p><u>2点で交わる</u></p>	<p>⑥ $y = x^2 - 81$</p>

例題	問題
<p>① $y = x^2 + 7x + 6$</p> <p>$a = 1, b = 7, c = 6$</p> <p>$D = 7^2 - 4 \times 1 \times 6$</p> <p>$= 25 > 0$</p> <p><u>2点で交わる</u></p>	<p>① $y = x^2 + 5x + 6$</p>
<p>② $y = x^2 - 6x + 9$</p> <p>$a = 1, b = -6, c = 9$</p> <p>$D = (-6)^2 - 4 \times 1 \times 9$</p> <p>$= 0$</p> <p><u>1点で接する</u></p>	<p>② $y = x^2 - 2x + 1$</p>
<p>③ $y = x^2 - 4x + 6$</p> <p>$a = 1, b = -4, c = 6$</p> <p>$D = (-4)^2 - 4 \times 1 \times 6$</p> <p>$= -8 < 0$</p> <p><u>共有点をもたない</u></p>	<p>③ $y = x^2 - 2x + 4$</p>
<p>④ $y = 5x^2 + 6x + 1$</p> <p>$a = 5, b = 6, c = 1$</p> <p>$D = 6^2 - 4 \times 5 \times 1$</p> <p>$= 16 > 0$</p> <p><u>2点で交わる</u></p>	<p>④ $y = 6x^2 + 5x + 1$</p>
<p>⑤ $y = 2x^2 - 8$</p> <p>$a = 2, b = 0, c = -8$</p> <p>$D = 0^2 - 4 \times 2 \times (-8)$</p> <p>$= 64 > 0$</p> <p><u>2点で交わる</u></p>	<p>⑤ $y = 4x^2 - 4$</p>
<p>⑥ $y = -x^2 + 4x - 4$</p> <p>$a = -1, b = 4, c = -4$</p> <p>$D = 4^2 - 4 \times (-1) \times (-4)$</p> <p>$= 0$</p> <p><u>1点で接する</u></p>	<p>⑥ $y = -x^2 - 2x - 1$</p>
<p>⑦ $y = 3x^2 - 5x + 2$</p> <p>$a = 3, b = -5, c = 2$</p> <p>$D = (-5)^2 - 4 \times 3 \times 2$</p> <p>$= 1 > 0$</p> <p><u>2点で交わる</u></p>	<p>⑦ $y = 2x^2 - 5x + 2$</p>

