

## Quadratic Development

Quadratic Formula -  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

The Discriminant -  $b^2 - 4ac$

The value of the discriminant gives important information about the nature of the graph of a function and its roots.

Give the 4 types of discriminant. What does each tell us about the roots of a quadratic function.

1)

2)

3)

4)

Example problems:

- Give the discriminant.

- Find the roots of the function.

- Graph the function.

- Describe how the value of the discriminant affects the roots and the graph.

A)  $y = x^2 - 2x - 8$

B)  $y = x^2 + 6x + 9$

C)  $y = x^2 + 4x + 2$

D)  $y = x^2 - 4x + 5$

For each problem give the discriminant and describe the roots, find the roots, and graph the function.

To Pass:

For a C.

For a B.

For an A.

1)  $y = x^2 + 7x - 18$

2)  $y = x^2 + 6x + 4$

3)  $y = 4x^2 + 4x + 1$

4)  $y = x^2 + 2x + 2$

5)  $y = x^2 - x - 20$

6)  $y = x^2 - 14x + 49$

7)  $y = x^2 - 4x + 7$

8)  $y = 3x^2 + 8x + 3$

9)  $y = 2x^2 - 7x - 4$

10)  $y = 9x^2 + 12x + 4$

11)  $y = x^2 + 8x + 5$

12)  $y = 3x^2 + 6x + 5$

13)  $y = 6x^2 - 5x - 6$

14)  $y = 4x^2 - 20x + 25$

15)  $y = 2x^2 - 4x + 6$

16)  $y = 3x^2 + 10x + 5$

In each problem below complete the square to put the function in vertex form. Give the vertex and graph the function with its vertex.

To Pass:

For a C.

For a B.

For an A.

17)  $y = x^2 + 6x$

19)  $y = x^2 - 4x + 5$

20)  $y = x^2 + 3x$

21)  $y = 2x^2 + 12x + 10$

18)  $y = x^2 + 6x + 8$

22)  $y = x^2 - 5x + 5$

23)  $y = x^2 + 12x$

25)  $y = x^2 + 8x + 19$

26)  $y = x^2 + 5x$

27)  $y = 2x^2 + 8x + 6$

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

28)  $y = x^2 + 5x + 3$

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

31)  $y = x^2 + 2x + 5$

32)  $y = x^2 + 7x$

33)  $y = 3x^2 + 18x + 21$

30)  $y = x^2 + 4x + 3$

34)  $y = x^2 - 3x + 2$

35)  $y = x^2 - 5x + 10$

36)  $y = x^2 - 14x$

38)  $y = x^2 - 6x + 11$

39)  $y = x^2 + 9x$

40)  $y = 3x^2 + 12x + 6$

37)  $y = x^2 - 10x + 19$

41)  $y = x^2 - 7x + 2$

42)  $y = x^2 + 3x + 5$