# More Quadratic Polynomials

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October 19, 2019

## 1 Vertex Form

Express each polynomial below in vertex form:

1. $x^2 + 4x + 5$

2. $-x^2 - 6x + 3$

3. $2x^2 - 7$

4. $4x^2 - 8x + 17$

5. $-7x^2 + 21x - 14$

6. $8x^2 - 30x + \frac{1}{2}$

## 2 Solving Equations in Vertex Form

Solve for the variable in each equation below:

1. $(x - 3)^2 - 9 = 0$

2. $(z - 5)^2 - 49 = 0$

3. $2(a + 11)^2 - 10 = 22$

4. $(k + 9)^2 - 29 = 1$

5. $3(p + \frac{2}{3})^2 - 27 = 0$

6. $4(y - \frac{3}{4})^2 - 13 = 0$

# 3    Solving Polynomial Equations

Solve by factoring or using the quadratic formula:

1. $x^2 + 6x + 9 = 0$

2. $2x^2 - 5x - 3 = 0$

3. $x^2 - 9x - 3 = 2$

4. $4x^2 + 15x + 7 = 0$

5. $-2x^2 - 2x + 19 = 11$

6. $-10x^2 + 41x - 24 = -3$

# 4    Word Problems

1. What is the vertex of the equation $y = 3x^2 - 6x$?

2. What is the y-value of the vertex of the equation $y = -4x^2 + 20x - 17$? Will it be a maximum or a minimum?

3. A parabola has a vertex of (-3, 4) and intersects the point (-1, -4). What is the equation of the graph (in expanded form)?

4. The area of a triangle with a height that is 2 times longer than its base, plus the area of a rectangle with width 5 cm and the same height as the triangle, is equal to 96 cm$^2$. What is the length of the triangle's base?

5. The inhabitants of the planet Marth uses a different number system compared to Earth's base 10. The number 111 in Marth's number system is equal to 21 in Earth's base 10 system. What is the Marth number 2021 in base 10?