Factoring the difference of perfect cubes:

$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

Factoring the sum of perfect cubes:

$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

$$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$

These Quadratics are NEVER factorable.

Therefore, you can use the Quadratic Formula to find the two solutions from this facotor.

$$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

Factor completely.

$250x^4 + 686x$

$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

$2x(125x^3 + 343) =$ $2x(5x+7)(25x^2-35x+49)$

$a^3 + b^3$

$a = 5x$

$b = 7$

Find all complex solutions.

$8x^3 - 125 = 0$

$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

$a^3 - b^3$

$8x^3 - 125$

$a = 2x$

$b = 5$

$(2x-5)(4x^2+10x+25)$

$x = \frac{5}{2}$

$b^2 - 4ac = -300$

$\frac{-10 \pm \sqrt{-300}}{8}$

$\frac{-10 \pm 10i\sqrt{3}}{8}$

$\frac{-5 \pm 5i\sqrt{3}}{4}$

Is each a polynomial?

- Exponents must be whole numbers
- Coefficients must be real numbers

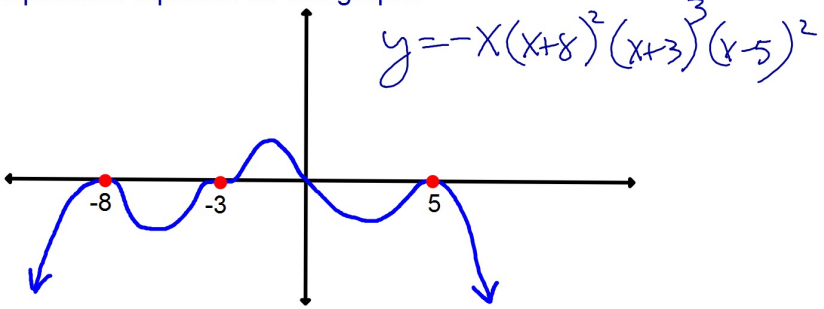
$y = 4x^3 - 9x^2 + \frac{3}{x} - 7$ → $\frac{3}{x} = 3x^{-1}$ NO exponent not a whole #

$y = 12x^5 + 13x^3 + 7\sqrt{x} + 10$ → $\sqrt{x} = x^{\frac{1}{2}}$ NO exponent not a whole #

$f(x) = -3.5x^2 + \frac{2}{9}x - 18.113$ Yes

$f(x) = -x^4 + 11x^3 + 7ix + 22$ → NO coefficient not a real #

Write a possible equation for this graph:



$y = -x(x+8)^2(x+3)^3(x-5)^2$