$$f(x) = -\left(x^2 - 16\right)^2 (3x - 7)^5$$

Degree:

Real roots:

Imaginary roots:

Practice

$$f(x) = -(x^2 - 16)^2 (3x - 7)^5$$

Degree: $4 + 5 =$ **9th**

Real roots:

$x^2 - 16 = 0$

$+16 \quad +16$

$\sqrt{x^2} = \sqrt{16}$

$x = \pm 4$ multiplicity of 2

$3x - 7 = 0$

$+7 \quad +7$

$\frac{3x}{3} = \frac{7}{3}$

$x = \frac{7}{3}$

multiplicity of 5

Imaginary roots:

No imaginary roots

9th degree has 9 real roots

Practice

$$f(x) = x^4 (x^2 + 36)^2 (2x + 6)^3$$

Degree:

Real roots:

Imaginary roots:

Practice

$$f(x) = x^4 (x^2 + 36)^2 (2x + 6)^3$$

Degree: $4+4+3 = 11^{th}$

Real roots:

$2x + 6 = 0$

$-6 \quad -6$

$\frac{2x}{2} = \frac{-6}{2}$

$x = -3$ Multiplicity of 3

$x = 0$ Multiplicity of 4

Imaginary roots:

$x^2 + 36 = 0$

$-36 \quad -36$

$\sqrt{x^2} = \sqrt{-36}$

$x = \pm 6i$ multiplicity of 2

11th degree has 11 complex roots

Practice

Create polynomial equations for each degree and set of complex roots

1) 2^{nd} degree & 2 imaginary roots

2) 3^{rd} degree, 1 real root & 2 imaginary roots

3) 4^{th} degree & 3 real roots

4) 5^{th} degree & 1 real root

Practice

Create polynomial equations for each degree and set of complex roots

1) 2nd degree & 2 imaginary roots

$f(x) = x^2 + 4$ or $g(x) = x^2 + 10$

2) 3rd degree, 1 real root & 2 imaginary roots

$f(x) = x(x^2 + 9)$ or $g(x) = (x - 8)(x^2 + 20)$

3) 4th degree & 3 real roots

$f(x) = x^2(x + 2)(x - 9)$ or $g(x) = (x + 7)^2(x^2 - 25)$

4) 5th degree & 1 real root

$f(x) = (x - 3)^5$ or $g(x) = 8x^5$

Practice