Write a polynomial function with the following zeroes. What degree is the polynomial? How many times does the graph cross the x-axis?

a) zeroes 2, -5 and \( \frac{1}{3} \)

b) zeroes \( 3i \), -1, and 0

c) zeroes \( 3 + 2i \), 4

\[
\text{Zeroes: } x = 3 + 2i, \quad x = 4, \quad x = 3 - 2i
\]

Factor:
\[
(x - 3 - 2i)(x - 3 + 2i)(x - 4) = 0
\]

Compute:
\[
(x^2 - 3x + 9 - 64 + 4i^2)(x - 4) = 0
\]

\[
(x^2 - 6x + 13)(x - 4) = 0
\]

\[
x^3 - 6x^2 + 13x - 4x^2 + 24x - 52 = 0
\]

\[
x^3 - 10x^2 + 37x - 52 = 0
\]
Honors PreCalculus

Finding Zeroes Using Factoring

Solve each equation by factoring.

1) \(x^2 - x = 20\)
2) \(3n^2 + 35n = -60\)
3) \(7x^2 - 224 = 28x\)
4) \(k^2 + 6k = 12\)

Factor each.

5) \(x^4 - 4x^2 - 21 = 0\)
6) \(x^4 - 2x^3 - 24 = 0\)

7) \(x^4 - 15x^2 + 54 = 0\)

Factor each completely.

8) \(12b^3 - 8b^2 + 3b - 2\)
9) \(3v^3 + 2v^2 + 9v + 6\)

Find all zeros.

10) \(f(x) = 5x^3 - 6x^2 - 8x\)
11) \(f(x) = 2x^4 - 15x^2 + 25x\)

12) \(f(x) = 3x^3 + 8x^2 + 5x\)
13) \(f(x) = 3x^3 + 11x^2 - 20x\)
Writing Polynomial Functions given the zeroes

Write a polynomial function of least degree that has real coefficients, the following zeros, and a leading coefficient of 1.

1) $-3, -2, 5$

2) $2, -4, -\frac{3}{4}$

3) $5, 3i, -3i$

4) $-\frac{1}{3}, -3 - 2i$