Fundamental Theorem of Algebra Name_____

Date_____

State the possible number of real and imaginary zeros and the possible rational zeros for each function.

1) $f(x) = x^5 + 5x^4 + 6x^3 + 30x^2 + 8x + 40$

2) $f(x) = x^3 - 7x^2 - x + 7$

3) $f(x) = x^4 + 5x^2 + 4$

4) $f(x) = x^3 + 4x^2 - 2x - 20$

5) $f(x) = x^4 - 49$

6) $f(x) = x^4 + 15x^2 + 54$

7) $f(x) = x^3 - 8$

8) $f(x) = x^3 + 1$

Answers to

1) Possible # of real zeros: 5, 3, or 1
Possible # of imaginary zeros: 4, 2, or 0
Possible rational zeros:
$\pm 1, \pm 2, \pm 4, \pm 5, \pm 8, \pm 10, \pm 20, \pm 40$

2) Possible # of real zeros: 3 or 1
Possible # of imaginary zeros: 2 or 0
Possible rational zeros: $\pm 1, \pm 7$

3) Possible # of real zeros: 4, 2, or 0
Possible # of imaginary zeros: 4, 2, or 0
Possible rational zeros: $\pm 1, \pm 2, \pm 4$

4) Possible # of real zeros: 3 or 1
Possible # of imaginary zeros: 2 or 0
Possible rational zeros:
$\pm 1, \pm 2, \pm 4, \pm 5, \pm 10, \pm 20$

5) Possible # of real zeros: 4, 2, or 0
Possible # of imaginary zeros: 4, 2, or 0
Possible rational zeros: $\pm 1, \pm 7, \pm 49$

6) Possible # of real zeros: 4, 2, or 0
Possible # of imaginary zeros: 4, 2, or 0
Possible rational zeros:
$\pm 1, \pm 2, \pm 3, \pm 6, \pm 9, \pm 18, \pm 27, \pm 54$

7) Possible # of real zeros: 3 or 1
Possible # of imaginary zeros: 2 or 0
Possible rational zeros: $\pm 1, \pm 2, \pm 4, \pm 8$

8) Possible # of real zeros: 3 or 1
Possible # of imaginary zeros: 2 or 0
Possible rational zeros: ± 1