 Name_____

The Remainder Theorem and Bounds

Date_____ Period____

Evaluate $f(x)$ at k.

1) $f(x) = x^3 - 4x^2 + 7x$
$k = -1$

2) $f(x) = x^3 - 16x$
$k = 1$

3) $f(x) = x^4 + 4x^3 + 5x^2 - 4x - 4$
$k = 1$

4) $f(x) = 5x^5 - 4x^4 - 5x^2 - 5$
$k = 1$

Find the remainder when $f(x)$ is divided by $x - k$.

5) $f(x) = 5x^6 + 5x^5 - 7x^4 + 7x^3 + 5x^2 - 4x - 1$
$k = -2$

6) $f(x) = 5x^4 - 6x^3 - x^2 + 7x - 2$
$k = 2$

7) $f(x) = x^4 + 12x^3 + 37x^2 + 42x + 16$
$k = -3$

8) $f(x) = 4x^6 - 5x^5 - 9x^4 + 2x^2 + 3x - 9$
$k = -1$

Determine whether the upper and lower bound tests indicate *k* is an upper bound, a lower bound, or neither bound on the real zeros of $f(x)$.

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

10) $f(x) = 2x^4 - 2x^3 - 6x^2 + 6x$
$k = -1$

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

12) $f(x) = x^5 - 5x^4 + 12x^3 + 5x^2 - 13x$
$k = -5$

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

14) $f(x) = 2x^6 + 5x^5 + 4x^4 + 3x^3 + 4x^2 + 3x - 5$
$k = -3$

Find an interval in which all real zeros of $f(x)$ lie.

15) $f(x) = 12x^4 - 25x^3 - 8x^2 + 23x - 6$

16) $f(x) = x^5 - 3x^4 - x^3 + 3x^2 + 3x + 1$

17) $f(x) = 3x^4 - 8x^3 - 15x^2 - 4x$

18) $f(x) = 2x^4 - 9x^3 - 7x^2 + 9x + 5$

 Name_____

The Remainder Theorem and Bounds

Date_____ Period____

Evaluate $f(x)$ at k.

1) $f(x) = x^3 - 4x^2 + 7x$
$k = -1$

-12

2) $f(x) = x^3 - 16x$
$k = 1$

-15

3) $f(x) = x^4 + 4x^3 + 5x^2 - 4x - 4$
$k = 1$

2

4) $f(x) = 5x^5 - 4x^4 - 5x^2 - 5$
$k = 1$

-9

Find the remainder when $f(x)$ is divided by $x - k$.

5) $f(x) = 5x^6 + 5x^5 - 7x^4 + 7x^3 + 5x^2 - 4x - 1$
$k = -2$

19

6) $f(x) = 5x^4 - 6x^3 - x^2 + 7x - 2$
$k = 2$

40

7) $f(x) = x^4 + 12x^3 + 37x^2 + 42x + 16$
$k = -3$

-20

8) $f(x) = 4x^6 - 5x^5 - 9x^4 + 2x^2 + 3x - 9$
$k = -1$

-10

Determine whether the upper and lower bound tests indicate *k* is an upper bound, a lower bound, or neither bound on the real zeros of $f(x)$.

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

Upper bound

10) $f(x) = 2x^4 - 2x^3 - 6x^2 + 6x$
$k = -1$

Neither

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

Upper bound

12) $f(x) = x^5 - 5x^4 + 12x^3 + 5x^2 - 13x$
$k = -5$

Lower bound

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

Upper bound

14) $f(x) = 2x^6 + 5x^5 + 4x^4 + 3x^3 + 4x^2 + 3x - 5$
$k = -3$

Lower bound

Find an interval in which all real zeros of $f(x)$ lie.

15) $f(x) = 12x^4 - 25x^3 - 8x^2 + 23x - 6$

[–1, 3]

16) $f(x) = x^5 - 3x^4 - x^3 + 3x^2 + 3x + 1$

[–1, 4]

17) $f(x) = 3x^4 - 8x^3 - 15x^2 - 4x$

[–2, 4]

18) $f(x) = 2x^4 - 9x^3 - 7x^2 + 9x + 5$

[–2, 6]