Unit 4 Test Review

Name_____ ID: 1

Date_____ Period____

Factor each completely.

1) $216m^3 + n^3$

2) $64x^3 + 125y^3$

3) $125x^3 + 27y^3$

4) $x^3 - 216y^3$

5) $x^3 - y^3$

6) $125m^3 - 8n^3$

7) $x^4 - 4x^2 - 45$

8) $x^4 + 2x^2 - 3$

9) $m^4 - 5m^2 - 6$

10) $168n^3 - 96n^2 + 210n - 120$

11) $16x^3 - 128x^2 + 4x - 32$

12) $294p^3 + 210p^2 + 84p + 60$

Use the Remainder Theorem (Synthetic Substitution) to evaluate $f(x)$ at the given value.

13) $f(x) = 5x^4 - 17x^3 - 15x^2 + 6x + 18$ at $x = 4$

14) $f(a) = -4a^4 + 15a^3 + 20a^2 + 26a - 14$ at $a = 5$

15) $f(x) = x^4 - 3x^3 - 6x^2 + 14x - 26$ at $x = 4$

16) $f(a) = -6a^4 + 14a^3 - 2a^2 - 7a$ at $a = 2$

State the possible rational zeros for each function.

17) $f(x) = 3x^4 - 5x^3 - 19x^2 + 6x$

18) $f(x) = 5x^4 + 19x^3 - 29x^2 + 5x$

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

20) $f(x) = 5x^4 + 49x^3 - 40x^2 + 6x$

State the possible rational zeros for each function. Then find all rational zeros.

21) $f(x) = x^3 + 9x^2 + 10x - 50$

22) $f(x) = x^3 - 3x^2 - 56x + 230$

Write a polynomial function of least degree with integral coefficients that has the given zeros.

30) 1, 5, −3

31) 2, 1, −3

32) 4, 5, −3

33) 2 − 3i, i

34) −3i, 2 + 3i

35) −3i, 1 + 2i

23) $f(x) = x^3 + 5x^2 + 8x + 6$

State if the given binomial is a factor of the given polynomial.

24) $(n^4 - n^3 - 97n^2 + 60n + 100) \div (n - 10)$

25) $(x^4 - x^3 - 98x^2 - 74x - 15) \div (x + 9)$

26) $(n^4 - 4n^3 - 62n^2 + 22n - 20) \div (n - 10)$

27) $(x^4 - 9x^3 + 18x^2) \div (x - 6)$

1. State the possible rational zeros for each function. 2. Find the rational roots. 3. Synthetically divide to further factor the polynomial. 4. Then find all zeros. If necessary, use the quadratic formula.

28) $f(x) = x^3 - 10x^2 + 30x - 25$

29) $f(x) = 3x^3 + 22x^2 + 16x + 3$