Algebra 2 Name_____

Fundamental Theorem of Algebra Practice Test

Date_____ Period____

Divide.

1) $(x^3 + 8x^2 - 8x - 2) \div (x - 1)$

2) $(5x^3 - 38x^2 - 25x + 70) \div (x - 8)$

3) $(x^3 + 3x^2 - 67x + 27) \div (x + 10)$

4) $(3m + 4 - 11m^2 + 5m^3) \div (4 + 5m)$

5) $(54n^3 + 36n^2 + 54n - 16) \div (9n - 3)$

6) $(6r^3 + 37r^2 - 40r - 35) \div (r + 7)$

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

7) $(n^5 + 6n^4 + 7n^2 + 33n - 54) \div (n + 6)$

8) $(v^5 - 5v^4 + 4v^2 - 28v + 49) \div (v - 5)$

9) $(x^5 - 3x^4 - 78x^3 + 84x^2 - 31x - 88) \div (x - 10)$

10) $(b^5 + 8b^4 - 11b^2 + 10b - 8) \div (b - 1)$

Evaluate each function at the given value.

11) $f(m) = -4m^4 + 12m^3 + 11m^2 + 18m + 5$ at $m = 4$

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

12) $5, \ -2 + 2i$

13) $-3, \ -3i$

Find all roots.

14) $(2x - 1)(x^2 - 2)(5x^2 + 8) = 0$

15) $(x - 3)(5x^2 - 2)(x^2 + 4) = 0$

State the number of complex zeros, the possible number of imaginary zeros, the possible number of positive and negative zeros, and the possible rational zeros for each function. Then find all zeros.

16) $f(x) = x^6 + 4x^4 - 16x^2 - 64$

17) $f(x) = x^6 - 3x^4 - 25x^2 + 75$

18) $f(x) = 8x^4 - 18x^3 + 11x^2 - 1$

19) $f(x) = 7x^4 - 65x^3 + 123x^2 - 79x + 14$

20) A box with an open top is formed by cutting squares out of the corners of a rectangular piece of cardboard and then folding up the sides. If x represents the length of the side of the square cut from each corner, and if the original piece of cardboard is 15 inches by 13 inches, what size square must be cut if the volume of the box is to be 189 cubic inches?

Algebra 2 Name_____

Fundamental Theorem of Algebra Practice Test

Date_____ Period____

Divide.

1) $(x^3 + 8x^2 - 8x - 2) \div (x - 1)$

$x^2 + 9x + 1 - \frac{1}{x - 1}$

2) $(5x^3 - 38x^2 - 25x + 70) \div (x - 8)$

$5x^2 + 2x - 9 - \frac{2}{x - 8}$

3) $(x^3 + 3x^2 - 67x + 27) \div (x + 10)$

$x^2 - 7x + 3 - \frac{3}{x + 10}$

4) $(3m + 4 - 11m^2 + 5m^3) \div (4 + 5m)$

$m^2 - 3m + 3 - \frac{8}{4 + 5m}$

5) $(54n^3 + 36n^2 + 54n - 16) \div (9n - 3)$

$6n^2 + 6n + 8 + \frac{8}{9n - 3}$

6) $(6r^3 + 37r^2 - 40r - 35) \div (r + 7)$

$6r^2 - 5r - 5$

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

7) $(n^5 + 6n^4 + 7n^2 + 33n - 54) \div (n + 6)$

Yes

8) $(v^5 - 5v^4 + 4v^2 - 28v + 49) \div (v - 5)$

No

9) $(x^5 - 3x^4 - 78x^3 + 84x^2 - 31x - 88) \div (x - 10)$

No

10) $(b^5 + 8b^4 - 11b^2 + 10b - 8) \div (b - 1)$

Yes

Evaluate each function at the given value.

11) $f(m) = -4m^4 + 12m^3 + 11m^2 + 18m + 5$ at $m = 4$

-3

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

12) $5, \quad -2 + 2i$

$f(x) = x^3 - x^2 - 12x - 40$

13) $-3, \quad -3i$

$f(x) = x^3 + 3x^2 + 9x + 27$

Find all roots.

14) $(2x - 1)(x^2 - 2)(5x^2 + 8) = 0$

$\left\{\frac{1}{2}, \sqrt{2}, -\sqrt{2}, \frac{2i\sqrt{10}}{5}, -\frac{2i\sqrt{10}}{5}\right\}$

15) $(x - 3)(5x^2 - 2)(x^2 + 4) = 0$

$\left\{3, \frac{\sqrt{10}}{5}, -\frac{\sqrt{10}}{5}, 2i, -2i\right\}$

State the number of complex zeros, the possible number of imaginary zeros, the possible number of positive and negative zeros, and the possible rational zeros for each function. Then find all zeros.

16) $f(x) = x^6 + 4x^4 - 16x^2 - 64$

# of complex zeros: 6
Possible # of imaginary zeros: 6, 4, 2, or 0
Possible # positive real zeros: 1
Possible # negative real zeros: 1
Possible rational zeros:
$\pm 1, \pm 2, \pm 4, \pm 8, \pm 16, \pm 32, \pm 64$
Zeros: $\{2i$ mult. 2, $-2i$ mult. 2, 2, $-2\}$

17) $f(x) = x^6 - 3x^4 - 25x^2 + 75$

# of complex zeros: 6
Possible # of imaginary zeros: 6, 4, 2, or 0
Possible # positive real zeros: 2 or 0
Possible # negative real zeros: 2 or 0
Possible rational zeros:
$\pm 1, \pm 3, \pm 5, \pm 15, \pm 25, \pm 75$
Zeros: $\{\sqrt{3}, -\sqrt{3}, \sqrt{5}, -\sqrt{5}, i\sqrt{5}, -i\sqrt{5}\}$

18) $f(x) = 8x^4 - 18x^3 + 11x^2 - 1$

# of complex zeros: 4
Possible # of imaginary zeros: 4, 2, or 0
Possible # positive real zeros: 3 or 1
Possible # negative real zeros: 1
Possible rational zeros: $\pm 1, \pm \frac{1}{2}, \pm \frac{1}{4}, \pm \frac{1}{8}$
Zeros: $\left\{-\frac{1}{4}, \frac{1}{2}, 1 \text{ mult. } 2\right\}$

19) $f(x) = 7x^4 - 65x^3 + 123x^2 - 79x + 14$

# of complex zeros: 4
Possible # of imaginary zeros: 4, 2, or 0
Possible # positive real zeros: 4, 2, or 0
Possible # negative real zeros: 0
Possible rational zeros:
$\pm 1, \pm 2, \pm 7, \pm 14, \pm \frac{1}{7}, \pm \frac{2}{7}$
Zeros: $\left\{\frac{2}{7}, 1 \text{ mult. } 2, 7\right\}$

20) A box with an open top is formed by cutting squares out of the corners of a rectangular piece of cardboard and then folding up the sides. If x represents the length of the side of the square cut from each corner, and if the original piece of cardboard is 15 inches by 13 inches, what size square must be cut if the volume of the box is to be 189 cubic inches?

3 in. by 3 in. square