MATH 244/GRACEY
3.1 PRACTICE

Name_____

Determine whether the given number is a zero of the polynomial.

1) 2; $f(x) = -2x^3 + 5x^2 - 5x + 6$

2) -3; $f(x) = -5x^4 - 23x^3 - 8x^2 + 19x - 12$

Use long division to determine whether the binomial is a factor of f(x).

3) $f(x) = x^3 - 6x^2 + 11x - 6$; $x - 1$

4) $f(x) = 2x^3 - 17x^2 - 7x + 120$; $x + 4$

A polynomial P(x) and a divisor d(x) are given. Express P(x) in the form $d(x) \cdot Q(x) + R(x)$, where Q(x) is the quotient and R(x) is the remainder.

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

6) $P(x) = x^4 + x^2 + 5$
$d(x) = x^2 - x + 4$

7) $P(x) = x^3 - 3$
$d(x) = x + 3$

Use synthetic division to find the quotient and the remainder.

8) $(2x^3 + 3x^2 + 4x - 10) \div (x + 1)$

9) $(-6x^3 + 2x^2 + 5x - 10) \div (x - 2)$

Use synthetic division to find the function value.

10) $f(x) = x^4 - 4$; find $f(1 - \sqrt{2})$.

Using synthetic division, determine whether the numbers are zeros of the polynomials.

11) 3, –4; $f(x) = x^3 - 6x^2 - 19x + 84$

12) 7, 2; $f(x) = x^3 - 10x^2 + 28x - 24$

Factor the polynomial f(x). Then solve the equation f(x) = 0.

13) $f(x) = x^3 - 4x^2 - 17x + 60$

14) $f(x) = x^3 - 12x^2 + 44x - 48$

15) $f(x) = x^4 - 10x^3 + 35x^2 - 50x + 24$

Use synthetic division to find the quotient and the remainder.

16) $(3x^4 - 9x^3 + 2x^2 - 6x) \div (x - 3)$

17) $(3x^5 + 4x^4 + 2x^2 - 1) \div (x + 2)$

18) $(x^4 - 5) \div (x - 2)$

19) $(3x^4 - 2x^2 - 1) \div \left(x + \frac{1}{2}\right)$

20) $(4x^3 - 4y^3) \div (x - y)$

21) $(x^3 + 5ix^2 - 6ix + 2i) \div (x + i)$

22) $(x^3 + 4ix^2 - 6ix - 2) \div (x + i)$

Use synthetic division to find the function value.

23) $f(x) = 2x^3 - 7x^2 - 5x + 23$; find $f(-3)$

24) $f(x) = x^5 - 12x^4 + 16x^3 - 3x - 200$; find $f(-3)$.

Answer Key
Testname: 3.1PRAC

1) Yes
2) No
3) Yes
4) No
5) $(x^2 - 3)\cdot(x^2 + 6) + 33$
6) $(x^2 - x + 4)\cdot(x^2 + x - 2) + (-6x + 13)$
7) $(x + 3)\cdot(x^2 - 3x + 9) - 30$
8) $Q(x) = (2x^2 + x + 3)$; $R(x) = -13$
9) $Q(x) = (-6x^2 - 10x - 15)$; $R(x) = -40$
10) $13 - 12\sqrt{2}$
11) Yes; yes
12) No; yes
13) $(x - 3)(x + 4)(x - 5)$; 3, –4, 5
14) $(x - 2)(x - 4)(x - 6)$; 2, 4, 6
15) $(x-1)(x-2)(x-3)(x-4)$; 1, 2, 3, 4
16) $Q(x) = (3x^3 + 2x)$; $R(x) = 0$
17) $Q(x) = (3x^4 - 2x^3 + 4x^2 - 6x + 12)$; $R(x) = -25$
18) $Q(x) = x^3 + 2x^2 + 4x + 8$; $R(x) = 11$
19) $Q(x) = 3x^3 - \frac{3}{2}x^2 - \frac{5}{4}x + \frac{5}{8}$; $R(x) = -\frac{21}{16}$
20) $Q(x) = 4x^2 + 4xy + 4y^2$; $R(x) = 0$
21) $Q(x) = x^2 + 4ix + 4 - 6i$; $R(x) = -2i - 6$
22) $Q(x) = x^2 + 3ix + 3 - 6i$; $R(x) = -3i - 6$
23) –79
24) –1838