

3.6 Remainder Theorem Worksheet

Period _____

Is the given a divisor a Factor? Yes or No. Show long division.

1) $x^3 + 9x^2 + 24x + 20 = 0; x + 2$

2) $x^3 + 3x^2 - 24x - 80 = 0; x - 5$

3) $(r^3 + 5r^2 + 15r + 25) \div (r + 2)$

4) $x^4 + 9x^3 + 26x^2 + 34x + 20 = 0; x + 1 - i$

5) $x^4 - 2x^3 - 8x^2 - 30x - 25 = 0; x + 1 - 2i$

6) $x^4 - 66x^2 - 256x - 255 = 0; x - 4 - \sqrt{33}$

Find all roots.

7) $x^4 - 25 = 0$

8) $x^3 + 2x^2 - 5x - 10 = 0$

9) $x^4 - x^2 - 72 = 0$

10) $x^3 + 9x^2 + 20x = 0$

11) Solve for x:

$$x^2 - 6x + 2 = 0$$

Remainder Theorem

12) How can you predict whether a factor will divide evenly or not?

Test your prediction:

I. List the possible factors of

$$f(x) = x^3 - 6x^2 + 12x - 8$$

II. Test 3 of the possible factors.

a. $f(_) =$

b. $f(_) =$

c. $f(_) =$

III. Test 1 impossible factor.

d. $f(_) =$

Evaluate each function at the given value AND state whether or not it is a zero.

13) $f(a) = 2a^3 - 10a^2 + 14a - 17$ at $a = 3$

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

15) $f(a) = a^3 - 3a^2 - 18a$ at $a = -3$

16) $f(m) = m^3 + 2m^2 - 13m - 20$ at $m = -4$

17) $f(n) = n^3 + n^2 - 12n + 6$ at $n = 3$

Write a polynomial function of least degree that has real coefficients, the following zeros, and a leading coefficient of 1.

18) $-1, -2i, 2i$

19) $3, 5, -4, -1$

20) $-3, 3 + \sqrt{7}$

21) $-5, -2, -2 + 3i$

Perform the indicated operation.

22) $g(x) = 2x + 4$
 $h(x) = 2x^3 - 3x$
Find $g(x) \cdot h(x)$

23) $g(x) = 3x + 5$
 $h(x) = x + 4$
Find $g(x) - h(x)$

24) $g(t) = t^3 + t$
 $h(t) = t - 1$
Find $g(t) - h(t)$

25) $h(t) = -t^3 - 4t$
 $g(t) = 3t - 2$
Find $h(t) \cdot g(t)$

26) $h(x) = x^2 + 3$
 $g(x) = 4x - 1$
Find $h(x) + g(x)$

27) $f(x) = -3x^3 + 5$
 $g(x) = 3x + 1$
Find $f(x) \cdot g(x)$