King Fahd University of Petroleum and Minerals
Mathematical Sciences Department

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Show All Necessary Steps

(1) The remainder of dividing $f(x) = x^{88} - 2x^5 + 1$ by $x + i$ is:

$a)$ $2 + 2i$
$b)$ 0
$c)$ 2
$d)$ 2i
e) $1 - 2i$

(2) The graph of the polynomial $f(x) = -5x^7 - 3x^4 + 2x - 1$:

$a)$ goes down to the far left and down to the far right
$b)$ down to the far left and up to the far right
$c)$ up to the far left and up to the far right
$d)$ up to the far left and down to the far righrt
$e)$ none of the above

(3) According to the Descarte's Rule, the polynomial $f(x) = 4x^4 - 12x^3 - 3x^2 + 12x - 7$ has:
$a)$ no povitive real zeros
b) one or three negative real zeros
$c)$ four positive real zeros
$d)$ one negative real zero only
e) three negative real zeros

(4) The largest negative integer number that is a lower bound for the real zeros of the polynomail $f(x) = 4x^4 - 12x^3 - 3x^2 + 12x - 7$ is:

$a)$ 2

$b)$ -1

$c)$ 0

$d)$ -2

$e)$ 3

(5) The lowest degree of a polynomial with real coefficients, having zeros 3 of multiplicity 2, -5, $4+i$, $7+i$ and $7-i$, is:

$a)$ 5

$b)$ 6

c) 7

$d)$ 8

$e)$ 9

(6) The polynomial $h(x) = 3x^3 + 7x^2 + 3x + 7$ has at least one real zero in the interval:

$a)$ $[-3,-2]$

$b)$ $[-2,-1]$

$c)$ $[-1,0]$

$d)$ $[0,1]$

$e)$ $[1,2]$

(7) The set of all possible rational zeros of the polynomial $p(x) = 2x^4 - 21x^2 - 17x + 5$ is:

$a)\ \{\pm 1, \pm 2, \pm\frac{1}{5}, \pm\frac{2}{5}\}$
$b)\ \{\pm 1, \pm 5, \pm\frac{1}{2}, \pm\frac{5}{2}\}$
$c)\ \{\pm 1, \pm 5\}$
$d)\ \{\pm 1, \pm 2\}$
$e)\ \{\pm 1, \pm 2, \pm 5\}$

(8) If $x + 1$ is a factor of the polynomial $9x^4 - 6x^3 - 23x^2 - 4x + k$, then $k =$

$a)$ 14
$b)$ -4
$c)$ -14
$d)$ 5
$e)$ 4

(9) The set of all zeros for the polynomial $x^4 - 14x^3 + 70x^2 - 150x + 125$ contains:

$a)$ 5, 2, -1, $2 + i$ and $2 - i$
$b)$ 5 and $2 + i$
$c)$ 5 of multiplicty 2, $2 + i$ and $2 - i$
$d)$ no real solutions
$e)$ five real solutions

Good Luck