3.5: Complex Zeroes and Fundamental of Algebra

1. If - 1 is a zero of multiplicity 2 of $P(x) = x^4 + 6x^3 + 14x^2 + 14x + k$ for some constant k, then the remaining zeros are

   A) $-2 \pm i$

   B) $-2 \pm 2i$

   C) $2 \pm i\sqrt{5}$

   D) $2 \pm i$

   E) $-2 \pm i\sqrt{5}$

2. If $3i$ is a zero of the polynomial function $g(x) = 2x^4 - x^3 + 12x^2 - 9x - 54$, then the product of all real zeros of $g(x)$ is equal to

   A) -3

   B) $-\frac{1}{2}$

   C) $\frac{3}{2}$

   D) 9

   E) -6

3. If $-i$ and i, where $i = \sqrt{-1}$, are zeros of the polynomial function $P(x) = x^4 - 2x^3 + 2x^2 - 2x + 1$, then the number of x-intercepts of the graph of $P(x)$ is

A) 1

B) 0

C) 2

D) 3

E) 4

4. If 3 is a zero of $f(x) = x^3 - x^2 - 4x - 6$, then the other zeros are

A) $1 \pm i$

B) $1 \pm 2i$

C) $-1 \pm 2i$

D) $2 \pm i$

E) $-1 \pm i$

5. Given that $-2i$ is a zero of the polynomial $p(x) = 2x^4 - x^3 + 7x^2 - 4x - 4$ then the sum of the real zeros of $p(x)$ is:

A) $\frac{1}{2}$

B) 0

C) $-\frac{1}{2}$

D) $\frac{3}{2}$

E) $-\frac{3}{2}$

6. If $1 + i$ is a zero of $P(x) = x^3 - x^2 - ix^2 - 9x + 9 + 9i$, then the product of the other zeros is

A) $9 - 9i$

B) $3 - 3i$

C) 2

D) $-3 + 3i$

E) -9

7. If

$$\begin{array}{c|cccc} i & 1 & i & m & 2 \\ & & i & n & w \\ \hline & k & l & t & 2+i \end{array} \quad \text{where } i = \sqrt{-1}$$

is the synthetic division of some polynomial $p(x)$ by $x - i$, then the quotient is equal to

A) $ix^2 + 1$

B) $x^2 + 2ix$

C) $x^2 - 1$

D) $x^2 + 2ix + 1$

E) $ix^2 + 2ix - 1$

8. If $a + bi$ is the remainder when $P(x) = x^{21} - 8x^{15} + x^6$ is divided by $x + i$, then $a + b =$

A) -10

B) 6

C) -8

D) -6

E) 8

9. Given $x - i$ is a factor of the polynomial function $p(x) = 8x^5 - 12x^4 + 14x^3 - 13x^2 + 6x - 1$, then the other zeros are

A) One nonreal and one rational zero of multiplicity 3

B) one nonreal, one rational, and two integer zeros

C) one nonreal, one rational, and two irrational zeros

D) one nonreal and three integer zeros

E) four nonreal zeros