3.3: Dividing Polynomials

1. If $\frac{8x^4+6x^2-3x+1}{2x^2-x+2} = Q(x) + \frac{ax+b}{2x^2-x+2}$, then $a + b =$

   A) -6

   B) 7

   C) -8

   D) 5

   E) 3

2. 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

3. Performing the division $\frac{2x^4-3x^2-3x+1}{x^2+x-1}$, the quotient $Q(x)$ and remainder $R(x)$ are:

A) $Q(x) = 2x^2 - 2x + 1; R(x) = -6x + 2$

B) $Q(x) = 2x^2 + 2x + 1; R(x) = 6x + 2$

C) $Q(x) = 2x^2 + 2x - 1; R(x) = 6x - 2$

D) $Q(x) = 2x^2 - 2x - 1; R(x) = -6x - 2$

E) $Q(x) = 2x^2 - 2x; R(x) = -6x$

4. If $-x^3 + kx^2 - 5x - 20$ is divided by $x + 2$, then the set of all values of k which makes the remainder positive is

A) $(1/2, \infty)$

B) $(11/2, \infty)$

C) $(9/2, \infty)$

D) $(19/2, \infty)$

E) $\emptyset$

5. If $f(x) = 5x^4 - 12x^2 + 2x + k$ is divided by $x - 2$, the remainder is 28 , then $k =$

A) -8

B) -36

C) -16

D) 8

E) 16

6. If $x + \frac{1}{2}$ is a factor of the polynomial $p(x) = 10x^4 + 9x^3 - 4x^2 + (k + 3)x + k$, then $k =$

A) 6

B) -5

C) 12

D) $-3/2$

E) $5/2$

7. 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

8. If $x^{55} - 8x + 1$ is divided by $x + 1$, then the remainder is

A) 6

B) 10

C) -6

D) 8

E) -8

9. Upon dividing $x^4 + 3x^3 + x^2 - 3x + 15$ by $x + 3$. we get

A) quotient $= x^3 + x - 6$; remainder $= 177$

B) quotient $= x^3 - 6x - 6$; remainder $= 33$

C) quotient $= x^3 + x - 6$; remainder $= 33$

D) quotient $= x^3 - x - 6$; remainder $= \frac{33}{x+3}$

E) quotient $= x^3 + x^2 - 6$; remainder $= 33$

10. The values of k so that when $x^2 - 3x - 8$ is divided by $x + k$, the remainder $= -4$ is

A) $1, -4$

11. The value of k for which -3 is a zero of the function $f(x) = -x^4 + 3x^2 - 4x + k$ is

A) 0

B) -15

C) 42

D) 39

E) -35

12. 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) $-1 \pm i$

13. If $x - 2$ is a factor of the polynomial $x^3 - 5x^2 + 7x + k$, then k is equal to

A) 14

B) -2

C) 2

D) -42

E) 42

14. If

$$\begin{array}{c|cccc} i & 1 & i & m & 2 \\ & & i & n & w \\ \hline & k & l & t & 2+i \end{array}$$ 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) $ix^2 + 2ix - 1$

15. The value of k so that $p(x) = x^4 + kx^3 - 3kx + 9$ is divisible by $x - 3$ is

A) 4

B) -5

C) 5

D) -4

E) 0

16. If $x + 2$ is a factor of the polynomial $p(x) = x^3 - kx^2 + 3x + 7k$, then k is equal to:

A) $\frac{14}{3}$

B) $\frac{11}{3}$

C) $\frac{16}{3}$

D) $\frac{10}{3}$

E) $\frac{13}{3}$