Dividing Polynomials

1) If $\dfrac{8x^4 + 6x^2 - 3x + 1}{2x^2 - x + 2} = Q(x) + \dfrac{ax + b}{2x^2 - x + 2}$, 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) $\varnothing$

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) If

$$\begin{array}{c|cccc} i & 1 & i & u & 2 \\ & & i & v & w \\ \hline & x & y & z & 2+i \end{array}$$

where $i=\sqrt{-1}$, is a result of synthetic division of some polynomial $p(x)$ by $x-i$, then $u+v+w=$

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

8) 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

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

(a) 6
(b) 10
(c) -6
(d) 8
(e) -8

10) 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 $= 33$

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

(a) $1, -4$

12) 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

13) 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) $-1 \pm i$

14) 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

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

16) 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

17) If $x+\frac{1}{2}$ is a factor of the Polynomial

$p(x)=10x^4+9x^3-4x^2+(k+3)x+k$, then the value of k is:

A) 6

B) 12

C) $\frac{5}{2}$

D) -5

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

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