Problems from polys

1. We know by the remainder theorem that $x^3 - 2\,x^2 - 4\,x + 7 = q\,(x)\,(x - 3) + r\,(x)$ for some polynomials q(x) (the quotient) and r(x) (the remainder), where r(x) = 0 or the degree of r(x) is less than the degree of x-3. Find the quotient and remainder. The quotient , q(x) =
   Circle correct answer:
   $x^2 + x - 1$ $x^2 + 2\,x - 1$ $-x^2 + x - 1$ 'none of the others'
   The remainder, r(x) =
   Circle correct answer:
   4 $4 + x$ 2 'none of the above'

2. We know by the remainder theorem that $x^3 + 6\,x^2 + 4\,x - 1 = q\,(x)\,(x + 5) + r\,(x)$ for some polynomials q(x) (the quotient) and r(x) (the remainder), where r(x) = 0 or the degree of r(x) is less than the degree of x+5. Find the quotient and remainder. The quotient , q(x) =
   Circle correct answer:
   $x^2 + x - 1$ $x^2 + 2\,x - 1$ $-x^2 + x - 1$ 'none of the others'
   The remainder, r(x) =
   Circle correct answer:
   4 $4 + x$ 2 'none of the above'

3. We know by the remainder theorem that $x^3 - 3\,x^2 - 5\,x + 9 = q\,(x)\,(x - 4) + r\,(x)$ for some polynomials q(x) (the quotient) and r(x) (the remainder), where r(x) = 0 or the degree of r(x) is less than the degree of x-4. Find the quotient and remainder. The quotient , q(x) =
   Circle correct answer:
   $x^2 + x - 1$ $x^2 + 2\,x - 1$ $-x^2 + x - 1$ 'none of the others'
   The remainder, r(x) =
   Circle correct answer:
   5 $x + 5$ 3 'none of the above'

4. We know by the remainder theorem that $6\,x^3 - 7\,x^2 - 5\,x + 7 = q\,(x)\,(2\,x - 3) + r\,(x)$ for some polynomials q(x) (the quotient) and r(x) (the remainder), where r(x) = 0 or the degree of r(x) is less than the degree of 2*x-3. Find the quotient and remainder. The quotient , q(x) =
   Circle correct answer:
   $3\,x^2 + x - 1$ $3\,x^2 + 2\,x - 1$ $x^2 + x - 1$ 'none of the others'
   The remainder, r(x) =
   Circle correct answer:
   4 $4 + x$ 2 'none of the above'

5. We know by the remainder theorem that $x^3 - 10\,x + 7 = q\,(x)\,(x-3) + r\,(x)$ for some polynomials q(x) (the quotient) and r(x) (the remainder), where r(x) = 0 or the degree of r(x) is less than the degree of x-3. Find the quotient and remainder. The quotient , q(x) =
Circle correct answer:
$x^2 + 3\,x - 1$ $x^2 + 4\,x - 1$ $-x^2 + 3\,x - 1$ `'none of the others'`
The remainder, r(x) =
Circle correct answer:
4 $4 + x$ 2 `'none of the above'`

6. According to the remainder theorem, the remainder of the division $\frac{x^3+3\,x-2}{x-3}$ is _____

7. According to the remainder theorem, the remainder of the division $\frac{x^4+3\,x^2-2}{x-3}$ is _____

8. According to the remainder theorem, the remainder of the division $\frac{2\,x^3+3\,x^2-2}{x-3}$ is _____

9. According to the remainder theorem, the remainder of the division $\frac{x^3-3\,x^2-2}{x-3}$ is _____

10. According to the remainder theorem, the remainder of the division $\frac{x^3+3\,x+2}{x-3}$ is _____

11. The product $(2\,x+3)\,(x^2+x-1)$,
when multiplied out, and like terms collected, has a term of degree 2,
Ax^2 . A = _____

12. The product $(2\,x-3)\,(x^3+x-1)$,
when multiplied out, and like terms collected, has a term of degree 1,
Ax . A = _____

13. The product $(2\,x+3)\,(x^4-x+2)$,
when multiplied out, and like terms collected, has a term of degree 1,
Ax . A = _____

14. The product $(4\,x+3)\,(x^2+x-1)$,
when multiplied out, and like terms collected, has a term of degree 3,
Ax^3 . A = _____

15. The product $(2\,x^2+3\,x+1)\,(3\,x^2-x-1)$,
when multiplied out, and like terms collected, has a term of degree 2,
Ax^2 . A = _____

16. The degree of the sum ($2\,x+3$) + (x^2+x-1) is

Circle correct answer:
2 0 1 3 4 'none of the others'

17. The degree of the sum ($2\,x-3$) + (x^3+x-1) is

Circle correct answer:
3 0 1 2 4 'none of the others'

18. The degree of the sum ($2\,x+3$) + (x^2-x+2) is

Circle correct answer:
2 0 1 3 4 'none of the others'

19. The degree of the sum ($4\,x+3$) + (x^2+x-1) is

Circle correct answer:
2 0 1 3 4 'none of the others'

20. The degree of the sum ($2\,x+3\,x^3$) + ($3\,x^2-x-1$) is

Circle correct answer:
3 0 1 2 4 ‘none of the others‘

21. The degree of the sum ($-(x+1)^2$) + (x^2+2x+1) is

Circle correct answer:
‘not defined‘ 0 1 2 3 4

22. The degree of the sum ($-x+1-x^3$) + (x^3+x-1) is

Circle correct answer:
‘not defined‘ 0 1 2 3 4

23. The degree of the sum ($-2+x-x^2$) + (x^2-x+2) is

Circle correct answer:
‘not defined‘ 0 1 2 3 4

24. The degree of the sum ($4x+3$) + (x^2+x-1) is

Circle correct answer:
2 0 1 3 4 ‘not defined‘

25. The degree of the sum ($x+1-3x^2$) + ($3x^2-x-1$) is

Circle correct answer:
‘not defined‘ 0 1 2 3 4

26. The degree of the product ($2x+3$)(x^2+x-1) is

Circle correct answer:
3 0 1 2 4 ‘none of the others‘

27. The degree of the product ($2x-3$)(x^3+x-1) is

Circle correct answer:
4 0 1 2 3 'none of the others'

28. The degree of the product ($2x+3$)(x^2-x+2) is

Circle correct answer:
3 0 1 2 4 'none of the others'

29. The degree of the product ($4x+3$)(x^2+x-1) is

Circle correct answer:
3 0 1 2 4 'none of the others'

30. The degree of the product ($2x+3x^3$)($3x^2-x-1$) is

Circle correct answer:
'none of the others' 0 1 2 3 4

31. Suppose that q(x) and r(x) are polynomials such that $\frac{-12+x^3+3x^2+x}{x^2-4} = q(x) + \frac{r(x)}{x^2-4}$ and r(x) = 0 or degree(r(x)) is less than 2. What is q(x)? q(x) = _____ What is r(x)? r(x) = _____

32. Suppose that q(x) and r(x) are polynomials such that $\frac{-1+x^5+x^4-x}{x^2-1} = q(x) + \frac{r(x)}{x^2-1}$ and r(x) = 0 or degree(r(x)) is less than 2. What is q(x)? q(x) = _____ What is r(x)? r(x) = _____

33. Suppose that q(x) and r(x) are polynomials such that $\frac{1-x^5+x^4-2x^3+2x^2-x}{x^2+1} = q(x) + \frac{r(x)}{x^2+1}$ and r(x) = 0 or degree(r(x)) is less than 2. What is q(x)? q(x) = _____ What is r(x)? r(x) = _____

34. Suppose that q(x) and r(x) are polynomials such that $\frac{-2+x^4-2x^2+x}{x^2-3} = q(x) + \frac{r(x)}{x^2-3}$ and r(x) = 0 or degree(r(x)) is less than 2. What is q(x)? q(x) = _____ What is r(x)? r(x) = _____

35. Suppose that q(x) and r(x) are polynomials such that $\frac{14+x^4+6x^2+x}{x^2+3} = q(x) + \frac{r(x)}{x^2+3}$ and r(x) = 0 or degree(r(x)) is less than 2. What is q(x)? q(x) = _____ What is r(x)? r(x) = _____

36. Consider the following equation, where q(x) and r(x) are polynomials with r(x) = 0 or degree(r(x)) ¡ 1: $\frac{-7+x^2-x}{x-4} = q(x) + \frac{r(x)}{x-4}$ What is q(x)? q(x) = _____ What is r(x)? r(x) = _____

37. Consider the following equation, where q(x) and r(x) are polynomials with r(x) = 0 or degree(r(x)) ¡ 1: $\frac{-1+x^4}{x-1} = q(x) + \frac{r(x)}{x-1}$ What is q(x)? q(x) = _____ What is r(x)? r(x) = _____

38. Consider the following equation, where q(x) and r(x) are polynomials with r(x) = 0 or degree(r(x)) ¡ 1: $\frac{1-x^4}{x+1} = q(x) + \frac{r(x)}{x+1}$ What is q(x)? q(x) = _____ What is r(x)? r(x) = _____

39. Consider the following equation, where q(x) and r(x) are polynomials with r(x) = 0 or degree(r(x)) ¡ 1: $\frac{1+x^3-3x^2+x}{x-3} = q(x) + \frac{r(x)}{x-3}$ What is q(x)? q(x) = _____ What is r(x)? r(x) = _____

40. Consider the following equation, where q(x) and r(x) are polynomials with r(x) = 0 or degree(r(x)) ¡ 1: $\frac{-7+x^3-4x^2+3x}{x-4} = q(x) + \frac{r(x)}{x-4}$ What is q(x)? q(x) = _____ What is r(x)? r(x) = _____

41. i) x - a divides a polynomial p(x) if and only if p(a) = 0.
Circle correct answer:
True False
ii) Given that 1 and 2 are roots of $p(x) = x^3 - 6x^2 + 11x - 6$ find the other one. Remaining root = _____

42. i) x - 2 divides a polynomial q(x) if and only if q(x-2) = 0.
Circle correct answer:
True False
ii) Given that 1 and -2 are roots of $p(x) = x^3 - 2x^2 - 5x + 6$ find the other one. Remaining root = _____

43. i) X - A divides a polynomial p(X) if and only if p(A) = 0.
Circle correct answer:
True False
ii) Given that 3 and 1 are roots of $p(X) = X^3 - 2X^2 - 5X + 6$ find the other one. Remaining root = _____

44. i) If p(x) is polynomial, then a is a root of p(x) if and only if x - a divides p(x)
Circle correct answer:

True False

ii) Given that 4 and 2 are roots of $p(x) = x^3 - 7x^2 + 14x - 8$ find the other one. Remaining root = _____

45. i) If p(x) is polynomial, then a is a root of p(x) if and only if x - a divides p(x)
Circle correct answer:
True False

ii) Given that 5 and -2 are roots of $p(x) = x^3 - 6x^2 - x + 30$ find the other one. Remaining root = _____

46. Find the product $(2x + 3)(x^2 + x - 1)$
Circle correct answer:
$2x^3 + 5x^2 + x - 3$ $2x^3 + 5x^2 - 3$ $2x^3 + 4x^2 + x - 3$ 'none of the others'

47. Find the product $(2x - 3)(x^3 + x - 1)$
Circle correct answer:
$2x^4 + 2x^2 - 5x - 3x^3 + 3$ $2x^4 + 2x^2 - 6x - 3x^3 + 3$ $2x^4 + x^2 - 5x - 3x^3 + 3$ 'none of the o

48. Find the product $(2x + 3)(x^2 - x + 2)$
Circle correct answer:
$2x^3 + x^2 + x + 6$ $2x^3 + x^2 + 6$ $2x^3 + x + 6$ 'none of the others'

49. Find the product $(4x + 3)(x^2 + x - 1)$
Circle correct answer:
$4x^3 + 7x^2 - x - 3$ $4x^3 + 7x^2 - 2x - 3$ $4x^3 + 6x^2 - x - 3$ 'none of the others'

50. Find the product $(2x + 3)(3x^2 - x - 1)$
Circle correct answer:
$6x^3 + 7x^2 - 5x - 3$ $6x^3 + 7x^2 - 6x - 3$ $6x^3 + 6x^2 - 5x - 3$ 'none of the others'

51. Given that a is a number such that $\frac{a}{x+1} + (x+3)^{-1} = \frac{3x+7}{(x+1)(x+3)}$ for all x such that both sides of the equation are defined, what is the value of a? _____

52. Given that a is a number such that $\frac{a}{2x-3} + (x-2)^{-1} = \frac{5x-9}{(2x-3)(x-2)}$ for all x such that both sides of the equation are defined, what is the value of a? _____

53. Given that a is a number such that $\frac{a}{2x+3} + (-x+1)^{-1} = \frac{3x-8}{(2x+3)(x-1)}$ for all x such that both sides of the equation are defined, what is the value of a? _____

54. Given that a is a number such that $\frac{a}{4x+3} + (3x-1)^{-1} = \frac{16x-1}{(4x+3)(3x-1)}$ for all x such that both sides of the equation are defined, what is the value of a? _____

55. Given that a is a number such that $\frac{a}{2x+3} + (x-1)^{-1} = \frac{8x-3}{(2x+3)(x-1)}$ for all x such that both sides of the equation are defined, what is the value of a? _____

56. Given that a and b are numbers such that $\frac{a}{x+1} + \frac{b}{x+3} = \frac{5x+9}{(x+1)(x+3)}$ for all x such that both sides of the equation are defined, what are the values of a and b?
a = _____ , b = _____

57. Given that a and b are numbers such that $\frac{a}{2x-3} + \frac{b}{x-2} = \frac{7x-12}{(2x-3)(x-2)}$ for all x such that both sides of the equation are defined, what are the values of a and b?
a = _____ , b = _____

58. Given that c and a are numbers such that $\frac{c}{2x+3} + \frac{a}{-x+1} = -5\,\frac{x+4}{(2x+3)(x-1)}$ for all x such that both sides of the equation are defined, what are the values of c and a?
c = _____ , a = _____

59. Given that r and d are numbers such that $\frac{r}{4x+3} + \frac{d}{3x-1} = \frac{40x+17}{(4x+3)(3x-1)}$ for all x such that both sides of the equation are defined, what are the values of r and d?
r = _____ , d = _____

60. Given that k and p are numbers such that $\frac{k}{2x+3} + \frac{p}{x-1} = \frac{8x-3}{(2x+3)(x-1)}$ for all x such that both sides of the equation are defined, what are the values of k and p?
k = _____ , p = _____

61. Find the sum $(x+1)^{-1} + (x+3)^{-1}$
Circle correct answer:
$2\,\frac{x+2}{(x+1)(x+3)}$ $\frac{2x+4+x^2}{(x+1)(x+3)}$ $\frac{3x+4}{(x+1)(x+3)}$ `'none of the others'`

62. Find the sum $(2x-3)^{-1} + (x-1)^{-1}$
Circle correct answer:

$\frac{3x-4}{(2x-3)(x-1)}$ $\frac{3x-4+x^2}{(2x-3)(x-1)}$ $\frac{4x-4}{(2x-3)(x-1)}$ ‘none of the others‘

63. Find the sum $(2x+3)^{-1}+(-x+2)^{-1}$
Circle correct answer:
$-\frac{x+5}{(2x+3)(x-2)}$ $\frac{-x-5+x^2}{(2x+3)(x-2)}$ $-5\frac{1}{(2x+3)(x-2)}$ ‘none of the others‘

64. Find the sum $(4x+3)^{-1}+(2x-1)^{-1}$
Circle correct answer:
$2\frac{3x+1}{(4x+3)(2x-1)}$ $\frac{6x+2+x^2}{(4x+3)(2x-1)}$ $\frac{7x+2}{(4x+3)(2x-1)}$ ‘none of the others‘

65. Find the sum $(2x+3)^{-1}+(-x-1)^{-1}$
Circle correct answer:
$-\frac{x+2}{(2x+3)(x+1)}$ $\frac{-x-2+x^2}{(2x+3)(x+1)}$ $-2\frac{1}{(2x+3)(x+1)}$ ‘none of the others‘

Answer Key for polys

1. ◇ $x^2 + x - 1$ ◇ 4
2. ◇ $x^2 + x - 1$ ◇ 4
3. ◇ $x^2 + x - 1$ ◇ 5
4. ◇ $3\,x^2 + x - 1$ ◇ 4
5. ◇ $x^2 + 3\,x - 1$ ◇ 4
6. ◇ 34
7. ◇ 106
8. ◇ 79
9. ◇ -2
10. ◇ 38
11. ◇ 5
12. ◇ -5
13. ◇ 1
14. ◇ 4
15. ◇ -2
16. ◇ 2
17. ◇ 3
18. ◇ 2
19. ◇ 2
20. ◇ 3
21. ◇ `‘not defined‘`
22. ◇ `‘not defined‘`
23. ◇ `‘not defined‘`
24. ◇ 2
25. ◇ `‘not defined‘`
26. ◇ 3
27. ◇ 4

28. ◇ 3

29. ◇ 3

30. ◇ ‘none of the others‘

31. ◇ $x + 3$ ◇ $5\,x$

32. ◇ $1 + x + x^2 + x^3$ ◇ 0

33. ◇ $1 - x + x^2 - x^3$ ◇ 0

34. ◇ $x^2 + 1$ ◇ $x + 1$

35. ◇ $x^2 + 3$ ◇ $x + 5$

36. ◇ $x + 3$ ◇ 5

37. ◇ $1 + x + x^2 + x^3$ ◇ 0

38. ◇ $1 - x + x^2 - x^3$ ◇ 0

39. ◇ $x^2 + 1$ ◇ 4

40. ◇ $x^2 + 3$ ◇ 5

41. ◇ True ◇ 3

42. ◇ True ◇ 3

43. ◇ True ◇ -2

44. ◇ True ◇ 1

45. ◇ True ◇ 3

46. ◇ $2\,x^3 + 5\,x^2 + x - 3$

47. ◇ $2\,x^4 + 2\,x^2 - 5\,x - 3\,x^3 + 3$

48. ◇ $2\,x^3 + x^2 + x + 6$

49. ◇ $4\,x^3 + 7\,x^2 - x - 3$

50. ◇ $6\,x^3 + 7\,x^2 - 5\,x - 3$

51. ◇ 2

52. ◇ 3

53. ◇ 5

54. ◇ 4

55. ◇ 6

56. $\diamond$ 2 $\diamond$ 3

57. $\diamond$ 3 $\diamond$ 2

58. $\diamond$ 5 $\diamond$ 5

59. $\diamond$ 4 $\diamond$ 7

60. $\diamond$ 6 $\diamond$ 1

61. $\diamond$ $2\,\frac{x+2}{(x+1)(x+3)}$

62. $\diamond$ $\frac{3\,x-4}{(2\,x-3)(x-1)}$

63. $\diamond$ $-\frac{x+5}{(2\,x+3)(x-2)}$

64. $\diamond$ $2\,\frac{3\,x+1}{(4\,x+3)(2\,x-1)}$

65. $\diamond$ $-\frac{x+2}{(2\,x+3)(x+1)}$

Problems from polys

1. According to the remainder theorem, the remainder of the division $\frac{x^3-3x^2-2}{x-3}$ is _____

2. The product $(2x+3)(x^2+x-1)$,
when multiplied out, and like terms collected, has a term of degree 2,
Ax^2 . A = _____

3. The degree of the sum ($2x+3x^3$) + ($3x^2-x-1$) is

Circle correct answer:
3 0 1 2 4 'none of the others'

4. The degree of the sum ($x+1-3x^2$) + ($3x^2-x-1$) is

Circle correct answer:
'not defined' 0 1 2 3 4

5. The degree of the product ($2x+3$)(x^2-x+2) is

Circle correct answer:
3 0 1 2 4 'none of the others'

6. Suppose that q(x) and r(x) are polynomials such that $\frac{-1+x^5+x^4-x}{x^2-1} = q(x) + \frac{r(x)}{x^2-1}$ and r(x) = 0 or degree(r(x)) is less than 2. What is q(x)? q(x) = _____ What is r(x)? r(x) = _____

7. Consider the following equation, where q(x) and r(x) are polynomials with r(x) = 0 or degree(r(x)) ¡ 1: $\frac{-7+x^3-4x^2+3x}{x-4} = q(x) + \frac{r(x)}{x-4}$ What is q(x)? q(x) = _____ What is r(x)? r(x) = _____

8. i) x - 2 divides a polynomial q(x) if and only if q(x-2) = 0.
Circle correct answer:
True False
ii) Given that 1 and -2 are roots of $p(x) = x^3 - 2x^2 - 5x + 6$ find the other one. Remaining root = _____

9. Find the product $(2x+3)(3x^2-x-1)$
Circle correct answer:
$6x^3+7x^2-5x-3$ $6x^3+7x^2-6x-3$ $6x^3+6x^2-5x-3$ `'none of the others'`

10. Given that a is a number such that $\frac{a}{2x+3}+(x-1)^{-1}=\frac{8x-3}{(2x+3)(x-1)}$ for all x such that both sides of the equation are defined, what is the value of a? _____

11. Given that r and d are numbers such that $\frac{r}{4x+3}+\frac{d}{3x-1}=\frac{40x+17}{(4x+3)(3x-1)}$ for all x such that both sides of the equation are defined, what are the values of r and d?
r = _____ , d = _____

12. Find the sum $(2x+3)^{-1}+(-x+2)^{-1}$
Circle correct answer:
$-\frac{x+5}{(2x+3)(x-2)}$ $\frac{-x-5+x^2}{(2x+3)(x-2)}$ $-5\frac{1}{(2x+3)(x-2)}$ `'none of the others'`

Answer Key for polys

1. ◇ -2
2. ◇ 5
3. ◇ 3
4. ◇ `'not defined'`
5. ◇ 3
6. ◇ $1 + x + x^2 + x^3$ ◇ 0
7. ◇ $x^2 + 3$ ◇ 5
8. ◇ True ◇ 3
9. ◇ $6\,x^3 + 7\,x^2 - 5\,x - 3$
10. ◇ 6
11. ◇ 4 ◇ 7
12. ◇ $-\frac{x+5}{(2\,x+3)(x-2)}$