MPS 21

# MEP1 HOMEWORK SHEET 1

In Exercises 1–22, perform the indicated operations and/or simplify.

1. $(6x + 5) - (8x + 15)$
2. $(2x^2 + 1) - (x^2 - 2x + 1)$
3. $-(x^3 - 2) + (4x^3 - 2x)$
4. $-(5x^2 - 1) - (-3x^2 + 5)$
5. $(15x^2 - 6) - (-8x^3 - 14x^2 - 17)$
6. $(15x^4 - 18x - 19) - (13x^4 - 5x + 15)$
7. $5z - [3z - (10z + 8)]$
8. $(y^3 + 1) - [(y^2 + 1) + (3y - 7)]$
9. $-5z(3z - 1)$
10. $-4x(3 - 6x^3)$
11. $(-2x)(-3x)(5x + 2)$
12. $(1 - x^3)(4x)$
13. $(x^3 - 2x + 1)(x - 5)$
14. $(x + 1)(x^2 - 1)$
15. $(x + 3)(x^2 - 3x + 9)$
16. $(2x^2 + 3)(4x^4 - 6x^2 + 9)$
17. $(x^2 + 1)(x + 1)(x - 1)$
18. $(x^2 + x - 2)(x^2 - x + 2)$
19. $5z(x + 1) - 3z(2x - 4)$
20. $(2x - y)(x + 3y) + 3(2x - y)$
21. $(x + \sqrt{5})(x - \sqrt{5})(x + 4)$
22. $\sqrt{x}(3\sqrt{x} - 4)$

In Exercises 23–36, find the given product.

23. $(3x - 5)(2x + 1)$
24. $(7x - 2)(4x - 3)$
25. $(2x - 5y)^2$
26. $(5 - 8x)^2$
27. $[(x - 3) + y]^2$
28. $[(x + 1) - y]^2$
29. $(x + 2y)(x - 2y)$
30. $(2x + 3y)(2x - 3y)$
31. $(m - 3 + n)(m - 3 - n)$
32. $(x + y + 1)(x + y - 1)$
33. $(x + 1)^3$
34. $(x - 2)^3$
35. $(2x - y)^3$
36. $(3x + 2y)^3$

In Exercises 37–40, remove the common factor.

37. $2x^3 - 6x$
38. $4x^3 - 6x^2 + 12x$
39. $(x - 1)^2 + 6(x - 1)$
40. $(3x - 5)(x + 2) + (3x - 5)(1 - x)$

In Exercises 41–44, factor the given difference of two squares.

41. $16y^2 - 9$
42. $x^2 - \frac{4}{25}$
43. $(x - 1)^2 - 4$
44. $25 - (z + 5)^2$

In Exercises 45–48, factor the given perfect square trinomial.

45. $x^2 - 4x + 4$
46. $x^2 + 10x + 25$
47. $25y^2 - 10y + 1$
48. $z^2 + z + \frac{1}{4}$

In Exercises 49–54, factor the given trinomial.

49. $s^2 - 5s + 6$
50. $t^2 - t - 6$
51. $x^2 - 30x + 200$
52. $x^2 - 13x + 42$
53. $9z^2 - 3z - 2$
54. $12x^2 + 7x + 1$

In Exercises 55–58, factor the sum or difference of cubes.

55. $x^3 - 8$
56. $z^3 + 125$
57. $27x^3 + 8$
58. $8t^3 - 1$

In Exercises 59–64, factor by grouping.

59. $x^3 - x^2 + 2x - 2$
60. $x^3 + 5x^2 - 5x - 25$
61. $2x^3 - x^2 - 6x + 3$
62. $5x^3 - 10x^2 + 3x - 6$
63. $6 + 2x - 3x^3 - x^4$
64. $x^5 + 2x^3 + x^2 + 2$

In Exercises 65–80, completely factor the given expression.

65. $x^3 - 4x^2$
66. $6x^2 - 54$
67. $1 - 4x + 4x^2$
68. $9x^2 - 6x + 1$
69. $9x^2 + 10x + 1$
70. $13x + 6 + 5x^2$
71. $4x(2x - 1) + (2x - 1)^2$
72. $5(3 - 4x)^2 - 8(3 - 4x)(5x - 1)$
73. $2(x + 1)(x - 3)^2 - 3(x + 1)^2(x - 3)$
74. $7(3x + 2)^2(1 - x)^2 + (3x + 2)(1 - x)^3$
75. $3x^3 + x^2 + 15x + 5$
76. $5 - x + 5x^2 - x^3$
77. $25 - (z + 5)^2$
78. $(t - 1)^2 - 49$
79. $2t^3 - 16$
80. $(a + 1)^3 + 1$

81. The probability of three successes and two failures in a certain experiment is given by

$$10p^3(1 - p)^2.$$

Find this product.

82. After three years an investment of $500 compounded annually at an interest rate $r$ will yield an amount

$$500(1 + r)^3.$$

Find this product.

In Exercises 83 and 84, factor the given expression by using the formula

$$(x + a)^3 = x^3 + 3x^2a + 3xa^2 + a^3.$$

83. $x^3 + 6x^2 + 12x + 8$
84. $27y^3 + 27y^2 - 9y + 1$

In Exercises 85 and 86, factor the given expression by using the formula

$$(x + a)^5 = x^5 + 5x^4a + 10x^3a^2 + 10x^2a^3 + 5xa^4 + a^5.$$

85. $x^5 - 10x^4 + 40x^3 - 80x^2 + 80x - 32$
86. $32x^5 + 80x^4 + 80x^3 + 40x^2 + 10x + 1$