Oral Exercises

Find two integers with the given sum and product.

	Example	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
Sum	$1 = 3 + (-2)$	2	-3	-2	15	3	-7	1	0	2	-10
Product	$-6 = 3(-2)$	-3	-10	-15	-16	-18	-18	-30	-25	-24	-24

For each trinomial tell which two factors of the constant term have a sum equal to the coefficient of the linear term.

Sample $x^2 - 3x - 28$

Solution $(-7)(4) = -28$ and $-7 + 4 = -3$
$\therefore -7$ and 4 are the correct factors. ***Answer***

11. $z^2 + 3z - 4$ **12.** $z^2 - 4z - 5$ **13.** $c^2 - c - 6$
14. $p^2 + p - 12$ **15.** $y^2 - 5y - 14$ **16.** $r^2 - 2r - 8$
17. $x^2 + 2x - 15$ **18.** $u^2 - u - 2$ **19.** $k^2 + 8k - 9$

Written Exercises

Factor. Check by multiplying the factors. If the polynomial is not factorable, write *prime*.

A

1. $y^2 + 5y - 6$ **2.** $v^2 - 3v - 4$ **3.** $x^2 - 6x - 16$
4. $x^2 + 2x - 8$ **5.** $c^2 - 4c - 12$ **6.** $u^2 - 10u - 9$
7. $n^2 + 2n - 6$ **8.** $a^2 - 5a - 24$ **9.** $b^2 - 13b - 30$
10. $p^2 + 7p - 18$ **11.** $y^2 + 12y - 36$ **12.** $y^2 - 4y - 32$
13. $x^2 - 25x - 54$ **14.** $t^2 - 16t - 40$ **15.** $y^2 - 21y - 72$
16. $z^2 + z - 72$ **17.** $a^2 - ab - 42b^2$ **18.** $r^2 - 20rs - 44s^2$
19. $u^2 + 9uv - 70v^2$ **20.** $x^2 - 2xy - 63y^2$ **21.** $h^2 - 25hk - 54k^2$
22. $m^2 + mn - 56n^2$ **23.** $p^2 - 16pq - 36q^2$ **24.** $a^2 - 13ab - 48b^2$

Sample $1 - 10x - 24x^2$

Solution Find two factors of $-24x^2$ whose sum is $-10x$: $2x$ and $-12x$.
$\therefore 1 - 10x - 24x^2 = (1 + 2x)(1 - 12x)$ ***Answer***

B

25. $1 - 2n - 48n^2$ **26.** $1 + 15c - 34c^2$
27. $x^2 - 10xy - 75y^2$ **28.** $a^2 + 5ab - 84b^2$

29. $1 + 11pq - 80p^2q^2$ **30.** $1 - 15mn - 100m^2n^2$

31. $p^2 + 2p - 360$ **32.** $n^2 + 9n - 400$

33. $-380 + x + x^2$ **34.** $-800 - 20a + a^2$

Find all the integral values of k for which the given polynomial can be factored.

35. $y^2 + ky - 28$ **36.** $c^2 + kc - 20$ **37.** $p^2 + kp - 35$ **38.** $x^2 + kx - 36$

Find two negative values of k for which the given polynomial can be factored. (There may be many possible values.)

39. $r^2 - 2r + k$ **40.** $y^2 + 4y + k$ **41.** $k + 5x + x^2$

42. $k - 7r + r^2$ **43.** $k + 4t + t^2$ **44.** $k - 6z + z^2$

Factor completely.

C **45.** $x^4 - 3x^2 - 4$ **46.** $t^4 - 7t^2 - 18$

47. $x^4 - 15x^2y^2 - 16y^4$ **48.** $(x + 2)^2 - 4(x + 2) - 21$

49. $(y + 3)^2 + 5(y + 3) - 24$ **50.** $(p + q)^2 - 2(p + q) - 15$

51. $(a + b)^2 - (a + b) - 2$ **52.** $(p + q)^2 - 2r(p + q) - 15r^2$

53. $(a + b)^2 - c(a + b) - 2c^2$ **54.** $(a + b)^4 - (a - b)^4$

55. Factor $x^{2n} - 4x^ny^{2n} - 221y^{4n}$, where n is a positive integer.

56. Factor $x^{4n} - 4x^{2n}y^n - 252y^{2n}$, where n is a positive integer.

Mixed Review Exercises

Simplify.

1. $(9x^2y)(3xy^2)(2x^2)$ **2.** $(3x - 4)(2x + 3)$ **3.** $-7x(3x^2 - 2x + 4)$

4. $(3x - 4)^2$ **5.** $(7x^5y^2)^3$ **6.** $5y(2y^2 + 3y + 5)$

7. $\dfrac{5(xy)^6}{10(xy)^3}$ **8.** $\dfrac{-4ab}{-12ab^3}$ **9.** $\dfrac{(-n)^6}{-n^{10}}$

10. $(n + 3p)^2$ **11.** $(a - 6)(5a + 2)$ **12.** $(2y + 7)^2$

Factor.

13. $15m - 21n + 9$ **14.** $121k^2 - 81$ **15.** $a^2 + 18a + 81$

16. $a^2 - 13ab + 42b^2$ **17.** $16x^2 + 24x$ **18.** $64 - n^2$

19. $u^2 - 10u + 25$ **20.** $44 + 15y + y^2$ **21.** $7a^2b^3 - 14ab$

22. $49w^4 - 16x^2$ **23.** $4m^2 + 20m + 24$ **24.** $c^2 - 11c - 26$

25. $9x^2 - 24xy + 16y^2$ **26.** $56 - 15z + z^2$ **27.** $x^2 - 1$

28. $a^2 + 13a - 68$ **29.** $25w^6 - 144x^6$ **30.** $25a^2 + 20ab + 4b^2$