# Chapter 5

**List all pairs of factors of each integer.** (5-1)

**1.** 42 **2.** 80 **3.** 91 **4.** 72 **5.** 52

**6–10.** Find the prime factorization of each integer in Exercises 1–5.

**Give the GCF of each group of numbers.** (5-1)

**11.** 126, 168 **12.** 144, 84 **13.** 65, 52 **14.** 90, 330

**Simplify. Assume that no denominator equals 0.** (5-2)

**15.** $\frac{12x^5}{4x}$ **16.** $\frac{25m^4n}{-15mn^6}$ **17.** $\frac{-7ab}{21ab^5}$ **18.** $\frac{-8(uv)^7}{-10(uv)^5}$

**19.** $\frac{(w^4)^2}{(w^5)^4}$ **20.** $\frac{(5k)^2}{5k^2}$ **21.** $\frac{(-3y)^3}{(y^3)^2}$ **22.** $\frac{(2c^5)(4c^3)}{(8c^2)^3}$

**Divide.** (5-3)

**23.** $\frac{12e + 8}{4}$ **24.** $\frac{6x - 9y + 12}{3}$ **25.** $\frac{2x^3 + 6x^2 + x}{x}$

**26.** $\frac{18ab - 24a^2}{-6a}$ **27.** $\frac{15m - 25m^2 - 5m^3}{5m}$ **28.** $\frac{28h^5k^3 - 35hk^2}{7hk^2}$

**Factor each polynomial as the product of its greatest monomial factor and another polynomial.** (5-3)

**29.** $15w^2 - 10w + 5$ **30.** $9x^2 + 18x$ **31.** $7u^3 + 14u^2$

**32.** $12a^3 - 6a^2 + 18a$ **33.** $15c^2 + 3cd$ **34.** $8m^2n - 24mn^2$

**Write each product as a trinomial.** (5-4)

**35.** $(x + 5)(x + 3)$ **36.** $(b - 2)(b - 4)$ **37.** $(n - 3)(n + 7)$

**38.** $(e - 8)(e + 6)$ **39.** $(3 + m)(2 + m)$ **40.** $(3f + 2)(f + 5)$

**41.** $(4y - 3)(2y - 1)$ **42.** $(8z + 7)(z - 2)$ **43.** $(5n - 3)(4n - 2)$

**44.** $a(6a - 4)(5a - 3)$ **45.** $h(3h + 7)(4h + 9)$ **46.** $2x(9x - 1)(2x + 3)$

**Write each product as a binomial.** (5-5)

**47.** $(k - 5)(k + 5)$ **48.** $(3 - y)(3 + y)$ **49.** $(4d - 8)(4d + 8)$

**50.** $(w^2 - 6)(w^2 + 6)$ **51.** $(5m^2 + n)(5m^2 - n)$ **52.** $(ab + c^2)(ab - c^2)$

**Factor. You may use a calculator or the table of squares.** (5-5)

**53.** $16e^2 - 9$ **54.** $36u^2 - 25$ **55.** $81 - f^2$ **56.** $144a^2 - 64b^2$

**57.** $49 - 100y^2$ **58.** $v^4 - w^4$ **59.** $s^6 - 4$ **60.** $16x^8 - 625$

**Express each square as a trinomial.** (5-6)

**61.** $(g + 7)^2$ **62.** $(k - 3)^2$ **63.** $(2x + 6)^2$ **64.** $(5y - 3)^2$

**65.** $(2m + 3n)^2$ **66.** $(7a - 5b)^2$ **67.** $(ef - 8)^2$ **68.** $(-4 + 9f)^2$

**Factor.** (5-6)

**69.** $x^2 - 6x + 9$ **70.** $e^2 + 18e + 81$ **71.** $4 - 28h + 49h^2$

**72.** $64x^2 + 80xy + 25y^2$ **73.** $4m^2 - 36mn + 81n^2$ **74.** $16w^2 + 24wz + 9z^2$

**Factor. Check by multiplying the factors. If the polynomial is not factorable, write *prime*.** (5-7, 5-8, 5-9)

**75.** $k^2 + 8k + 7$ **76.** $v^2 - 9v + 20$ **77.** $a^2 - 2a + 1$

**78.** $35 + 12u + u^2$ **79.** $n^2 - 16n + 48$ **80.** $w^2 + 18w + 80$

**81.** $x^2 + 13xy + 42y^2$ **82.** $m^2 - 10mn + 21n^2$ **83.** $e^2 - 15ef + 44f^2$

**84.** $c^2 + 3c - 18$ **85.** $x^2 - 2x - 35$ **86.** $k^2 + 8k - 32$

**87.** $h^2 - 7h - 18$ **88.** $b^2 + 7b - 30$ **89.** $y^2 - 4y - 45$

**90.** $a^2 - 2ab - 3b^2$ **91.** $u^2 + 3uv - 4v^2$ **92.** $m^2 - mn - 20n^2$

**93.** $2x^2 + 11x + 12$ **94.** $10e^2 - 12e + 3$ **95.** $10d^2 + d - 3$

**96.** $-10 - 26y - 12y^2$ **97.** $-7 - 39z - 18z^2$ **98.** $-10 + 24z - 8z^2$

**99.** $15x^2 + 13xy + 2y^2$ **100.** $8a^2 - 22ab + 12b^2$ **101.** $14m^2 - mn - 3n^2$

**Factor. Check by multiplying.** (5-10)

**102.** $8(m - 3) - 5m(3 - m)$ **103.** $6a(a + 2) + 4(a + 2)$

**104.** $u(u - 2v) - (2v - u)$ **105.** $b(b - 2)(b + 1) - 3 - 3b$

**106.** $a^2 + 2a + ab + 2b$ **107.** $7cw + 3c - 7w^2 - 3w$

**108.** $n^3 + n^2 - 6n - 6$ **109.** $64 - 64m^2 + m^4 - m^6$

**Factor completely. Check by multiplying.** (5-11)

**110.** $42x^3 + 68x^2 + 16x$ **111.** $60y^3 - 18y^2 - 6y$ **112.** $12x^5 - 20x^4 + 3x^3$

**113.** $16a^4 - 144a^2$ **114.** $4n^5 - 100n$ **115.** $28w^7 - 102w^5$

**116.** $36m^2 + 24mn + 4n^2$ **117.** $24cd - 12c^2 - 12d^2$ **118.** $-7x^3 + 14x^2y - 7xy^2$

**Solve and check.** (5-12)

**119.** $(a + 13)(a + 8) = 0$ **120.** $(f - 16)(f - 27) = 0$ **121.** $(2x - 4)(3x - 5) = 0$

**122.** $(6h - 5)(6h + 5) = 0$ **123.** $7w(4w + 3) = 0$ **124.** $m(2m + 7)(3m - 4) = 0$

**125.** $a^2 + 7a + 6 = 0$ **126.** $q^2 - 21q = -20$ **127.** $d^2 = 14d - 45$

**128.** $y^2 - 7y - 18 = 0$ **129.** $c^2 - 36 = -5c$ **130.** $h^2 = -3h + 54$

**131.** $6 - 23z - 4z^2 = 0$ **132.** $3m^2 + 1 = 4m$ **133.** $2n^2 = 10 + n$

**134.** $e^2 - 49 = 0$ **135.** $36g^2 = 16$ **136.** $w^3 - 9w = 0$

**137.** The sum of a number and its square is 56. Find the number. (5-13)

**138.** Find two consecutive negative odd integers whose product is 143.

**139.** The length of a rectangle is 5 cm less than twice the width. If the area of the rectangle is 88 $cm^2$, find the dimensions of the rectangle.

**140.** Find two numbers that total 12 and whose squares total 74.

# Chapter 6

**Simplify. Give the restrictions on the variable.** (6-1)

**1.** $\frac{5m - 15}{m - 3}$ **2.** $\frac{2a + 1}{6a + 3}$ **3.** $\frac{7c - 7d}{7c + 7d}$ **4.** $\frac{6k - k^2}{36 - k^2}$

**5.** $\frac{3uv}{u^2v - v^2u}$ **6.** $\frac{8w^3}{8w^2 - 12w}$ **7.** $\frac{x^2 - 64}{x^2 - x - 56}$ **8.** $\frac{(e - 7)^2}{49 - e^2}$

**9.** $\frac{15m + 6n}{25m^2 - 4n^2}$ **10.** $\frac{a^2 + ab}{a^2 - ab}$

**11.** $\frac{(k - 3)(7k - 2)}{(2 - 7k)(k - 3)}$ **12.** $\frac{3x^2 + 17xy + 20y^2}{3x^2 - xy - 10y^2}$

**13.** $\frac{14 - 9t + t^2}{t^2 - 4}$ **14.** $\frac{u^2 - v^2}{u^2 + 2uv + v^2}$

**15.** $\frac{(5w - x)^5}{(x - 5w)^7}$ **16.** $\frac{(4s - 6)^2(3s - 2)}{(2 - 3s)(6 - 4s)}$

**Multiply. Express each product in simplest form.** (6-2)

**17.** $\frac{5}{8} \cdot \frac{32}{15}$ **18.** $\frac{4}{3} \cdot \frac{3}{5} \cdot \frac{5}{7}$ **19.** $\left(\frac{-2}{5}\right)^2 \cdot \frac{15}{16}$ **20.** $\left(-\frac{3}{2}\right)^3 \cdot \frac{24}{9}$

**21.** $\frac{e}{f} \cdot \frac{f}{g} \cdot \frac{g}{h}$ **22.** $\frac{5}{w} \cdot \frac{w^2}{10}$ **23.** $\frac{8m}{3} \cdot \frac{9}{12m}$ **24.** $\frac{a^2}{3b} \cdot \frac{b^2}{4a}$

**25.** $\frac{14v}{12v^2} \cdot \frac{4uw^2}{7v^2}$ **26.** $\frac{a + 5}{a} \cdot \frac{a^2}{a^2 - 25}$

**27.** $\frac{4x - xy}{8x^2y} \cdot \frac{2}{16 - y^2}$ **28.** $\frac{m + n}{m - n} \cdot \frac{m^2 - n^2}{3m + 3n}$

**Simplify. Use the rules of exponents for a power of a product and a power of a quotient.** (6-2)

**29.** $(5k^3)^2$ **30.** $\left(\frac{x}{7}\right)^2$ **31.** $\left(\frac{3x}{4}\right)^2$ **32.** $\left(\frac{2m}{3n^2}\right)^3$

**33.** $\left(-\frac{x^2}{5}\right)^3$ **34.** $\left(\frac{e}{f}\right)^3 \cdot \frac{e}{f}$ **35.** $\left(\frac{4c}{d}\right)^3 \cdot \frac{c^2}{8}$ **36.** $\left(\frac{7a}{b}\right)^2 \cdot \frac{3ab}{14}$