

Name _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Factor out the GCF from the polynomial.

1) $12m^8 - 60m^4 + 54m^2$ 1) _____

Answer: $6m^2(2m^6 - 10m^2 + 9)$

2) $48x^8y^7 + 160x^6y^5 - 32x^3y^2$ 2) _____

Answer: $16x^3y^2(3x^5y^5 + 10x^3y^3 - 2)$

3) $32x^8y^8 - 40x^2y^6 - 64x^5y^3$ 3) _____

Answer: $8x^2y^3(4x^6y^5 - 5y^3 - 8x^3)$

4) $32p + 8q - 8$ 4) _____

Answer: $8(4p + q - 1)$

Factor the four-term polynomial by grouping.

5) $6x^4 + 8x^2 + 15x^2 + 20$ 5) _____

Answer: $(2x^2 + 5)(3x^2 + 4)$

6) $15x^2 + 6xy - 25xy - 10y^2$ 6) _____

Answer: $(3x - 5y)(5x + 2y)$

7) $15a^3 + 20a^2b - 9ab^2 - 12b^3$ 7) _____

Answer: $(5a^2 - 3b^2)(3a + 4b)$

8) $20x^6 - 15x^3 - 8x^3 + 6$ 8) _____

Answer: $(5x^3 - 2)(4x^3 - 3)$

Factor the trinomial completely. If the polynomial cannot be factored, write "prime."

9) $x^8 - 12x^4 + 35$ 9) _____

Answer: $(x^4 - 7)(x^4 - 5)$

10) $x^2 + 10xy + 16y^2$ 10) _____

Answer: $(x + 2y)(x + 8y)$

11) $u^2 - 6uv - 16v^2$ 11) _____

Answer: $(u + 2v)(u - 8v)$

12) $x^2 + 4xy - 12y^2$ 12) _____

Answer: $(x + 6y)(x - 2y)$

$$13) 4t^5 - 12t^4 - 40t^3$$

$$\text{Answer: } 4t^3(t + 2)(t - 5)$$

13) _____

$$14) 4r^6 - 8r^5 - 32r^4$$

$$\text{Answer: } 4r^4(r + 2)(r - 4)$$

14) _____

$$15) -x^2 - 6x + 55$$

$$\text{Answer: } -1(x + 11)(x - 5)$$

15) _____

$$16) a^3b^2 - 9a^2b + 18a$$

$$\text{Answer: } a(ab - 3)(ab - 6)$$

16) _____

Factor completely.

$$17) 15y^2 - 22y + 8$$

$$\text{Answer: } (3y - 2)(5y - 4)$$

17) _____

$$18) 8z^2 - 6z - 9$$

$$\text{Answer: } (4z + 3)(2z - 3)$$

18) _____

$$19) 12x^2 - 17xy + 6y^2$$

$$\text{Answer: } (4x - 3y)(3x - 2y)$$

19) _____

$$20) 9x^2 + 6xy - 8y^2$$

$$\text{Answer: } (3x + 4y)(3x - 2y)$$

20) _____

$$21) 49p^4 - 42p^3 + 9p^2$$

$$\text{Answer: } p^2(7p - 3)^2$$

21) _____

$$22) -2x^2 + 7x - 6$$

$$\text{Answer: } -1(2x - 3)(x - 2)$$

22) _____

$$23) 84x^2 + 49xy + 7y^2$$

$$\text{Answer: } 7(3x + y)(4x + y)$$

23) _____

Factor the perfect square trinomial completely.

$$24) 25x^2 - 40xy + 16y^2$$

$$\text{Answer: } (5x - 4y)^2$$

24) _____

$$25) x^3 + 20x^2 + 100x$$

$$\text{Answer: } x(x + 10)^2$$

25) _____

$$26) 32x^2 - 48xy + 18y^2$$

$$\text{Answer: } 2(4x - 3y)^2$$

26) _____

Factor the binomial completely.

27) $49x^2 - 9y^2$

Answer: $(7x + 3y)(7x - 3y)$

27) _____

28) $9a^3 - 4a$

Answer: $a(3a + 2)(3a - 2)$

28) _____

29) $98x^2y - 8y$

Answer: $2y(7x + 2)(7x - 2)$

29) _____

30) $64 - x^2y^2$

Answer: $(8 - xy)(8 + xy)$

30) _____

Solve the equation.

31) $x^2 + 8x - 33 = 0$

Answer: -11, 3

31) _____

32) $x^2 - x = 12$

Answer: -3, 4

32) _____

33) $x(5x + 28) = 12$

Answer: $\frac{2}{5}, -6$

33) _____

34) $2x^2 - 5x - 7 = 0$

Answer: $\frac{7}{2}, -1$

34) _____

35) $9x^2 - 7 = 18x$

Answer: $\frac{7}{3}, -\frac{1}{3}$

35) _____

36) $3x^2 + 15x + 18 = 0$

Answer: -3, -2

36) _____

Simplify. Assume that all variables represent positive numbers.

37) $\sqrt{64x^{11}}$

Answer: $8x^5\sqrt{x}$

37) _____

38) $\sqrt{8x^{16}}$

Answer: $2x^8\sqrt{2}$

38) _____

39) $\sqrt{245x^2}$

Answer: $7x\sqrt{5}$

39) _____

40) $\sqrt{8k^7q^8}$

Answer: $2k^3q^4\sqrt{2k}$

40) _____

41) $6\sqrt{2} + 3\sqrt{18}$

Answer: $15\sqrt{2}$

41) _____

42) $\sqrt{144} + \sqrt{98} + \sqrt{81} + \sqrt{18}$

Answer: $10\sqrt{2} + 21$

42) _____

43) $\sqrt{3} + 4\sqrt{12} - 6\sqrt{27}$

Answer: $-9\sqrt{3}$

43) _____

44) $\sqrt{3x^2} + x\sqrt{12}$

Answer: $3x\sqrt{3}$

44) _____

45) $\sqrt{6a} - 5\sqrt{24a} - 4\sqrt{150a}$

Answer: $-29\sqrt{6a}$

45) _____

Multiply and simplify. Assume that all variables represent positive real numbers.

46) $\sqrt{98} \cdot \sqrt{50}$

Answer: 70

46) _____

47) $\sqrt{3x^9} \cdot \sqrt{15x}$

Answer: $3x^5\sqrt{5}$

47) _____

48) $\sqrt{2}(\sqrt{10} + \sqrt{2})$

Answer: $2\sqrt{5} + 2$

48) _____

49) $(\sqrt{2} + \sqrt{5})(\sqrt{19} - \sqrt{5})$

Answer: $\sqrt{38} + \sqrt{95} - \sqrt{10} - 5$

49) _____

50) $(5\sqrt{13} + 9)(7\sqrt{13} + 4)$

Answer: $491 + 83\sqrt{13}$

50) _____

51) $(2\sqrt{7} + 6)^2$

Answer: $64 + 24\sqrt{7}$

51) _____

Rationalize the denominator and simplify. Assume that all variables represent positive real numbers.

52) $\sqrt{\frac{13}{3}}$

Answer: $\frac{\sqrt{39}}{3}$

52) _____

53) $\frac{\sqrt{7}}{\sqrt{11}}$

Answer: $\frac{\sqrt{77}}{11}$

53) _____

54) $\frac{5}{\sqrt{2}}$

Answer: $\frac{5\sqrt{2}}{2}$

54) _____