1. Factor. Remember to use the largest common factor and to check by multiplying. Factor out a negative factor if the first coefficient is negative.

   $9x + 27$

   ___

   $9x + 27 =$ _____

2. Factor.

   $6s^2 + 3s$

   $6s^2 + 3s =$ _____
   (Factor completely.)

3. Factor. Remember to use the largest common factor and to check by multiplying. Factor out a negative factor if the first coefficient is negative.

   $-7y^2 - 35y$

   ___

   The answer is _____.

4. Factor. Remember to use the largest common factor and to check by multiplying. Factor out a negative factor if the first coefficient is negative.

   $2x^8 + 2x^7 - 6x^6 + 16x^5$

   $2x^8 + 2x^7 - 6x^6 + 16x^5 =$ _____ (Factor completely.)

5. Factor. Remember to use the largest common factor and to check by multiplying. Factor out a negative factor if the first coefficient is negative.

   $-9r^4s^3 - 12r^2s^4 + 15rs^5$

   $-9r^4s^3 - 12r^2s^4 + 15rs^5 =$ _____ (Factor completely.)

6. Factor.

   $x^4(x + 8) + 2(x + 8)$

   $x^4(x + 8) + 2(x + 8) =$ _____ (Factor completely.)

7. Factor.

   $x^2(x + 10) + (x + 10)$

   The factored expression is _____.

8. Factor by grouping.

   $x^3 + 2x^2 + 9x + 18$

   Select the correct choice below and fill in any answer boxes within your choice.

   ○ **A.** $x^3 + 2x^2 + 9x + 18 =$ _____ (Factor completely.)
   ○ **B.** The polynomial is not factorable.

9. Factor by grouping.

$24x^3 - 16x^2 + 3x - 2$

Select the correct choice below and fill in any answer boxes within your choice.

    ○ **A.** $24x^3 - 16x^2 + 3x - 2 = $ _____ (Factor completely.)

    ○ **B.** The polynomial is not factorable.

---

10. Factor the expression by grouping.

$8x^3 - 3x^2 - 8x + 3$

Select the correct choice below and fill in any answer boxes within your choice.

    ○ **A.** $8x^3 - 3x^2 - 8x + 3 = $ _____

    ○ **B.** The polynomial is not factorable.

---

11. Factor the trinomial.

$a^2 + 11a + 24$

Select the correct choice below and, if necessary, fill in the answer box within your choice.

    ○ **A.** $a^2 + 11a + 24 = $ _____ (Factor completely.)

    ○ **B.** The polynomial is prime.

---

12. Factor the trinomial.

$t^2 - 7t + 6$

Select the correct choice below and, if necessary, fill in the answer box within your choice.

    ○ **A.** $t^2 - 7t + 6 = $ _____ (Factor completely.)

    ○ **B.** The polynomial is prime.

---

13. Factor the trinomial.

$t^2 - 9t + 20$

Select the correct choice below and, if necessary, fill in the answer box within your choice.

    ○ **A.** $t^2 - 9t + 20 = $ _____ (Factor completely.)

    ○ **B.** The polynomial is prime.

14. Factor the trinomial.

$s^2 - 13s + 42$

Select the correct choice below and, if necessary, fill in the answer box within your choice.

○ **A.** $s^2 - 13s + 42 =$ _____ (Factor completely.)

○ **B.** The polynomial is prime.

15. Factor.

$b^2 - 2b - 48$

Select the correct choice below and, if necessary, fill in the answer box within your choice.

○ **A.** $b^2 - 2b - 48 =$ _____ (Factor completely.)

○ **B.** The polynomial is prime.

16. Factor the trinomial.

$t^2 + 6t - 40$

Select the correct choice below and, if necessary, fill in the answer box within your choice.

○ **A.** $t^2 + 6t - 40 =$ _____ (Factor completely.)

○ **B.** The polynomial is prime.

17. Factor completely.

$5y^2 - 70y - 160$

Select the correct choice below and, if necessary, fill in the answer box within your choice.

○ **A.** $5y^2 - 70y - 160 =$ _____

○ **B.** The polynomial is prime.

18. Factor the trinomial completely.

$q^2 - 9q + 15$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

○ **A.** $q^2 - 9q + 15 =$ _____ (Factor completely.)

○ **B.** The polynomial is prime.

19. Factor the trinomial, or state that the trinomial is prime. Check the factorization using FOIL multiplication.

   $4x^2 + 5x - 6$

   Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

   ○ **A.** $4x^2 + 5x - 6 =$ _____ (Factor completely.)

   ○ **B.** The polynomial is prime.

20. Factor completely.

   $3w^2 - 4w - 15$

   Select the correct choice below and fill in any answer boxes within your choice.

   ○ **A.** $3w^2 - 4w - 15 =$ _____

   ○ **B.** The expression is prime.

21. Factor completely.

   $15c^2 - 14c + 3$

   Select the correct choice below and fill in any answer boxes within your choice.

   ○ **A.** $15c^2 - 14c + 3 =$ _____

   ○ **B.** The polynomial is prime.

22. Factor.

   $15v^2 + 131v + 50$

   Factor completely. Select the correct choice below and fill in the answer box within your choice.

   ○ **A.** $15v^2 + 131v + 50 =$ _____

   ○ **B.** The polynomial is prime.

23. Factor completely. If the polynomial is prime, state this.

   $21y^2 + 83y - 4$

   Select the correct choice below and fill in any answer boxes within your choice.

   ○ **A.** $21y^2 + 83y - 4 =$ _____

   ○ **B.** The polynomial is prime.

24. Factor completely.

$c^2 + 16c + 64$

Select the correct choice below and fill in any answer boxes within your choice.

    ○ **A.** $c^2 + 16c + 64 =$ _____

    ○ **B.** The polynomial is prime.

---

25. Factor completely.

$c^2 - 6c + 9$

Select the correct choice below and fill in any answer boxes within your choice.

    ○ **A.** $c^2 - 6c + 9 =$ _____

    ○ **B.** The polynomial is prime.

---

26. Factor completely.

$w^2 - 81$

Select the correct choice below and fill in any answer boxes within your choice.

    ○ **A.** $w^2 - 81 =$ _____

    ○ **B.** The polynomial is prime.

---

27. Factor completely.

$r^2 - 64$

Select the correct choice below and fill in any answer boxes within your choice.

    ○ **A.** $r^2 - 64 =$ _____

    ○ **B.** The polynomial is prime.

---

28. Factor completely.

$25x^2 - 10x + 1$

Select the correct choice below and fill in any answer boxes within your choice.

    ○ **A.** $25x^2 - 10x + 1 =$ _____

    ○ **B.** The polynomial is prime.

---

29. Factor completely.

$5w^2 - 320$

Select the correct choice below and fill in any answer boxes within your choice.

    ○ **A.** $5w^2 - 320 =$ _____

    ○ **B.** The polynomial is prime.

30. Factor completely.

$w^4 - 4096$

Select the correct choice below and fill in any answer boxes within your choice.

○ **A.** $w^4 - 4096 =$ _____

○ **B.** The polynomial is prime.

31. Factor.

$r^3 - 27$

Select the correct choice below and, if necessary, fill in the answer box within your choice.

○ **A.** $r^3 - 27 =$ _____ (Factor completely.)

○ **B.** The polynomial is prime.

32. Factor.

$v^3 + 64$

Select the correct choice below and, if necessary, fill in the answer box within your choice.

○ **A.** $v^3 + 64 =$ _____ (Factor completely.)

○ **B.** The polynomial is prime.

33. Factor completely. If a polynomial is prime, state this.

$3x^2 - 27$

Select the correct choice below and, if necessary, fill in the answer box within your choice.

○ **A.** $3x^2 - 27 =$ _____

○ **B.** The polynomial is prime.

34. Factor completely.

$c^3 + 10c^2 + 25c$

Select the correct choice below and fill in any answer boxes within your choice.

○ **A.** $c^3 + 10c^2 + 25c =$ _____

○ **B.** The polynomial is prime.

35. Factor completely.

$s^2 + 49$

Select the correct choice below and fill in any answer boxes within your choice.

○ **A.** $s^2 + 49 =$ _____

○ **B.** The polynomial is prime.

36. Factor completely. If a polynomial is prime, state this.

   $8x^2 + 16x - 64$

   Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

   ○ **A.** $8x^2 + 16x - 64 = $ _____

   ○ **B.** The polynomial is prime.

37. Factor completely. If a polynomial is prime, state this.

   $3x^5 - 48x$

   Select the correct choice below and fill in any answer boxes within your choice.

   ○ **A.** $3x^5 - 48x = $ _____

   ○ **B.** The polynomial is prime.

38. Factor completely.

   $3\pi ap + 3\pi a^2$

   Select the correct choice below and fill in any answer boxes within your choice.

   ○ **A.** $3\pi ap + 3\pi a^2 = $ _____

   ○ **B.** The polynomial is prime.

39. Factor completely.

   $v^2 + 2v + vd + 2d$

   Choose the correct factorization of $v^2 + 2v + vd + 2d$.

   ○ **A.** $v(v + 2) + d(v + 2)$

   ○ **B.** $(v + d)(v + 2)$

   ○ **C.** $v^2 + vd + 2v + 2d$

   ○ **D.** $v + d(v + 2)$

40. Factor the trinomial.

   $c^2 - 2c + 25$

   Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

   ○ **A.** $c^2 - 2c + 25 = $ _____
   (Factor completely.)

   ○ **B.** The polynomial is prime.

41. Factor completely. If the polynomial is prime, state this.

   $c^3 - 25c^2 - 9c + 225$

   Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

   ○ **A.** $c^3 - 25c^2 - 9c + 225 = $ _____ (Factor completely.)

   ○ **B.** The polynomial is prime.

42. Choose the most appropriate choice for the phrase.

    The name of equations of the type $ax^2 + bx + c = 0$, with $a \neq 0$.

    Choose the correct answer below.

    ○   Pythagorean
    ○   Quadratic

43. Choose the most appropriate choice for the phrase.

    The idea that $A \cdot B = 0$ if and only if $A = 0$ or $B = 0$.

    Choose the correct answer below.

    ○   Special product rule
    ○   The principle of zero products

44. Solve using the principle of zero products.

    $(r + 4)(r + 49) = 0$

    Choose the correct solutions for r.

    ○ **A.** $-4, -49$ ○ **B.** $-2, 7$
    ○ **C.** $2, 7$ ○ **D.** $-2, -7$

45. Solve using the principle of zero products.

    $(t + 12)(t - 14) = 0$

    Choose the correct solutions for t.

    ○ **A.** The solutions are $t = -12, -14$.
    ○ **B.** The solutions are $t = 2, 7$.
    ○ **C.** The solutions are $t = 2, -7$.
    ○ **D.** The solutions are $t = -12, 14$.

46. Solve using the principle of zero products.

    $(x + 6)(2x - 5) = 0$

    Select the correct choice below and fill in any answer boxes in your choice.

    ○ **A.** The solution is $x =$ _____ .
              (Simplify your answer. Use a comma to separate answers as needed. Type each solution
              only once.)
    ○ **B.** There is no solution.

47. Solve using the principle of zero products.

    $v(v + 5) = 0$

    Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

    ○ **A.** The solution(s) is/are
              $v =$ _____ .
              (Use a comma to separate answers as
              needed. Type each solution only once.)
    ○ **B.** There is no solution.

48. Solve.

    $t^2 - 12t + 35 = 0$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

  ○ **A.** The solution(s) is/are

  t = _____ .

  (Type an integer or a simplified fraction.
  Use a comma to separate answers as
  needed. Type each solution only once.)

  ○ **B.** There is no solution.

---

49. Solve.

    $c^2 + c - 6 = 0$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

  ○ **A.** The solution(s) is/are

  c = _____ .

  (Type an integer or a simplified fraction.
  Use a comma to separate answers as
  needed. Type each solution only once.)

  ○ **B.** There is no solution.

---

50. Solve.

    $c^2 + 9c + 18 = 0$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

  ○ **A.** The solution(s) is/are

  c = _____ .

  (Type an integer or a simplified fraction.
  Use a comma to separate answers as
  needed. Type each solution only once.)

  ○ **B.** There is no solution.

---

51. Solve.

    $a^2 - 4a = 0$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

  ○ **A.** The solution(s) is/are

  a = _____ .

  (Type an integer or a simplified fraction.
  Use a comma to separate answers as
  needed. Type each solution only once.)

  ○ **B.** There is no solution.

---

52. Solve by factoring and using the principle of zero products.

    $a^2 - 9 = 0$

Select the correct choice below and, if necessary, fill in the answer box within your choice.

  ○ **A.** The solution(s) is/are

  a = _____ .

  (Simplify your answer. Use a comma to
  separate answers as needed. Type
  each solution only once.)

  ○ **B.** There is no solution.

53. Solve.

    $t^2 + 1 = 2t$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

  ○ **A.** The solution is t = _____ .
      (Use a comma to separate answers as needed. Type each solution only once.)

  ○ **B.** There is no solution.

---

54. Solve.

    $6b^2 = 7b$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

  ○ **A.** The solution(s) is/are

     b = _____ .
     (Type an integer or a simplified fraction. Use a comma to separate answers as needed. Type each solution only once.)

  ○ **B.** There is no solution.

---

55. Choose the term from the following list that best completes the sentence.

    If x is an integer, then the next consecutive integer is _____ .

    If x is an integer, then the next consecutive integer is (1) _____

    (1) ○ x + 1.
       ○ x + 2.
       ○ 2x.
       ○ 2x + 1.

---

56. Choose the term from the following list that best completes the sentence.

    A right triangle contains a(n) _____ angle.

    A right triangle contains a(n) (1) _____ angle.

    (1) ○ 100°
       ○ 120°
       ○ 90°
       ○ 110°

57. Solve the problem. Use the five-step problem-solving approach.

    A number is 12 less than its square. Find all such numbers.

    The numbers are _____ . (Use a comma to separate answers as needed.)

---

58. The product of the page numbers on two facing pages of a book is 110. Find the page numbers.

    The page numbers are _____ .
    (Use a comma to separate answers.)

---

59. The diagonal braces in a fire tower are 10 ft long and span a horizontal distance of 6 ft. How high does each brace reach vertically?
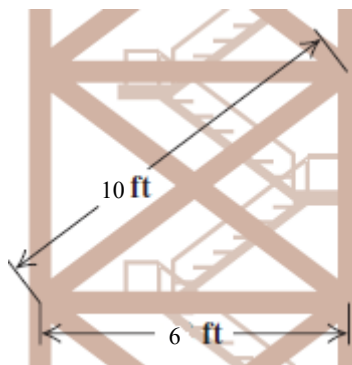
The height each brace reaches vertically is _____ (1) _____
(Simplify your answer.)

(1) ○ ft^3.
     ○ ft^2.
     ○ ft.

60. On one zipline in a canopy tour in a country, riders drop 60 ft while covering a distance of 899 ft along the ground. How long is the zipline?

The zipline is _____ (1) _____ long.
(Simplify your answer.)

(1) ○ ft
     ○ ft^3
     ○ ft^2

61. The shortest side of a right triangle measures 6 m. The lengths of the other two sides are consecutive even integers. Find the lengths of the other two sides.

The length of the second side (shorter than the third side) is _____ (1) _____

The length of the third side is _____ (2) _____

(1) ○ m^3.   (2) ○ m^3.
     ○ m^2.   ○ m.
     ○ m.   ○ m^2.