KIDSLEARN MATH · PRACTICE ASSIGNMENT

Equations

Name: Date: Score: / 50

Solve each equation for the letter shown, or expand / factor as asked. Give answers that are not whole numbers as fractions in lowest terms. Answers are at the end.

Part A — Warm-up

1. Solve $5 - x = -9$.

2. Solve $x + 16 = 9$.

3. Solve $x - 9 = -6$.

4. Solve $\frac{x}{7} = -5$.

5. Solve $-2x = 14$.

6. Solve $-6x - 9 = 21$.

7. Solve $-2x + 18 = -6$.

8. Solve $9x + 12 = 12$.

9. Solve $2x + 6 = 30$.

10. Solve $-3x - 2 = 25$.

11. Expand $(x - 5)(x + 5)$.

(A) $x^2 - 25x$ (B) $x^2 - 10x - 25$

(C) $x^2 - 25$ (D) $x^2 + 25$

12. Expand $(x + 5)(x - 5)$.

(A) $x^2 + 10x - 25$ (B) $x^2 - 25x$

(C) $x^2 + 25$ (D) $x^2 - 25$

13. Expand $(x-1)(x+6)$.

(A) x^2+5x-6 (B) x^2-6x+5

(C) x^2+5x+6 (D) x^2-7x-6

14. Solve $6(x+7)=102$.

15. Solve $4(x-4)=16$.

16. Solve $2(x-3)=14$.

Part B — Core practice

17. Solve $-2x+12=10x-120$.

18. Solve $-5x-13=-8x+23$.

19. Solve $x-8=11x-128$.

20. Solve $11x-11=-7x-83$.

21. Solve $-4x-15=-x+1$.

22. Solve $2(x+2)=5(x-3)+25$.

23. Solve $5(x-5)=2(x-4)-35$.

24. Solve $3(x-1)=6(x+6)-27$.

25. Solve $3(x-2)=2(x+4)-7$.

26. Solve $\frac{x}{2}-\frac{x}{3}=1$.

27. Solve $\frac{x}{4} + \frac{x}{5} = -45$.

28. Solve $\frac{x}{3} - \frac{x}{5} = 6$.

29. Solve $\frac{x}{4} - \frac{x}{5} = -2$.

30. Expand $(5x - 1)^2$.

(A) $25x^2 + 1$ (B) $25x^2 - 10x + 1$

(C) $25x^2 - 5x + 1$ (D) $25x^2 - 10x - 1$

31. Expand $(5y + 7)^2$.

(A) $25y^2 + 49$ (B) $25y^2 + 70y + 49$

(C) $25y^2 + 70y - 49$ (D) $25y^2 + 35y + 49$

32. Expand $(3x - 1)^2$.

(A) $9x^2 - 6x + 1$ (B) $9x^2 - 3x + 1$

(C) $9x^2 - 6x - 1$ (D) $9x^2 + 1$

33. Expand $(x + 4)^2$.

(A) $x^2 + 8x + 16$ (B) $x^2 + 4x + 16$

(C) $x^2 + 16$ (D) $x^2 + 8x - 16$

34. Factor $x^2 + 2x - 3$.

(A) $(x + 3)(x - 1)$ (B) $(x - 3)(x + 1)$

(C) $(x + 3)(x + 1)$ (D) $(x - 3)(x - 1)$

35. Factor $x^2 - 8x + 7$.

(A) $(x + 7)(x - 1)$ (B) $(x + 7)(x + 1)$

(C) $(x - 7)(x + 1)$ (D) $(x - 7)(x - 1)$

36. Factor $m^2 - 4$.

(A) $(m - 2)^2$ (B) $(m + 2)(m - 2)$

(C) $(m + 2)^2$ (D) $(m + 4)(m - 1)$

37. Factor $x^2 - 25$.

(A) $(x + 25)(x - 1)$ (B) $(x + 5)^2$

(C) $(x - 5)^2$ (D) $(x + 5)(x - 5)$

38. Factor $x^2 - 6x + 8$.

(A) $(x - 4)(x - 2)$ (B) $(x + 4)(x - 2)$

(C) $(x - 4)(x + 2)$ (D) $(x + 4)(x + 2)$

Part C — Challenge

39. Use $(a - b)^2 = a^2 - 2ab + b^2$ to work out 36^2.

40. Use $(a + b)(a - b) = a^2 - b^2$ to work out 84×76.

41. Use $(a+b)^2 = a^2 + 2ab + b^2$ to work out 24^2.

42. Use $(a-b)^2 = a^2 - 2ab + b^2$ to work out 38^2.

43. Use $(a+b)(a-b) = a^2 - b^2$ to work out 31×29.

44. If $a + b = 7$ and $ab = 12$, find $(a-b)^2$.

45. If $a + b = 14$ and $a - b = -4$, find $a^2 - b^2$.

46. If $a + b = -6$ and $ab = 0$, find $(a-b)^2$.

47. If $a + b = -1$ and $ab = -2$, find $(a-b)^2$.

48. The sum of five consecutive whole numbers is 145. What is the smallest of them?

49. I think of a number, multiply it by 3 and then subtract 8. I get 16 more than the number I first thought of. What was my number?

50. I think of a number, multiply it by 6 and then subtract 19. I get 46 more than the number I first thought of. What was my number?

Answer Key — Equations

1. 14
   Add x to both sides: $5 = -9 + x$. So $x = 5 - (-9) = 14$.
2. -7
   Subtract 16 on both sides: $x = 9 - 16 = -7$.
3. 3
   Add 9 on both sides: $x = -6 + 9 = 3$.
4. -35
   Multiply both sides by 7: $x = -5 \times 7 = -35$.
5. -7
   Divide both sides by (-2): $x = 14 \div (-2) = -7$.
6. -5
   Add 9: $-6x = 30$. Divide by (-6): $x = -5$.
7. 12
   Subtract 18: $-2x = -24$. Divide by (-2): $x = 12$.
8. 0
   Subtract 12: $9x = 0$. Divide by 9: $x = 0$.
9. 12
   Subtract 6: $2x = 24$. Divide by 2: $x = 12$.
10. -9
    Add 2: $-3x = 27$. Divide by (-3): $x = -9$.
11. **(C)** $x^2 - 25$
    Add for the middle term, multiply for the last: $(-5) + 5 = 0$ and $(-5) \times 5 = -25$, so $x^2 - 25$.
12. **(D)** $x^2 - 25$
    Add for the middle term, multiply for the last: $5 + (-5) = 0$ and $5 \times (-5) = -25$, so $x^2 - 25$.
13. **(A)** $x^2 + 5x - 6$
    Add for the middle term, multiply for the last: $(-1) + 6 = 5$ and $(-1) \times 6 = -6$, so $x^2 + 5x - 6$.
14. 10
    Divide both sides by 6: $x + 7 = 17$, so $x = 10$. (Or expand: $6x + 42 = 102$.)
15. 8
    Divide both sides by 4: $x - 4 = 4$, so $x = 8$. (Or expand: $4x - 16 = 16$.)
16. 10
    Divide both sides by 2: $x - 3 = 7$, so $x = 10$. (Or expand: $2x - 6 = 14$.)
17. 11
    Move the x terms to the left and the numbers to the right: $-12x = -132$. So $x = 11$.
18. 12
    Move the x terms to the left and the numbers to the right: $3x = 36$. So $x = 12$.
19. 12
    Move the x terms to the left and the numbers to the right: $-10x = -120$. So $x = 12$.
20. -4
    Move the x terms to the left and the numbers to the right: $18x = -72$. So $x = -4$.
21. $-\frac{16}{3}$
    Move the x terms to the left and the numbers to the right: $-3x = 16$. So $x = -\frac{16}{3}$.
22. -2
    Expand: $2x + 4 = 5x + 10$. Collect: $-3x = 6$, so $x = -2$.
23. -6
    Expand: $5x - 25 = 2x - 43$. Collect: $3x = -18$, so $x = -6$.
24. -4
    Expand: $3x - 3 = 6x + 9$. Collect: $-3x = 12$, so $x = -4$.
25. 7
    Expand: $3x - 6 = 2x + 1$. Collect: $x = 7$, so $x = 7$.
26. 6
    Multiply every term by 6: $3x - 2x = 6$, so $x = 6$ and $x = 6$.
27. -100
    Multiply every term by 20: $5x + 4x = -900$, so $9x = -900$ and $x = -100$.
28. 45
    Multiply every term by 15: $5x - 3x = 90$, so $2x = 90$ and $x = 45$.
29. -40
    Multiply every term by 20: $5x - 4x = -40$, so $x = -40$ and $x = -40$.
30. **(B)** $25x^2 - 10x + 1$
    Use $(p - q)^2 = p^2 - 2pq + q^2$ with $p = 5x$, $q = 1$: $25x^2 - 10x + 1$. Don't forget the middle term!
31. **(B)** $25y^2 + 70y + 49$
    Use $(p + q)^2 = p^2 + 2pq + q^2$ with $p = 5y$, $q = 7$: $25y^2 + 70y + 49$. Don't forget the middle term!
32. **(A)** $9x^2 - 6x + 1$
    Use $(p - q)^2 = p^2 - 2pq + q^2$ with $p = 3x$, $q = 1$: $9x^2 - 6x + 1$. Don't forget the middle term!

33. **(A)** $x^2 + 8x + 16$
Use $(p+q)^2 = p^2 + 2pq + q^2$ with $p = x, q = 4$: $x^2 + 8x + 16$. Don't forget the middle term!

34. **(A)** $(x+3)(x-1)$
Find two numbers that multiply to -3 and add to 2: 3 and -1. So $(x+3)(x-1)$.

35. **(D)** $(x-7)(x-1)$
Find two numbers that multiply to 7 and add to -8: -7 and -1. So $(x-7)(x-1)$.

36. **(B)** $(m+2)(m-2)$
Difference of squares: $p^2 - q^2 = (p+q)(p-q)$ with $p = m, q = 2$.

37. **(D)** $(x+5)(x-5)$
Difference of squares: $p^2 - q^2 = (p+q)(p-q)$ with $p = x, q = 5$.

38. **(A)** $(x-4)(x-2)$
Find two numbers that multiply to 8 and add to -6: -4 and -2. So $(x-4)(x-2)$.

39. 1296
$36^2 = (40-4)^2 = 1600 - 320 + 16 = 1296$.

40. 6384
$84 \times 76 = (80+4)(80-4) = 80^2 - 4^2 = 6400 - 16 = 6384$.

41. 576
$24^2 = (20+4)^2 = 400 + 160 + 16 = 576$.

42. 1444
$38^2 = (40-2)^2 = 1600 - 160 + 4 = 1444$.

43. 899
$31 \times 29 = (30+1)(30-1) = 30^2 - 1^2 = 900 - 1 = 899$.

44. 1
$(a-b)^2 = (a+b)^2 - 4ab = 49 - 48 = 1$.

45. -56
$a^2 - b^2 = (a+b)(a-b) = 14 \times (-4) = -56$.

46. 36
$(a-b)^2 = (a+b)^2 - 4ab = 36 - 0 = 36$.

47. 9
$(a-b)^2 = (a+b)^2 - 4ab = 1 + 8 = 9$.

48. 27
Call them $n, n+1, \ldots$: $5n + 10 = 145$, so $5n = 135$ and $n = 27$.

49. 12
Call the number n: $3n - 8 = n + 16$. So $2n = 24$ and $n = 12$.

50. 13
Call the number n: $6n - 19 = n + 46$. So $5n = 65$ and $n = 13$.