Key

10.2 Quadratic equations puzzle

Solve the quadratic equations and match them with the answers. The answer letters matched with each question number decode the answer to the riddle below.

1 $x^2 - 9 = 0$ J
2 $x^2 = 6x$ R
3 $x^2 - 4x + 4 = 0$ B
4 $(2x + 1)(x - 3) = 0$ H
5 $2x^2 - 5x + 2 = 0$ K
6 $6x^2 + 9x - 27 = 0$ W
7 $x(x + 4) - 6(x + 4) = 0$ F
8 $x(3x + 1) = 4$ T
9 $\frac{x}{5} = \frac{5}{x}$ G
10 $(3x + 5)(2x - 3) = 0$ T
11 $x^2 + 5x - 9 = 0$ S
12 $2x^2 - 32 = 0$ S
13 $(x - 4)(x + 3) = 8$ X
14 $x^2 - 9x + 2 = 0$ A
15 $x(x + 4) + 8(x + 5) = 4$ I
16 $(x - 3)^2 = 22$ D
17 $10x^2 - 17x - 20 = 0$ P
18 $3x(x + 7) = 9x$ C
19 $2x^2 - 7x + 2 = 0$ E
20 $x^2 + 7x = 14$ L
21 $-x^2 + 5x + 7 = 0$ U
22 $3x^2 + 5x - 4 = 0$ N
23 $(2x - 5)^2 = 0$ O
24 $2(x + 1)^2 = 12$ Y
25 $2x^2 + 3x - 35 = 0$ M
26 $2x(2x - 1) = 30$ O
27 $-4x^2 + 6x - 1 = 0$ E
28 $9x^2 - 12x + 4 = 0$ Q
29 $x + 2 = \frac{4}{x - 1}$ V
30 $9x^2 - 9x - 4 = 0$ Z

Answers

R $x = 0, 6$
X $x = -6$
J $x = \pm 3$
S $x = \pm 4$
D $x = 3 \pm \sqrt{22}$
W $x = -3, \frac{3}{2}$
T $x = 1, -\frac{4}{3}$
H $x = 3, -\frac{1}{2}$
Q $x = \frac{2}{3}$
O $x = \frac{5}{2}$
K $x = 5, -4$
Y $x = -1 \pm \sqrt{6}$
G $x = \pm 5$
V $x = 2, -3$
B $x = 2$
N $x = \frac{-5 \pm \sqrt{73}}{6}$
A $x = \frac{9 \pm \sqrt{73}}{2}$
L $x = \frac{-7 \pm \sqrt{105}}{2}$
U $x = \frac{5 \pm \sqrt{53}}{2}$
S $x = \frac{-5 \pm \sqrt{61}}{2}$
M $x = -5, \frac{7}{2}$
K $x = 2, \frac{1}{2}$
E $x = \frac{7 \pm \sqrt{33}}{4}$
T $x = -\frac{5}{3}, \frac{3}{2}$
E $x = \frac{3 \pm \sqrt{5}}{4}$
C $x = 0, -4$
O $x = 3, -\frac{5}{2}$
F $x = -4, 6$
Z $x = -\frac{1}{3}, \frac{4}{3}$
P $x = -\frac{4}{5}, \frac{5}{2}$

Why is an equation solver so difficult to argue with?

THE	KEEPS	CHANGING	THE	SUBJECT
4 19	5 19 27 17 11	18 4 14 22 9 15 22 9	8 4 19	12 21 3 1 27 18 8

OF	THE	FORMULA,	SAYS	ONE
26 7	10 4 27	7 26 2 25 21 20 14	11 14 24 12	23 22 19

THING	ON	ONE	SIDE	BUT	DOES
10 4 15 22 9	23 22	26 22 27	12 15 16 19	3 21 8	16 26 27 11

THE	OPPOSITE	ON	THE	OTHER,
10 4 27	26 17 17 23 12 15 10 19	26 22	8 4 19	23 8 4 27 2

AND	OFTEN	GIVES	IRRATIONAL.
14 22 16	23 7 10 27 22	9 15 29 19 12	15 2 2 14 10 15 26 22 14 20

ANSWERS.
14 22 11 6 19 2 11

① $x^2 - 9 = 0$

$(x-3)(x+3) = 0$

$x = 3, x = -3$

② $x^2 = 6x$

$x^2 - 6x = 0$

$x(x-6) = 0$

$x = 0, x = 6$

③ $x^2 - 4x + 4 = 0$

$(x-2)^2 = 0$

$x = 2$

④ $(2x+1)(x-3) = 0$

$2x+1=0 \quad x-3=0$

$2x=-1 \quad x=3$

$x=-\frac{1}{2}$

⑤ $2x^2 - 5x + 2 = 0$

① $x^2 - 5x + 4$

② $(x-4)(x-1)$

③ $(x-\frac{4}{2})(x-\frac{1}{2})$

④ $(x-2)(x-\frac{1}{2})$

⑤ $(x-2)(2x-1) = 0$

$x = 2$

$2x-1=0$

$2x=1$

$x=\frac{1}{2}$

⑥ $6x^2 + 9x - 27 = 0$

$3(2x^2+3x-9) = 0$

$x^2+3x-18$

$(x+6)(x-3)$

$(x+6/2)(x-3/2)$

$(x+3)(x-\frac{3}{2})$

$(x+3)(2x-3) = 0$

$x = -3$

$2x-3=0$

$2x=3$

$x=3/2$

⑦ $x(x+4) - 6(x+4) = 0$

$x^2+4x-6x-24=0$

$x^2-2x-24=0$

$(x-6)(x+4)=0$

$x=6, \quad x=-4$

⑧ $x(3x+1) = 4$

$3x^2+x=4$

$3x^2+x-4=0$

x^2+x-12

$(x+4)(x-3)$

$(x+\frac{4}{3})(x-\frac{3}{3})$

$(x+\frac{4}{3})(x-1)$

$(3x+4)(x-1)=0$

$3x+4=0 \quad x=1$

$3x=-4$

$x=-\frac{4}{3}$

⑨ $\frac{x}{5} = \frac{5}{x}$

$x^2 = 25$

$x^2 - 25 = 0$

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

$x=5, \quad x=-5$

⑩ $(3x+5)(2x-3) = 0$

$3x=-5 \quad 2x-3=0$

$x=-\frac{5}{3} \quad 2x=3$

$x=\frac{3}{2}$

⑪ $x^2+5x-9=0$

$a=1, \ b=5 \ c=-9$

$\frac{-5 \pm \sqrt{25-4(1)(-9)}}{2}$

$x = \frac{-5 \pm \sqrt{61}}{2}$

⑫ $2x^2 - 32 = 0$

$2(x^2-16)=0$

$2(x-4)(x+4)=0$

$x=4, \quad x=-4$

⑬ $(x-4)(x+3) = 8$

$x^2-x-12=8$

$x^2-x-20=0$

$(x-5)(x+4)=0$

$x=5, \quad x=-4$

⑭ $x^2 - 9x + 2 = 0$

$a=1 \quad b=-9 \quad c=2$

$\frac{9 \pm \sqrt{81-4(1)(2)}}{2}$

$\frac{9 \pm \sqrt{73}}{2}$

⑮ $x(x+4) + 8(x+5) = 4$

$x^2+4x+8x+40=4$

$x^2+12x+36=0$

$(x+6)^2=0$

$x=-6$

⑯ $(x-3)^2 = 22$

$x^2-6x+9=22$

$x^2-6x-13=0$

$a=1 \quad b=-6 \quad c=-13$

$\frac{6 \pm \sqrt{36-4(1)(-13)}}{2}$

$\frac{6 \pm \sqrt{88}}{2} = \frac{6 \pm 2\sqrt{22}}{2}$

$= 3 \pm \sqrt{22}$

(17) $10x^2 - 17x - 20 = 0$

$x^2 - 17x - 200$

$(x-25)(x+8)$

$\left(x-\frac{25}{10}\right)\left(x+\frac{8}{10}\right)$

$\left(x-\frac{5}{2}\right)\left(x+\frac{4}{5}\right)$

$(2x-5)(5x+4) = 0$

$x = \frac{5}{2}$ $x = -\frac{4}{5}$

(18) $3x(x+7) = 9x$

$3x^2 + 21x = 9x$

$3x^2 + 12x = 0$

$3x(x+4) = 0$

$x = 0$ $x = -4$

(19) $2x^2 - 7x + 2 = 0$

$a = 2$ $b = -7$ $c = 2$

$$\frac{7 \pm \sqrt{49 - 4 \cdot 2 \cdot 2}}{4}$$

$$\frac{7 \pm \sqrt{33}}{4}$$

(20) $x^2 + 7x = 14$

$x^2 + 7x - 14 = 0$

$a = 1$ $b = 7$ $c = -14$

$$\frac{-7 \pm \sqrt{49 - 4 \cdot 1 \cdot (-14)}}{2}$$

$$\frac{-7 \pm \sqrt{105}}{2}$$

(21) $-x^2 + 5x + 7 = 0$

$a = -1$ $b = 5$ $c = 7$

$$\frac{-5 \pm \sqrt{25 - 4(-1)(7)}}{-2}$$

$$\frac{5 \pm \sqrt{53}}{2}$$

(22) $3x^2 + 5x - 4 = 0$

$a = 3$ $b = 5$ $c = -4$

$$\frac{-5 \pm \sqrt{25 - 4 \cdot 3 \cdot (-4)}}{6}$$

$$\frac{-5 \pm \sqrt{73}}{6}$$

(23) $(2x-5)^2 = 0$

$2x - 5 = 0$

$2x = 5$

$x = \frac{5}{2}$

(24) $2(x+1)^2 = 12$

$2(x^2 + 2x + 1) = 12$

$2x^2 + 4x + 2 = 12$

$2x^2 + 4x - 10 = 0$

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

$a = 1$ $b = 2$ $c = -5$

$$\frac{-2 \pm \sqrt{4 - 4 \cdot 1 \cdot (-5)}}{2}$$

$$\frac{-2 \pm \sqrt{24}}{2}$$

$$\frac{-2 \pm 2\sqrt{6}}{2}$$

$-1 \pm \sqrt{6}$

(25) $2x^2 + 3x - 35 = 0$

$x^2 + 3x - 70$

$(x+10)(x-7)$

$\left(x+\frac{10}{2}\right)\left(x-\frac{7}{2}\right)$

$(x+5)\left(x-\frac{7}{2}\right)$

$(x+5)(2x-7) = 0$

$x = -5$ $x = \frac{7}{2}$

(26) $2x(2x-1) = 30$

$4x^2 - 2x = 30$

$4x^2 - 2x - 30 = 0$

$2(2x^2 - x - 15) = 0$

$x^2 - x - 30$

$(x-6)(x+5)$

$\left(x-\frac{6}{2}\right)\left(x+\frac{5}{2}\right)$

$(x-3)\left(x+\frac{5}{2}\right)$

$(x-3)(2x+5) = 0$

$x = 3$ $x = -\frac{5}{2}$

(27) $-4x^2 + 6x - 1 = 0$

$a = -4$ $b = 6$ $c = -1$

$$\frac{-6 \pm \sqrt{36 - 4 \cdot (-4)(-4)}}{-8}$$

$$\frac{-6 \pm \sqrt{20}}{-8} = \frac{-6 \pm 2\sqrt{5}}{-8}$$

$$\frac{3 \pm \sqrt{5}}{4}$$

(28) $9x^2 - 12x + 4 = 0$

$(3x-2)^2 = 0$

$x = \frac{2}{3}$

(29) $x + 2 = \frac{4}{x-1}$

$(x+2)(x-1) = 4$

$x^2 + x - 2 = 4$

$x^2 + x - 6 = 0$

$(x+3)(x-2) = 0$

$x = -3$ $x = 2$

(30) $9x^2 - 9x - 4 = 0$

$x^2 - 9x - 36$

$(x-12)(x+3)$

$\left(x-\frac{12}{9}\right)\left(x+\frac{3}{9}\right)$

$\left(x-\frac{4}{3}\right)\left(x+\frac{1}{3}\right)$

$(3x-4)(3x+1) = 0$

$3x = 4$ $3x = -1$

$x = \frac{4}{3}$ $x = -\frac{1}{3}$