13.	$3w^2 - 12w = -12$ $3w^2 - 12w + 12 = 0$ $w^2 - 4w + 4 = 0$ $$w = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(1)(4)}}{2(1)}$$ $$w = \frac{4 \pm \sqrt{0}}{2}$$ $$w = 2$$ The solution is 2.
15.	$s^2 = -14 - 3s$ $s^2 + 3s + 14 = 0$ $$s = \frac{-3 \pm \sqrt{3^2 - 4(1)(14)}}{2(1)}$$ $$s = \frac{-3 \pm \sqrt{-47}}{2}$$ $$s = \frac{-3 \pm i\sqrt{47}}{2}$$ $$s = \frac{-3}{2} \pm i\frac{\sqrt{47}}{2}$$ The solutions are $-\frac{3}{2} + i\frac{\sqrt{47}}{2}$ and $-\frac{3}{2} - i\frac{\sqrt{47}}{2}$.

17.	$3 - 8v - 5v^2 = 2v$ $-5v^2 - 10v + 3 = 0$ $$v = \frac{-(-10) \pm \sqrt{(-10)^2 - 4(-5)(3)}}{2(-5)}$$ $$v = \frac{10 \pm \sqrt{160}}{-10}$$ $$v = \frac{10 \pm 4\sqrt{10}}{-10}$$ $$v = -1 \pm \frac{2\sqrt{10}}{5}$$ The solutions are $v = -1 + \dfrac{2\sqrt{10}}{5} \approx 0.26$ and $v = -1 - \dfrac{2\sqrt{10}}{5} \approx -2.26.$
19.	$4x^2 + 3 = x^2 - 7x$ $3x^2 + 7x + 3 = 0$ $$x = \frac{-7 \pm \sqrt{7^2 - 4(3)(3)}}{2(3)}$$ $$x = \frac{-7 \pm \sqrt{13}}{6}$$ $$x = -\frac{7}{6} \pm \frac{\sqrt{13}}{6}$$ The solutions are $x = -\dfrac{7}{6} + \dfrac{\sqrt{13}}{6} \approx -0.57$ and $x = -\dfrac{7}{6} - \dfrac{\sqrt{13}}{6} \approx -1.77.$

21.	$4 + 9n - 3n^2 = 2 - n$ $-3n^2 + 10n + 2 = 0$ $$n = \frac{-10 \pm \sqrt{10^2 - 4(-3)(2)}}{2(-3)}$$ $$n = \frac{-10 \pm \sqrt{124}}{-6}$$ $$n = \frac{-10 \pm 2\sqrt{31}}{-6}$$ $$n = \frac{5}{3} \pm \frac{\sqrt{31}}{3}$$ The solutions are $n = \frac{5}{3} + \frac{\sqrt{31}}{3} \approx 3.52$ and $n = \frac{5}{3} - \frac{\sqrt{31}}{3} \approx -0.19$.
23.	$x^2 - 5x + 10 = 4$ $x^2 - 5x + 6 = 0$ $$x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(1)(6)}}{2(1)}$$ $$x = \frac{5 \pm \sqrt{1}}{2}$$ $$x = \frac{5 \pm 1}{2}$$ $x = 3, 2$ The solutions are 3 and 2. Check: $x^2 - 5x + 6 = 0$ $(x - 3)(x - 2) = 0$ $x - 3 = 0$ or $x - 2 = 0$ $x = 3$ or $x = 2$

25.	$s^2 - s - 3 = s$ $s^2 - 2s - 3 = 0$ $$s = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(-3)}}{2(1)}$$ $$s = \frac{2 \pm \sqrt{16}}{2}$$ $$s = \frac{2 \pm 4}{2}$$ $s = 3, -1$ The solutions are 3 and -1. Check: $s^2 - 2s - 3 = 0$ $(s - 3)(s + 1) = 0$ $s - 3 = 0$ or $s + 1 = 0$ $s = 3$ or $s = -1$
27.	$3x^2 + 7x - 24 = 13x$ $3x^2 - 6x - 24 = 0$ $x^2 - 2x - 8 = 0$ $$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(-8)}}{2(1)}$$ $$x = \frac{2 \pm \sqrt{36}}{2}$$ $$x = \frac{2 \pm 6}{2}$$ $x = 4, -2$ The solutions are 4 and -2. Check: $x^2 - 2x - 8 = 0$ $(x - 4)(x + 2) = 0$ $x - 4 = 0$ or $x + 2 = 0$ $x = 4$ or $x = -2$

29.	$5p^2 + 40p + 100 = 25$ $5p^2 + 40p + 75 = 0$ $p^2 + 8p + 15 = 0$ $$p = \frac{-8 \pm \sqrt{8^2 - 4(1)(15)}}{2(1)}$$ $$p = \frac{-8 \pm \sqrt{4}}{2} = \frac{-8 \pm 2}{2}$$ $$p = -3, -5$$ The solutions are -3 and -5. Check: $p^2 + 8p + 15 = 0$ $\qquad (p + 3)(p + 5) = 0$ $\qquad\qquad p + 3 = 0 \quad$ or $p + 5 = 0$ $\qquad\qquad\quad p = -3$ or $\qquad p = -5$
31.	$x^2 - 8x + 16 = 0$ $b^2 - 4ac = (-8)^2 - 4(1)(16) = 0$ One real solution: $$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-(-8) \pm \sqrt{0}}{2(1)} = 4$$
33.	$8p^2 + 8p + 3 = 0$ $b^2 - 4ac = 8^2 - 4(8)(3) = -32 < 0$ Two imaginary solutions: $$p = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-8 \pm \sqrt{-32}}{2(8)} = \frac{-8 \pm 4i\sqrt{2}}{16}$$ $$= -\frac{1}{2} \pm i\frac{\sqrt{2}}{4}$$

35.	$5x^2 + 20x + 21 = 0$ $b^2 - 4ac = 20^2 - 4(5)(21) = -20 < 0$ Two imaginary solutions: $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \dfrac{-20 \pm \sqrt{-20}}{2(5)}$ $= \dfrac{-20 \pm 2i\sqrt{5}}{10}$ $= -2 \pm i\dfrac{\sqrt{5}}{5}$
37.	$8n^2 - 4n + 2 = 5n - 11$ $8n^2 - 9n + 13 = 0$ $b^2 - 4ac = (-9)^2 - 4(8)(13) = -335 < 0$ Two imaginary solutions: $n = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \dfrac{-(-9) \pm \sqrt{-335}}{2(8)}$ $= \dfrac{9 \pm i\sqrt{335}}{16}$ $= \dfrac{9}{16} \pm i\dfrac{\sqrt{335}}{16}$
39.	$7r^2 - 5 = 2r + 9r^2$ $-2r^2 - 2r - 5 = 0$ $b^2 - 4ac = (-2)^2 - 4(-2)(-5) = -36 < 0$ Two imaginary solutions: $r = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $= \dfrac{-(-2) \pm \sqrt{-36}}{2(-2)}$ $= \dfrac{2 \pm 6i}{-4}$ $= -\dfrac{1}{2} \pm \dfrac{3}{2}i$