Solve the following pairs of simultaneous equations, one linear and one quadratic.

13. $s = 2t - 1$
$3t^2 - 2ts + s^2 = 9$

Sub linear into quadratic

$(a+b)^2 = a^2 + 2ab + b^2$

$\dfrac{-8}{\pm (\times\mp 8}$ t solns
$\pm 2 \times \mp 4$

Sub into linear

$S = 2t - 1$

solutions

$3t^2 - 2t(2t-1) + (2t-1)^2 = 9$

$3t^2 - 4t^2 + 2t + 4t^2 - 4t + 1 = 9$

$3t^2 - 2t - 8 = 0$

$(3t + 4)(t - 2) = 0$ ✓
  +4t   -6t

$3t + 4 = 0$ $t - 2 = 0$
$3t = -4$ $t = 2$
$t = -4/3 \ (or -1\tfrac{1}{3})$

$s = 2(-4/3) - 1$ $s = 2(2) - 1 = 3$

$= -\dfrac{8}{3} - 1$

$= -\dfrac{11}{3} \ (or -3\tfrac{2}{3})$

$\overset{s}{} \quad \overset{t}{}$ $\overset{s}{} \quad \overset{t}{}$
$pt(-\tfrac{11}{3}, -\tfrac{4}{3})$ and $pt(3, 2)$

Solve the following pairs of simultaneous equations, one linear and one quadratic.

14. $2s^2 = t^2 + 1$
$2s = t - 3$

① Rewrite linear

② Sub in & solve

$(a+b)^2 = a^2 + 2ab + b^2$

S solns

③ Sub into linear
$t = 2s + 3$

$t = 2s + 3$

$t^2 + 1 - 2s^2 = 0$

$(2s+3)^2 + 1 - 2s^2 = 0$

$4s^2 + 12s + 9 + 1 - 2s^2 = 0$

$2s^2 + 12s + 10 = 0$
$s^2 + 6s + 5 = 0$
$(s + 5)(s + 1) = 0$

$s = -5$ or $s = -1$

$t = 2(-5) + 3 = -7$ $t = 2(-1) + 3 = 1$

$(s,t) = (-5, -7)$ $(s,t) = (-1, 1)$