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Weidenbach

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Tutorials for “Automated Reasoning WS24/25”  
Exercise sheet 10

**Exercise 10.1:**

Use virtual substitution to eliminate  $x_2$  in

$$\exists x_1, x_2, x_3. (3x_1 + 4x_2 - 1 > 0 \wedge -x_1 + x_2 + 1 \geq 0 \wedge 2x_2 - x_3 \approx 0)$$

**Exercise 10.2:**

Use virtual substitution to eliminate  $x_1, x_2, x_3$  in

$$\exists x_1, x_2, x_3. (-x_1 + x_2 + 1 \geq 0 \wedge -x_2 - x_3 \geq 0 \wedge x_1 + x_3 - 2 \geq 0)$$

**Exercise 10.3:**

Use virtual substitution to eliminate  $\exists x$  from the formula

$$\exists x. ((2x - y > 0 \vee x \geq 2) \wedge (y - x \geq -1 \vee x < 1) \wedge x < 3y)$$

Simplify the result as much as possible.

It is not encouraged to prepare joint solutions, because we do not support joint exams.