

$$1. \quad a^2 + a - 42 = 0$$

$$a_{1,2} = \frac{-1 \pm \sqrt{1 + 4 \cdot 1 \cdot 42}}{2} = \frac{-1 \pm \sqrt{169}}{2} = \frac{-1 \pm 13}{2}$$

$$a_1 = -7 \quad a_2 = +6$$

$$a^2 + a - 42 = (a+7)(a-6)$$

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

$$x_{1,2} = \frac{-1 \pm \sqrt{1 + 4 \cdot 6 \cdot 22}}{12} = \frac{-1 \pm \sqrt{529}}{12} = \frac{-1 \pm 23}{12}$$

$$x_1 = -2 \quad x_2 = \frac{22}{12} = \frac{11}{6}$$

$$6x^2 + x - 22 = (x+2)(6x-11)$$

$$3. \quad y = x^4 - 5x^2 + 2 \quad x = 10000$$

$$y = \frac{3}{5x^2 + 4x - 1}$$

$$5x^2 + 4x - 1 \neq 0$$

$$x_{1,2} = \frac{-2 \pm \sqrt{4 + 5}}{5} = \frac{-2 \pm 3}{5}$$

$$x_1 = -1 \quad x_2 = \frac{1}{5}$$

$$x \neq -1 \quad x \neq \frac{1}{5}$$

$$y = \sqrt{6x+4} \quad 6x+4 \geq 0 \quad x \geq -\frac{2}{3}$$

$$5. \quad \frac{x^2 + 10x + 25}{3x^2 + 14x - 5} = \frac{(x+5)(x+5)}{(x+5)(3x-1)} = \frac{x+5}{3x-1}$$

$$3x^2 + 14x - 5 = 0$$

$$x_{1,2} = \frac{-7 \pm \sqrt{49 + 15}}{3} = \frac{-7 \pm 8}{3} \quad x_1 = -5 \quad x_2 = \frac{1}{3}$$