

restart;

$$y := 20 + 10 \cdot x1 + 20 \cdot x2 - 1 \cdot x1^2 - 2 \cdot x2^2 + 1 \cdot x1 \cdot x2;$$

$$y := -x1^2 + x1 x2 - 2 x2^2 + 10 x1 + 20 x2 + 20 \quad (1)$$

# 4 a:

$$\text{ArbitraryIsoquants\_x2} := (\text{solve}(y=y0, x2));$$

$$\text{ArbitraryIsoquants\_x2} := \frac{x1}{4} + 5 + \frac{\sqrt{-7 x1^2 + 120 x1 - 8 y0 + 560}}{4}, \frac{x1}{4} + 5 - \frac{\sqrt{-7 x1^2 + 120 x1 - 8 y0 + 560}}{4} \quad (2)$$

# 4. b: MRTS

$$f1 := \text{diff}(y, x1);$$

$$f1 := -2 x1 + x2 + 10 \quad (3)$$

$$f2 := \text{diff}(y, x2);$$

$$f2 := x1 - 4 x2 + 20 \quad (4)$$

$$\text{MRTS} := \frac{f1}{f2};$$

$$\text{MRTS} := \frac{-2 x1 + x2 + 10}{x1 - 4 x2 + 20} \quad (5)$$

# 4.c:

$$f11 := \text{diff}(f1, x1); f22 := \text{diff}(f2, x2); f12 := \text{diff}(f1, x2);$$

$$f11 := -2$$

$$f22 := -4$$

$$f12 := 1$$

(6)

$$\text{Curvature} := \text{simplify}\left(\frac{(2 \cdot f1 \cdot f2 \cdot f12 - f1 \cdot f1 \cdot f22 - f2 \cdot f2 \cdot f11)}{f2 \cdot f2 \cdot f2}\right);$$

$$\text{Curvature} := \frac{14 x1^2 + (-14 x2 - 140) x1 + 28 x2^2 - 280 x2 + 1600}{(x1 - 4 x2 + 20)^3} \quad (7)$$

$$\text{eval}(\text{Curvature}, [x1 = 15, x2 = 5]);$$

$$\frac{4}{15} \quad (8)$$