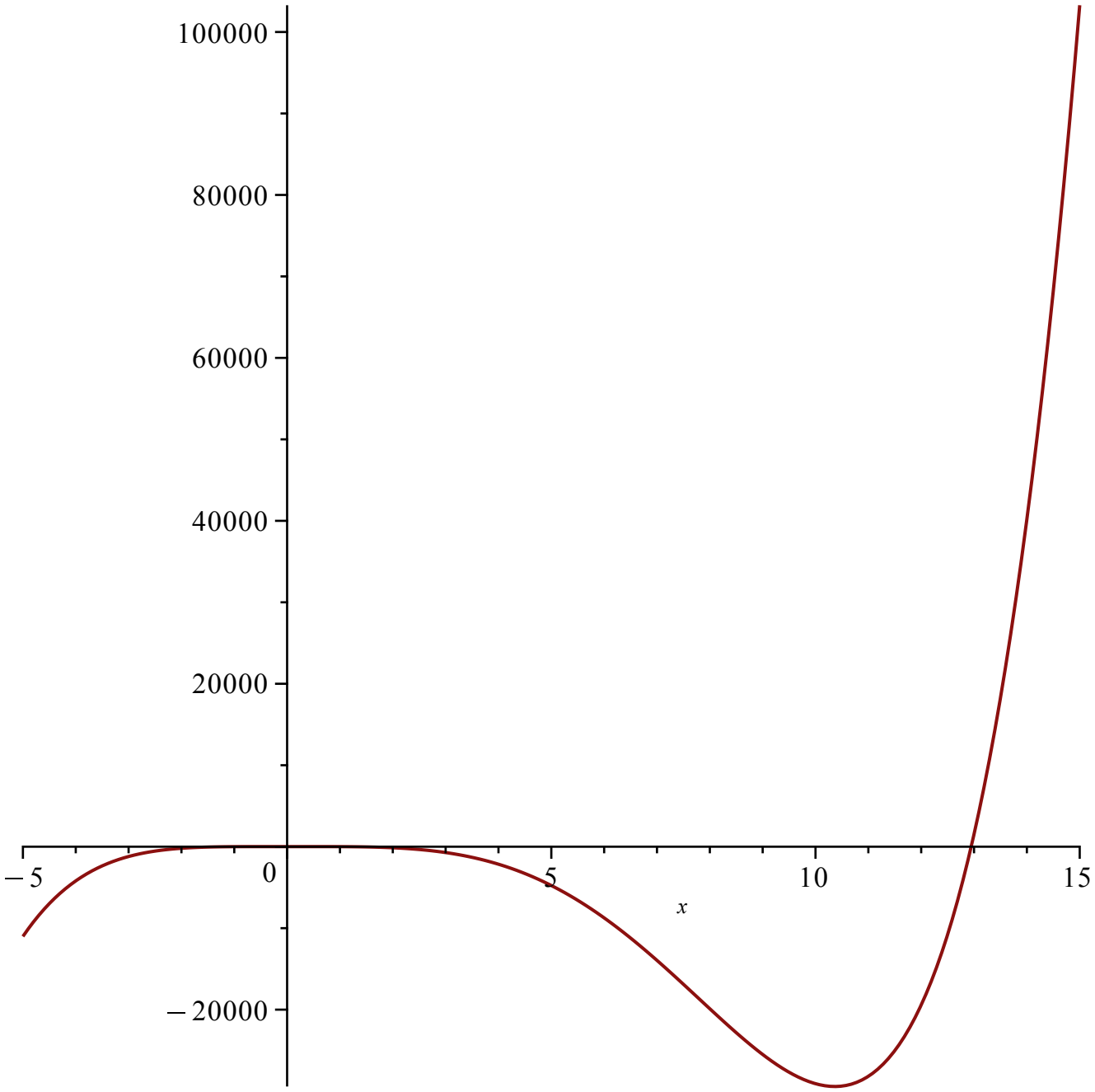
Sara Abdorab

HomeWork #2:

Problem 1:

$$plot\left(x^5 - 13 \cdot x^4 + 9 \cdot x^2 + 11, x = -5..15\right)$$



Problem 2:

$$f := x \mapsto x^5 - 13 \cdot x^4 + 9 \cdot x^2 + 11$$

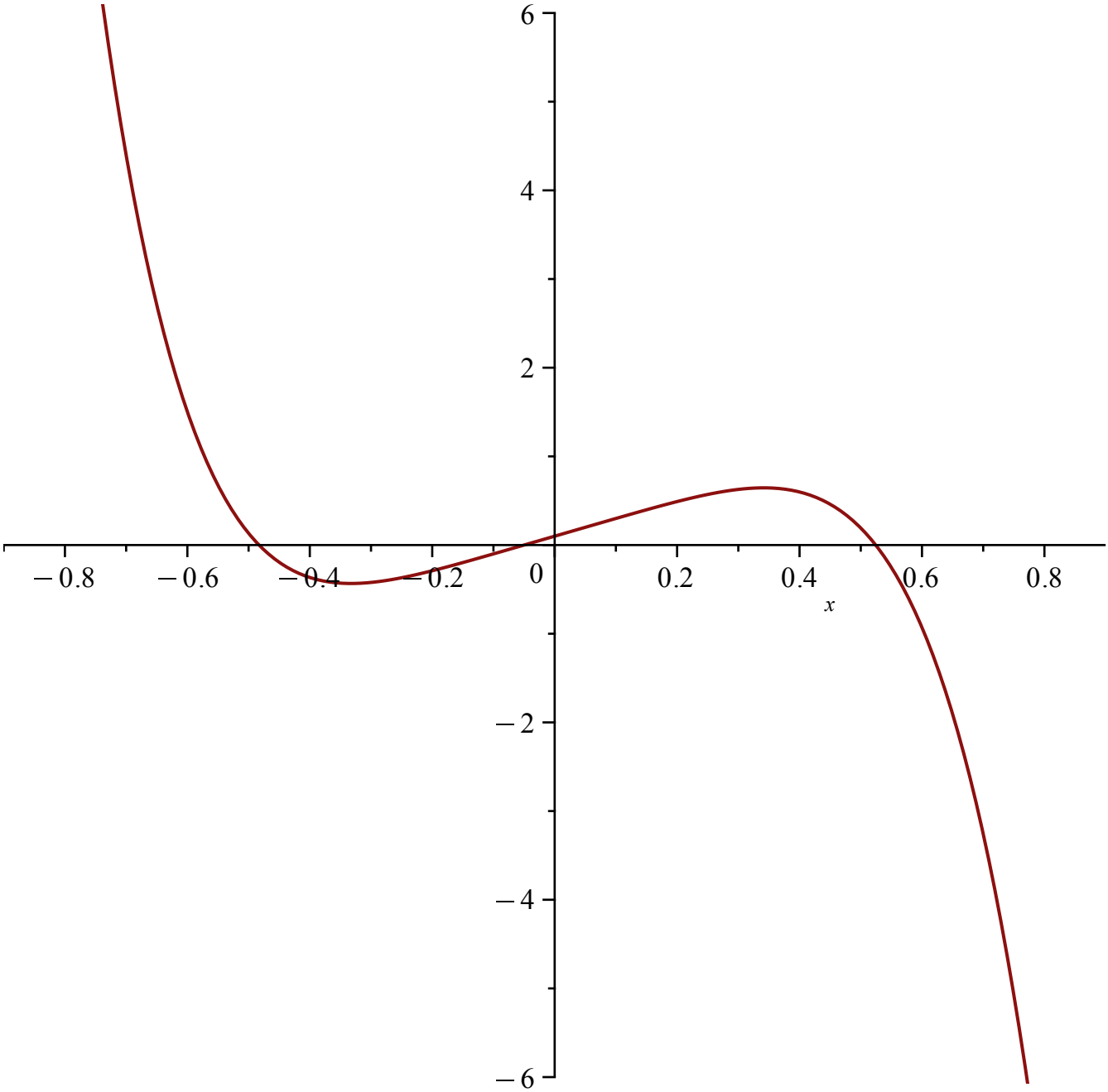
$$f := x \mapsto x^5 - 13 \cdot x^4 + 9 \cdot x^2 + 11 \quad \textbf{(1)}$$

$$fsolve(f(x) = 0)$$

$$-1.121174458,\ 1.191098967,\ 12.94590799 \quad \textbf{(2)}$$

Problem 3:

$$plot\left(-0.2 \cdot x^7 + 4 \cdot x^6 - 31 \cdot x^5 + 2 \cdot x + 0.1\right)$$



Problem 4:

$$g := x \mapsto -0.2 \cdot x^{7} + 4 \cdot x^{6} - 31 \cdot x^{5} + 2 \cdot x + 0.1$$

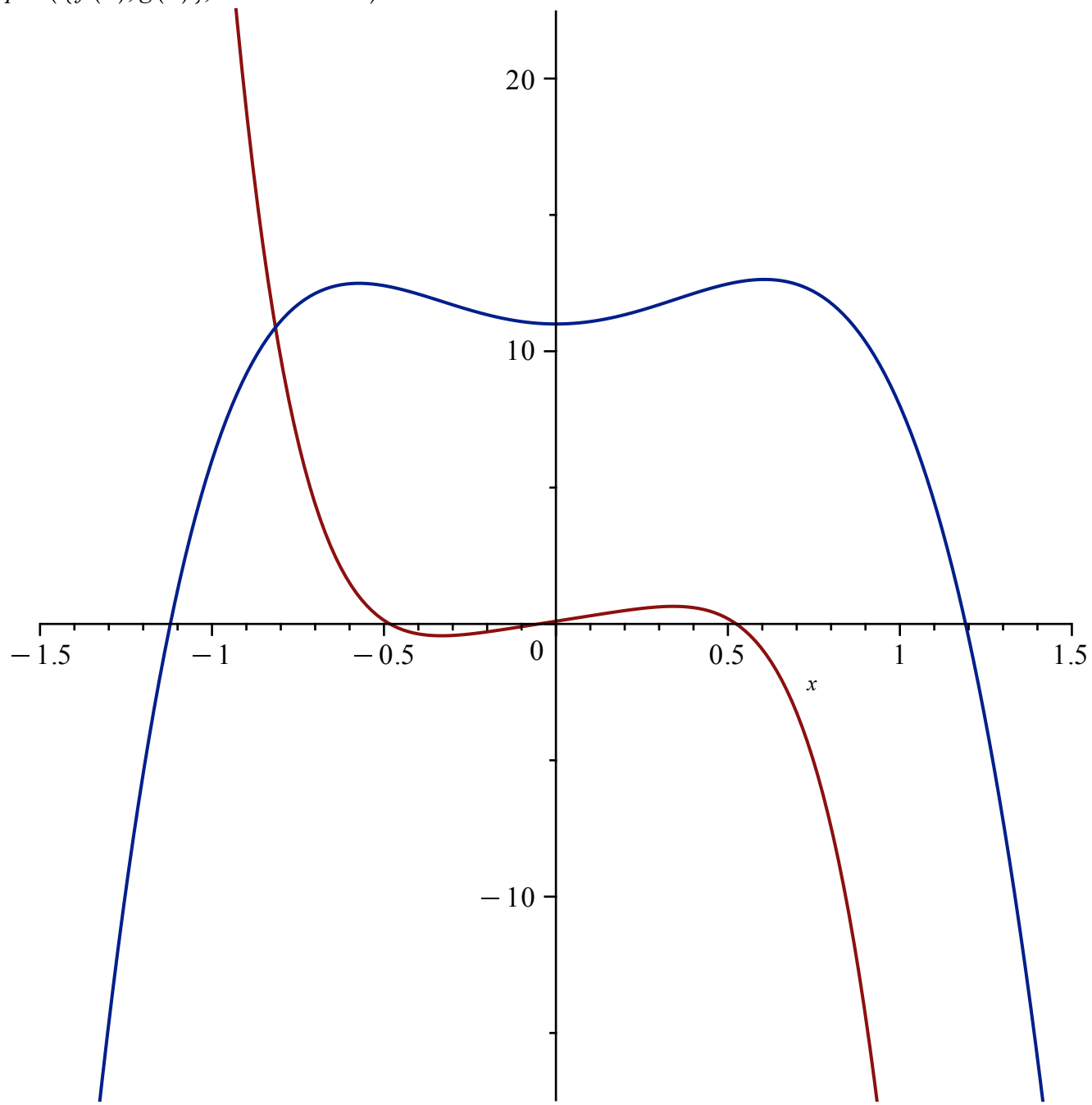
$$g := x \mapsto (-1) \cdot 0.2 \cdot x^{7} + 4 \cdot x^{6} - 31 \cdot x^{5} + 2 \cdot x + 0.1 \quad \textbf{(3)}$$

$$fsolve(g(x) = 0)$$

$$-0.4828729770,\ -0.05000487746,\ 0.5244515241 \quad \textbf{(4)}$$

Problem 5:

$$plot(\{f(x), g(x)\}, x = -1.5..1.5)$$



Problem 6:

$$fsolve(f(x)=g(x))$$

$$-0.8155058614 \quad \textbf{(5)}$$

Problem 7A:

$$Limit\left(\frac{\left(x^7-1\right)}{x^5-1}, x=0\right)=limit\left(\frac{\left(x^7-1\right)}{x^5-1}, x=0\right)$$

$$\lim_{x\to 0}\frac{x^7-1}{x^5-1}=1 \quad \textbf{(6)}$$

Problem 7B:

$$Limit\left(\frac{\left(x^7-1\right)}{x^5-1}, x=1\right)=limit\left(\frac{\left(x^7-1\right)}{x^5-1}, x=1\right)$$

$$\lim_{x\to 1}\frac{x^7-1}{x^5-1}=\frac{7}{5} \quad \textbf{(7)}$$

Problem 7C:

$$Limit\left(\frac{\left(x^7-1\right)}{x^5-1}, x=2\right)=limit\left(\frac{\left(x^7-1\right)}{x^5-1}, x=2\right)$$

$$\lim_{x\to 2}\frac{x^7-1}{x^5-1}=\frac{127}{31} \quad \textbf{(8)}$$

Problem 8A:

$$f:=x\mapsto x^3+\sin(x)$$

$$f:=x\mapsto x^3+\sin(x) \quad \textbf{(9)}$$

$$\xrightarrow{\text{differentiate}}$$

$$x\mapsto 3\cdot x^2+\cos(x) \quad \textbf{(10)}$$

Problem 8B:

$$f := x \mapsto \log \cdot x$$

$$f := x \mapsto \log \cdot x \tag{11}$$

differentiate

$$x \mapsto \log \tag{12}$$

Problem 8C:

$$f := x \mapsto \log(\sin(x))$$

$$f := x \mapsto \log(\sin(x)) \tag{13}$$

differentiate

$$x \mapsto \frac{\cos(x)}{\sin(x)} \tag{14}$$

Problem 8D:

$$f := x \mapsto e^{x}$$

$$f := x \mapsto e^{x} \tag{15}$$

differentiate

$$\exp \tag{16}$$

Problem 8E:

$$f := x \mapsto e^{\sin x}$$

$$f := x \mapsto e^{\sin \cdot x} \tag{17}$$

differentiate

$$x \mapsto \sin \cdot e^{\sin \cdot x} \tag{18}$$

Problem 8F:

$$f := x \mapsto e^{e^{x}}$$

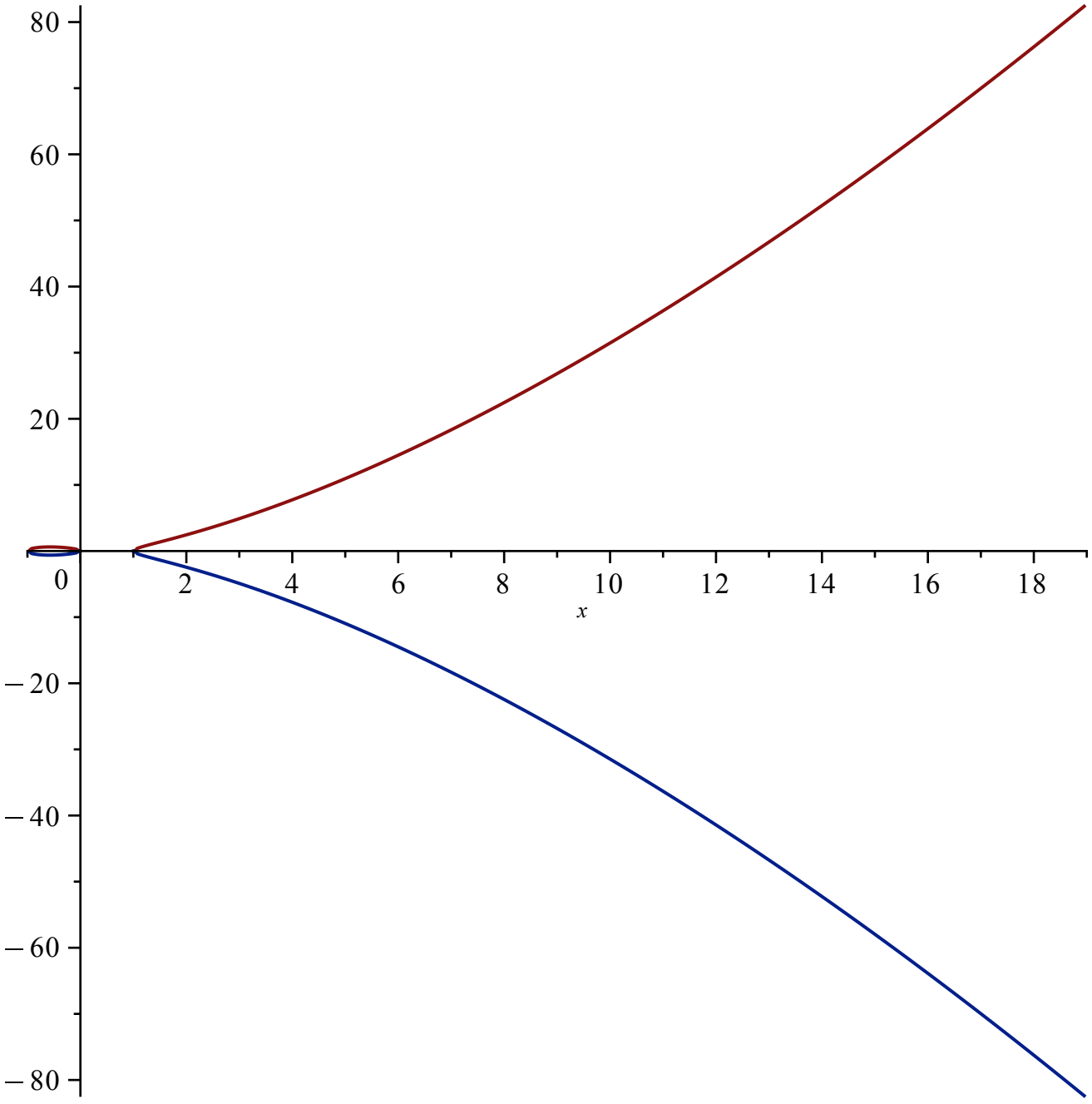
$$f := x \mapsto e^{e^{x}} \tag{19}$$

differentiate

$$x \mapsto e^{x} \cdot e^{e^{x}} \tag{20}$$

Problem 9:

$plot(\{\text{sqrt}(x^3 - x), -\text{sqrt}(x^3 - x)\})$



Problem 10:

for n **from** 1 **to** 20 **do** $n, fsolve\left(x^3 - x - n = 0\right)$; **end do**;

1, 1.324717957

2, 1.521379707

3, 1.671699882

4, 1.796321903

5, 1.904160859

6, 2.

7, 2.086745340

8, 2.166312747

9, 2.240040987

10, 2.308907320

11, 2.373649822

12, 2.434841368

13, 2.492936686

14, 2.548303552

15, 2.601244187

16, 2.652010358

17, 2.700814309

18, 2.747836837

19, 2.793233379

20, 2.837138669 **(21)**

Problem 11:

for *n* **from** 1 **to** 20 **do** *n*, *evalf*; **end do**;

1, *evalf*

2, *evalf*

3, *evalf*

4, *evalf*

5, *evalf*

6, *evalf*

7, *evalf*

8, *evalf*

9, *evalf*

10, *evalf*

11, *evalf*

12, *evalf*

13, *evalf*

14, *evalf*

15, *evalf*

16, *evalf*

17, *evalf*

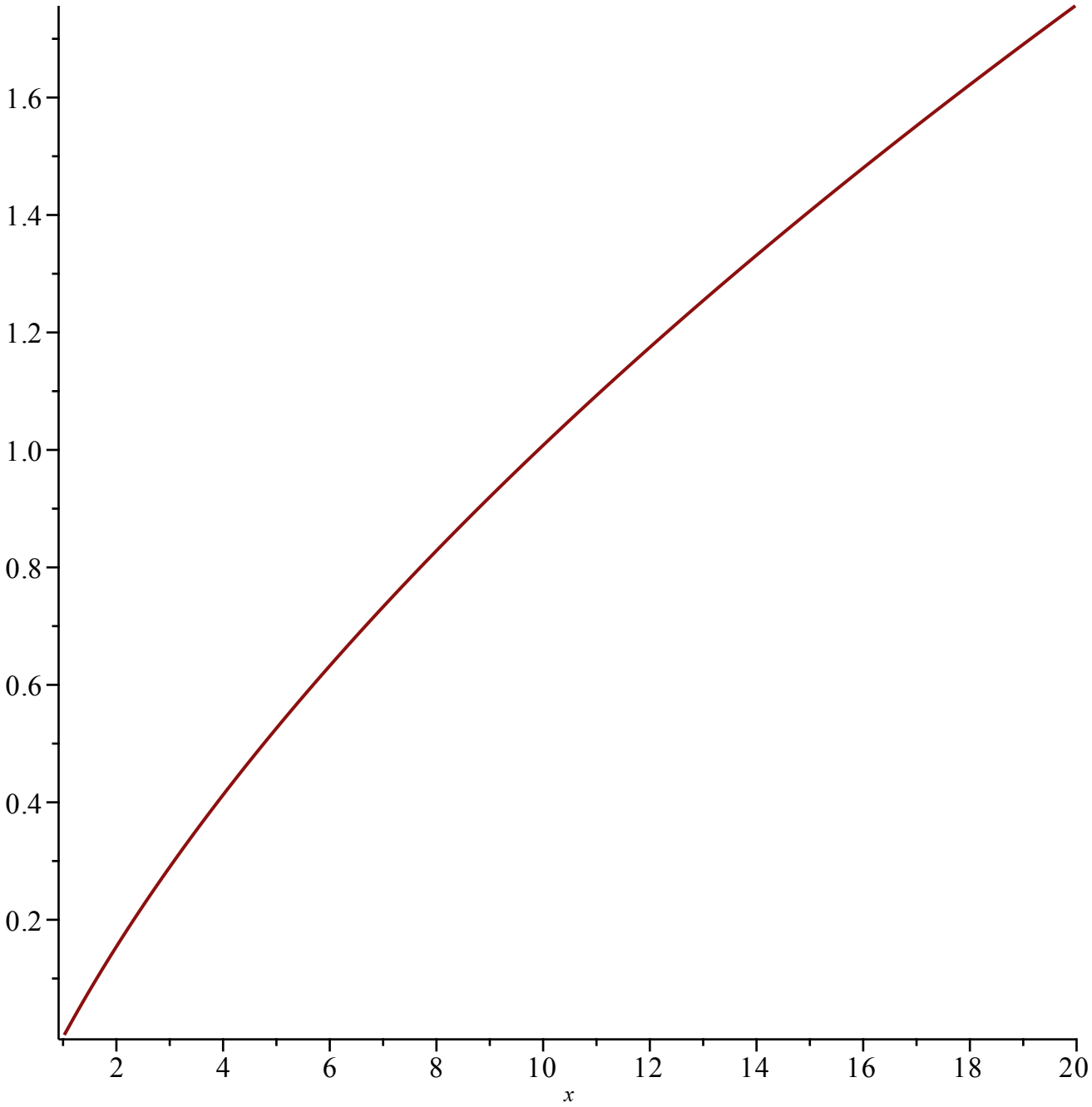
18, *evalf*

19, *evalf*

20, *evalf* **(22)**

Problem 12:

$$plot\left(x^{\frac{1}{2}} - x^{\frac{1}{3}}, x = 1..20\right)$$


1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
2
4
6
8
10
12
14
16
18
20
x