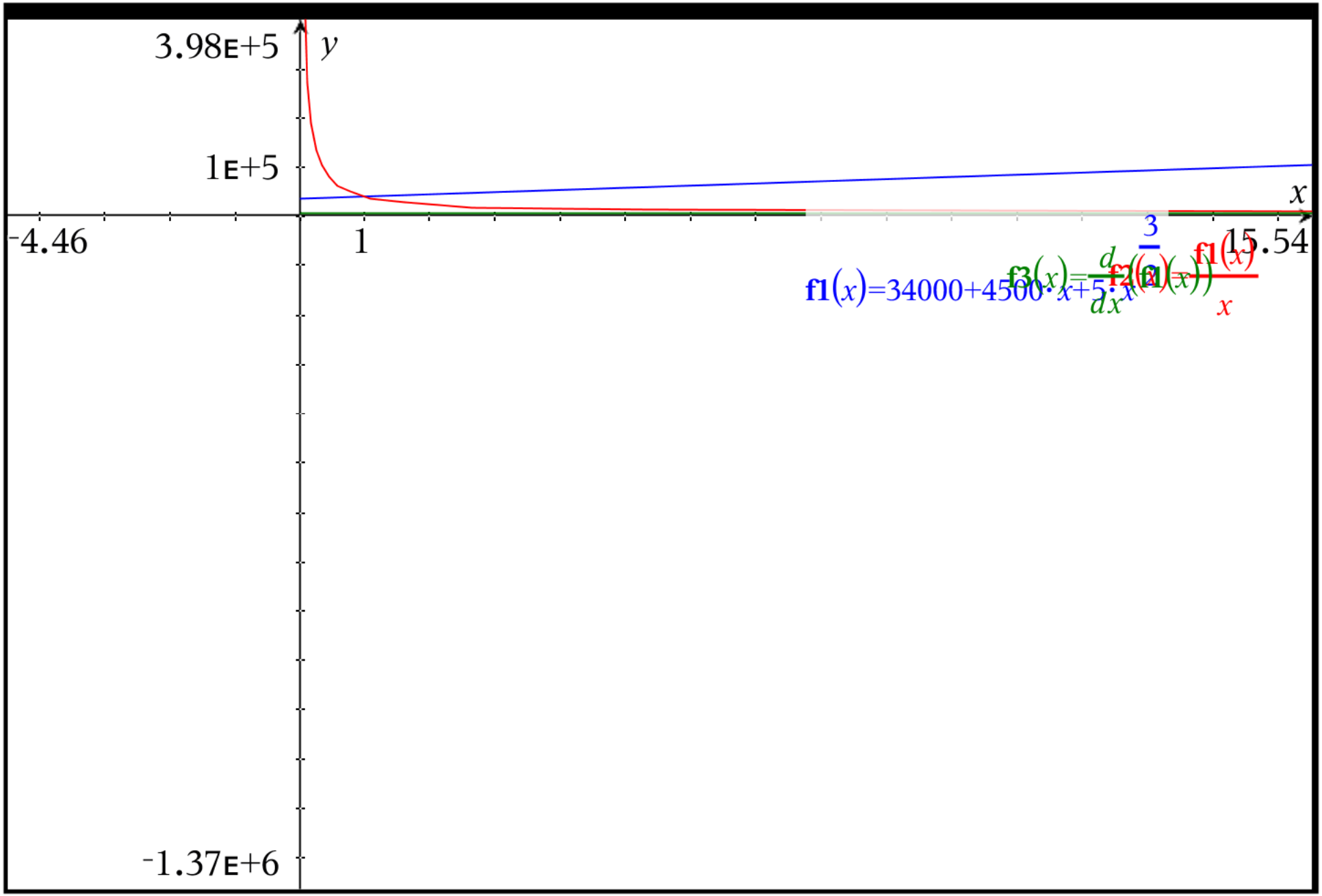

3.98E+5
y
1E+5
x
-4.46
1
15.54
f1(x)=34000+4500·x+5·x^3
f3(x)=d/dx(f2(f1(x)))/x
-1.37E+6

1) $\mathbf{f1}(x) \blacktriangleright 5\cdot x^{\frac{3}{2}}+4500\cdot x+34000$

$\mathbf{f1}(2000.) \blacktriangleright 9481213.5955$

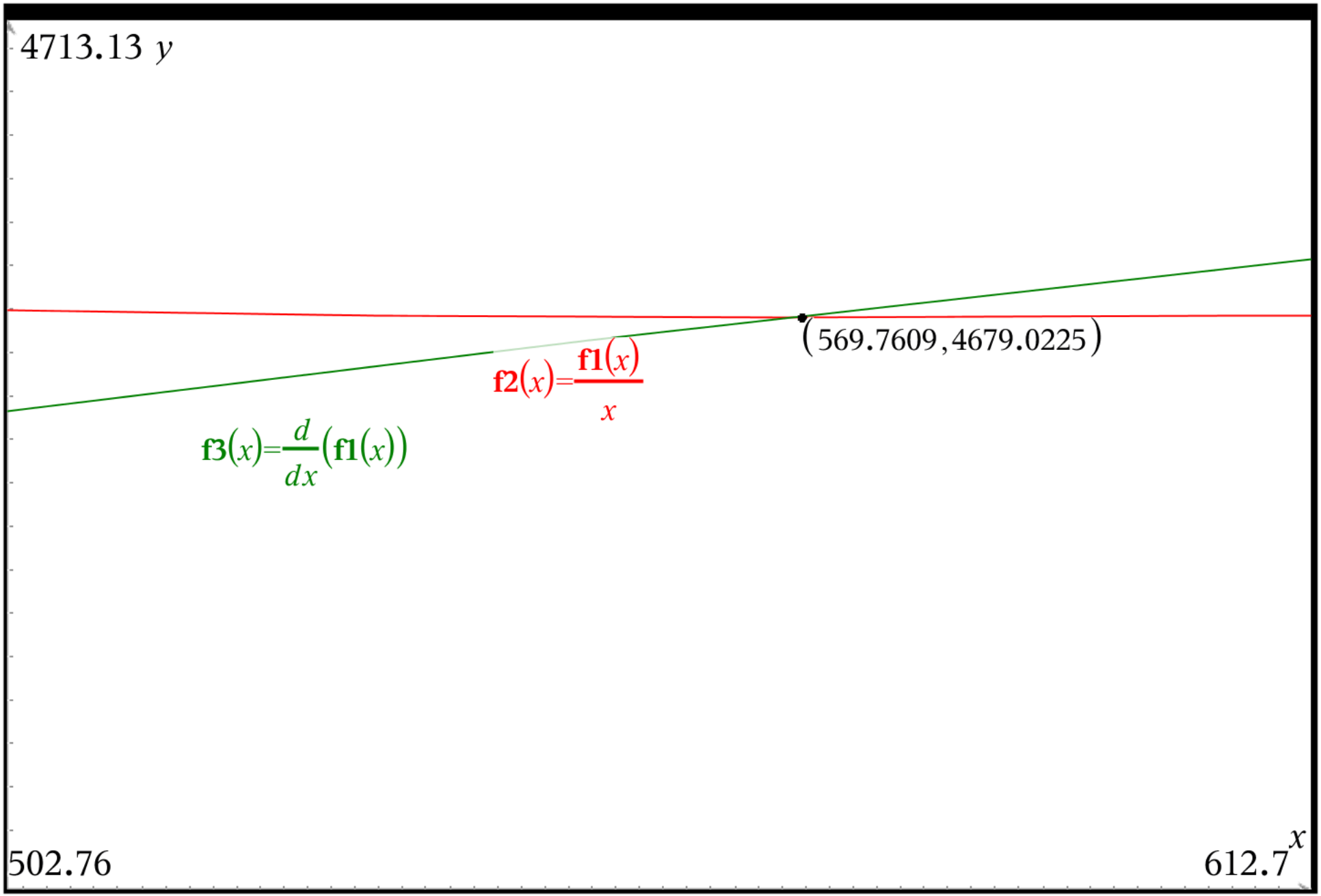
2) $\mathbf{f2}(x) \blacktriangleright \frac{5\cdot\left(x^{\frac{3}{2}}+900\cdot x+6800\right)}{x}$

$\mathbf{f2}(2000.) \blacktriangleright 4740.60679775$

3) $\mathbf{f3}(x) \blacktriangleright \frac{15\cdot\sqrt{x}}{2}+4500$

$\mathbf{f3}(2000.) \blacktriangleright 4835.41019663$

4) $1.\cdot\text{solve}\left(\mathbf{f2}(x)=\mathbf{f3}(x),x\right) \blacktriangleright x=569.760851765$


4713.13 y
(569.7609,4679.0225)
f2(x)=f1(x)/x
f3(x)=d/dx(f1(x))
502.76
612.7 x

$R(x) = 240 \cdot \sqrt{x}$ $C(x) = 9 \cdot x^2 + 12 \cdot x$ $P(x) = -9 \cdot x^2 - 12 \cdot x + 240 \cdot \sqrt{x}$

5a) marginal cost function $= \frac{dC}{dx} = C'(x) = 18 \cdot x + 12$

5b) average cost function $= \frac{C(x)}{x} = A(x) = 9 \cdot x + 12$

5c) marginal revenue function $= \frac{dR}{dx} = R'(x) = \text{expand}(\mathbf{f6}(x)) \blacktriangleright \frac{120}{\sqrt{x}}$

5d) marginal profit function $= \frac{dP}{dx} = P'(x) = -18 \cdot x + \frac{120}{\sqrt{x}} - 12$

R(x) $= 240 \cdot \sqrt{x}$ C(x) $= 9 \cdot x^2 + 12 \cdot x$ P(x) $= -9 \cdot x^2 - 12 \cdot x + 240 \cdot \sqrt{x}$

6a) average cost function of producing 4000 means x = 8 because $\frac{4000}{500} \blacktriangleright 8$

average cost function $= \frac{C(8)}{8} =$ A (8) $= 84$ C(8) $= 672$ $A(8) = \frac{672}{8} \blacktriangleright 84$

6b) marginal cost of producing 4000 means x = 8 because $\frac{4000}{500} \blacktriangleright 8$

$\frac{dC}{dx} =$ C' (8) $= 156$

6c) marginal revenue function of producing 4000 means x = 8 because $\frac{4000}{500} \blacktriangleright 8$

$\frac{dR}{dx} =$ R' (8) $= 30 \cdot \sqrt{2} = 42.4264068712$

R(x) $=240\cdot\sqrt{x}$ C(x) $= 9\cdot x^2+12\cdot x$ P(x) $= -9\cdot x^2-12\cdot x+240\cdot\sqrt{x}$

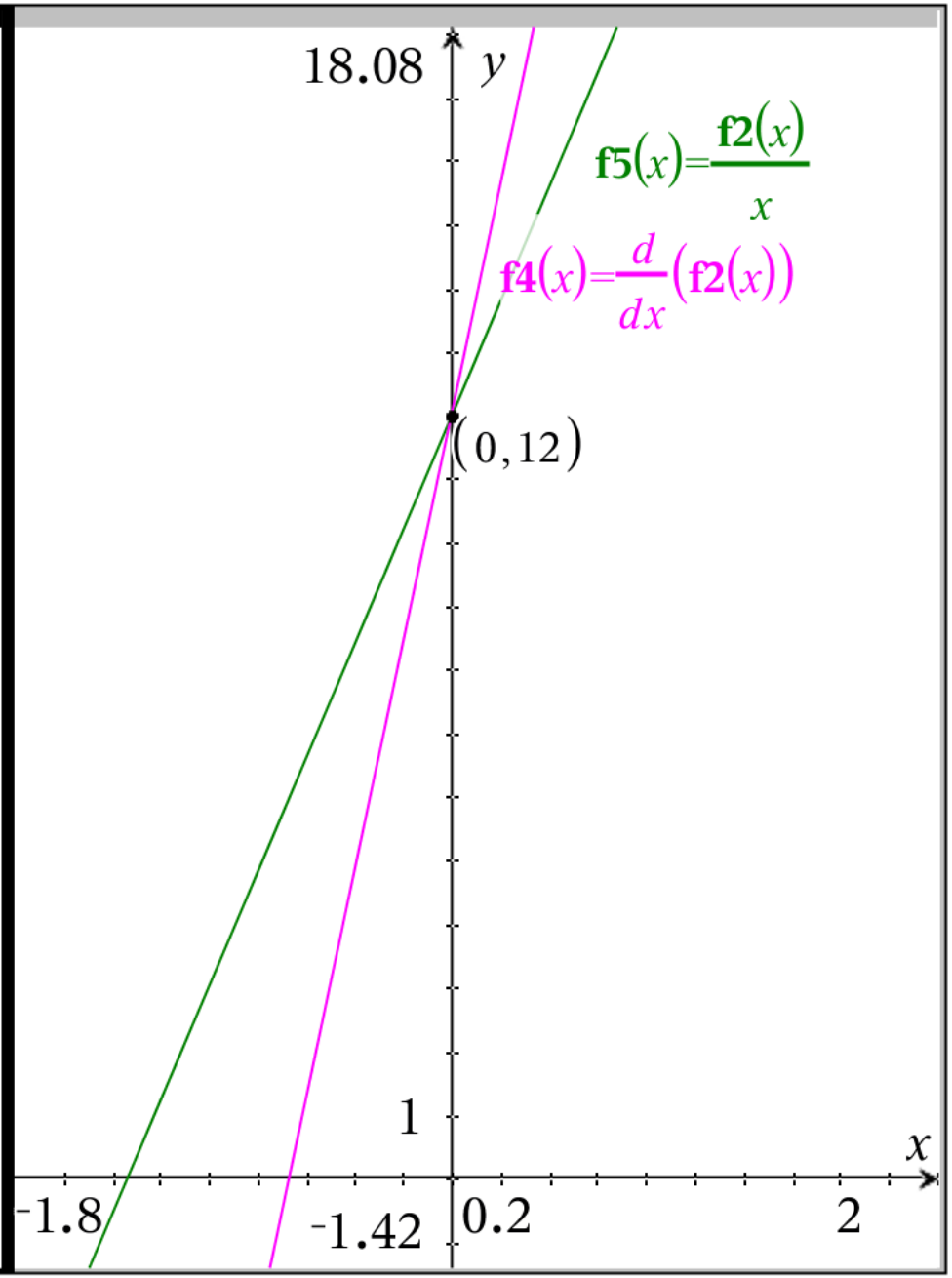
6d) Set average cost function =marginal cost

marginal cost function $=\frac{dC}{dx}=$

C' (x) $= 18\cdot x+12$

average cost function $=\frac{C(x)}{x}=$

A (x) $= 9\cdot x+12$



R(x) $=240\cdot\sqrt{x}$ C(x) $= 9\cdot x^2+12\cdot x$

P(x) $=-9\cdot x^2-12\cdot x+240\cdot\sqrt{x}$

6e)

Set marginal revenue function =marginal cost

marginal cost function

$\frac{dC}{dx}$ = C' (x) $= 18\cdot x+12$

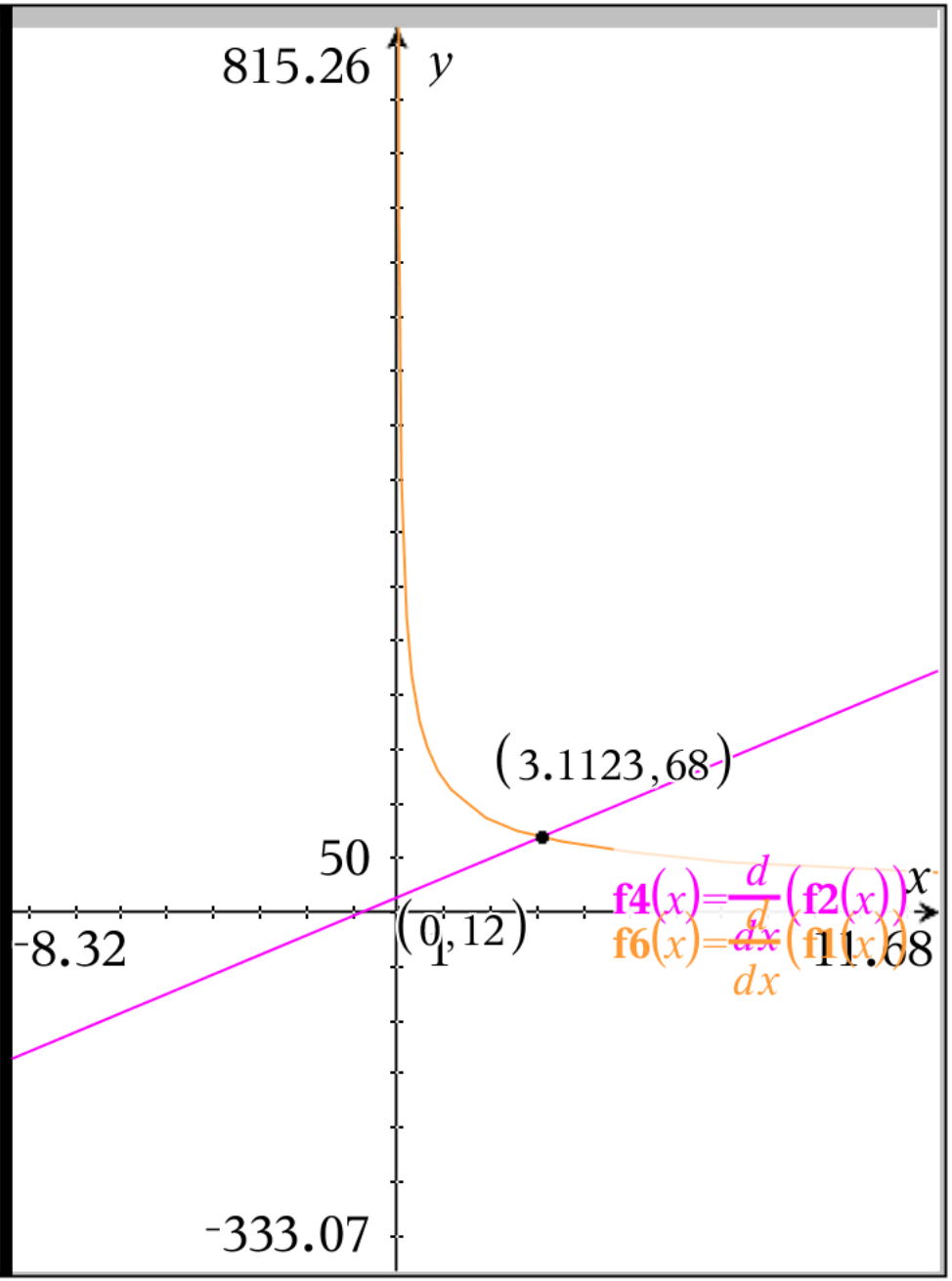
marginal revenue function

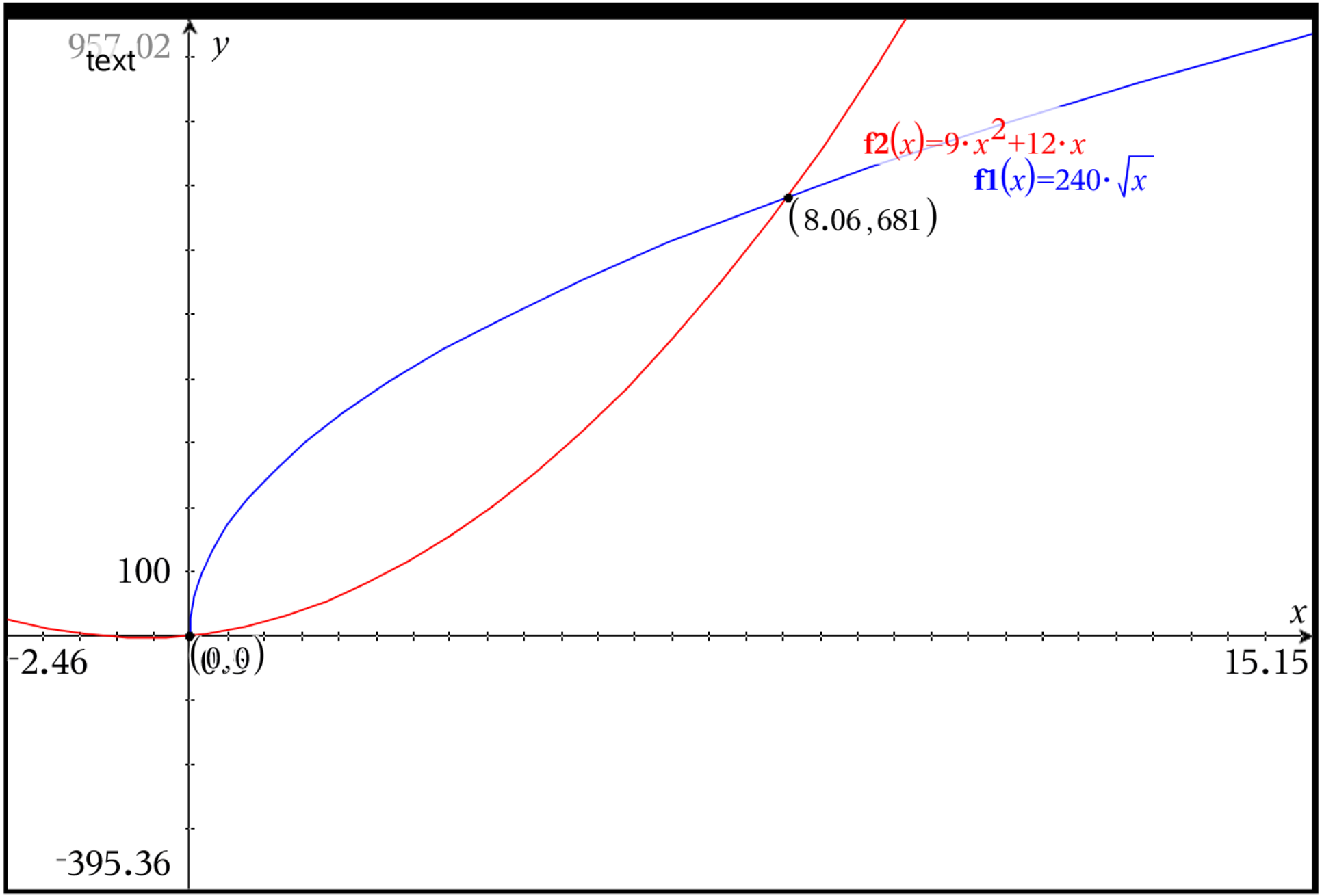
$\frac{dR}{dx}$ = R' (x) $= \frac{120}{\sqrt{x}}$

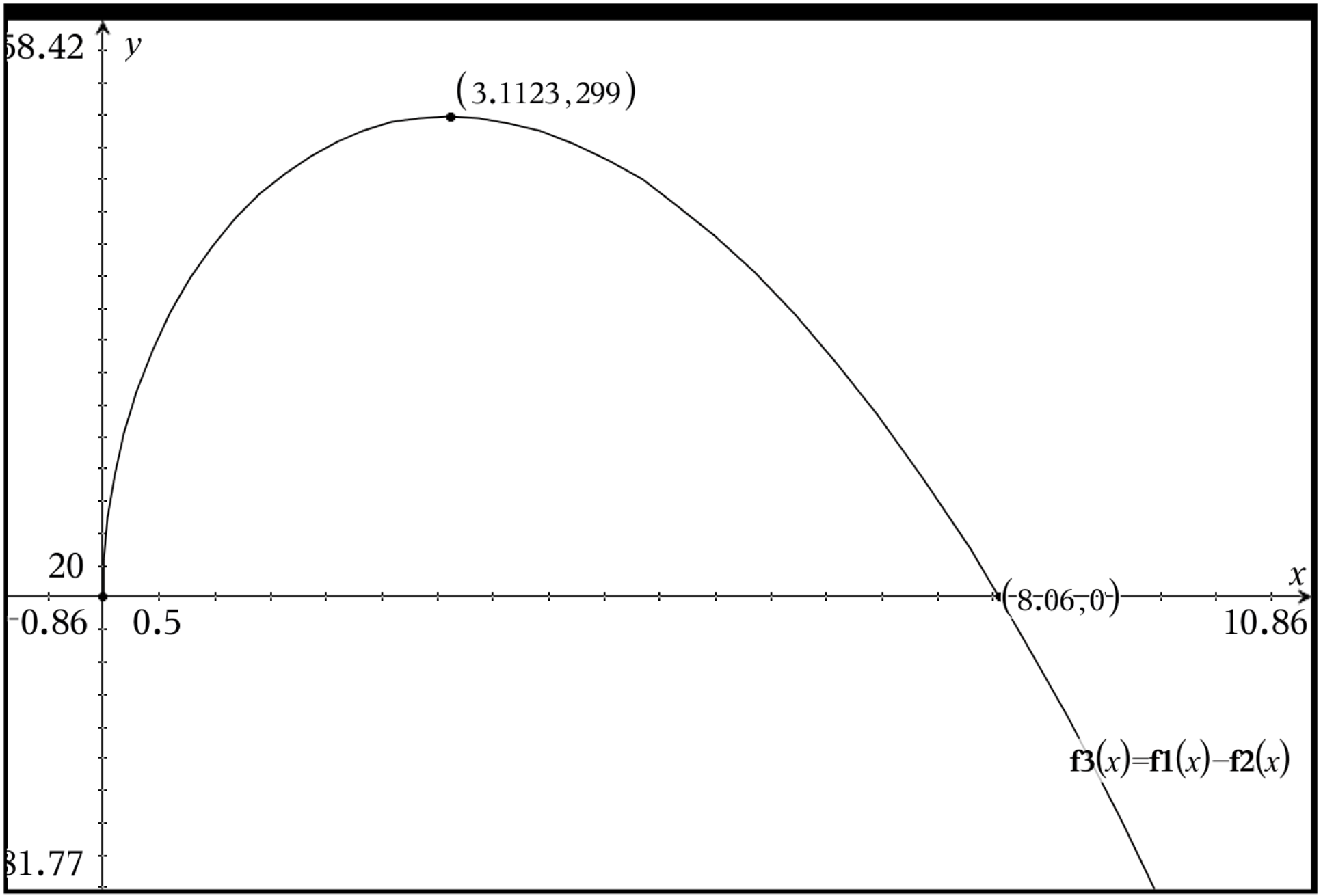
This model will maximize profit at

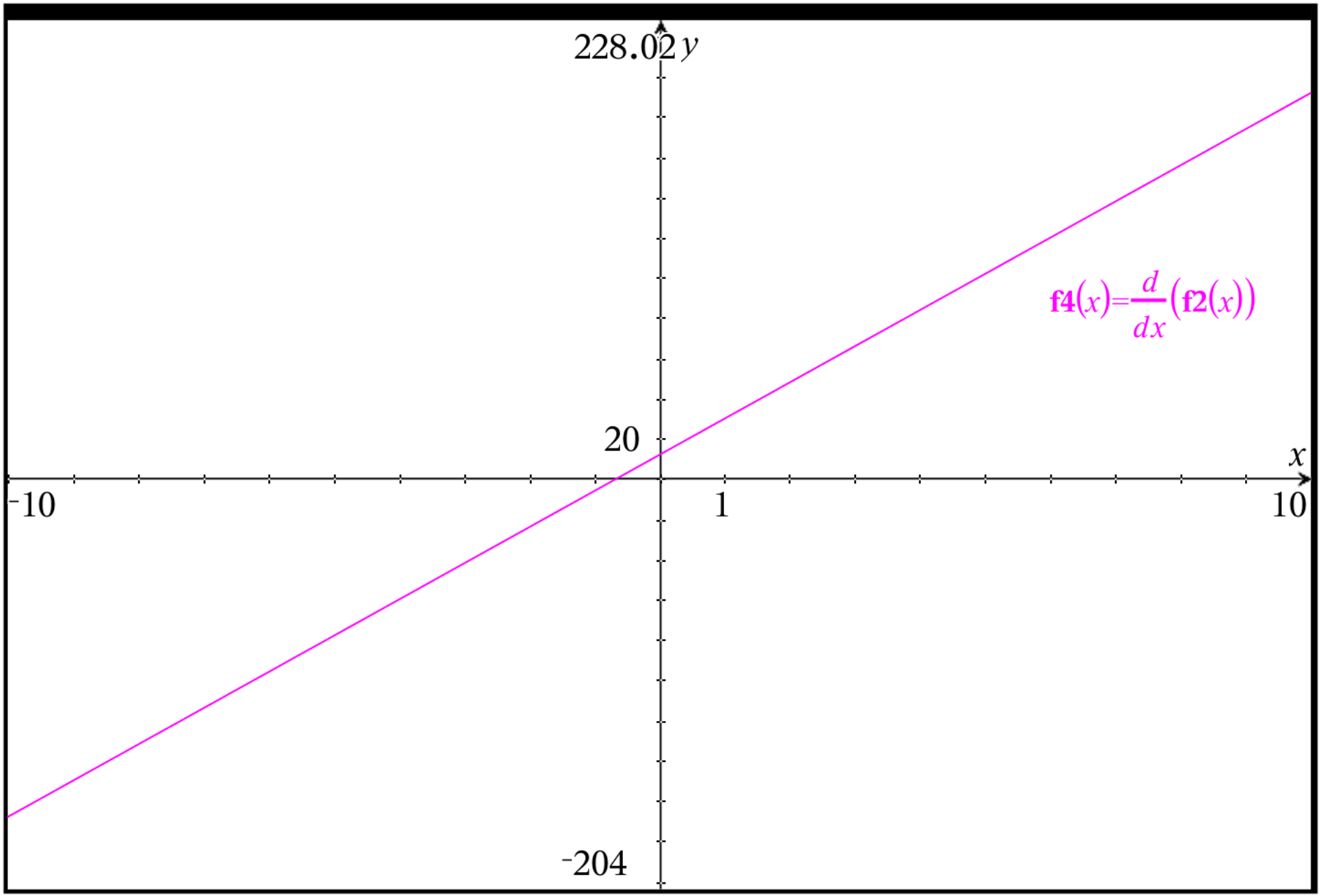
x = 3.1123 or $3.1123\cdot 500$ ▸ 1556.15

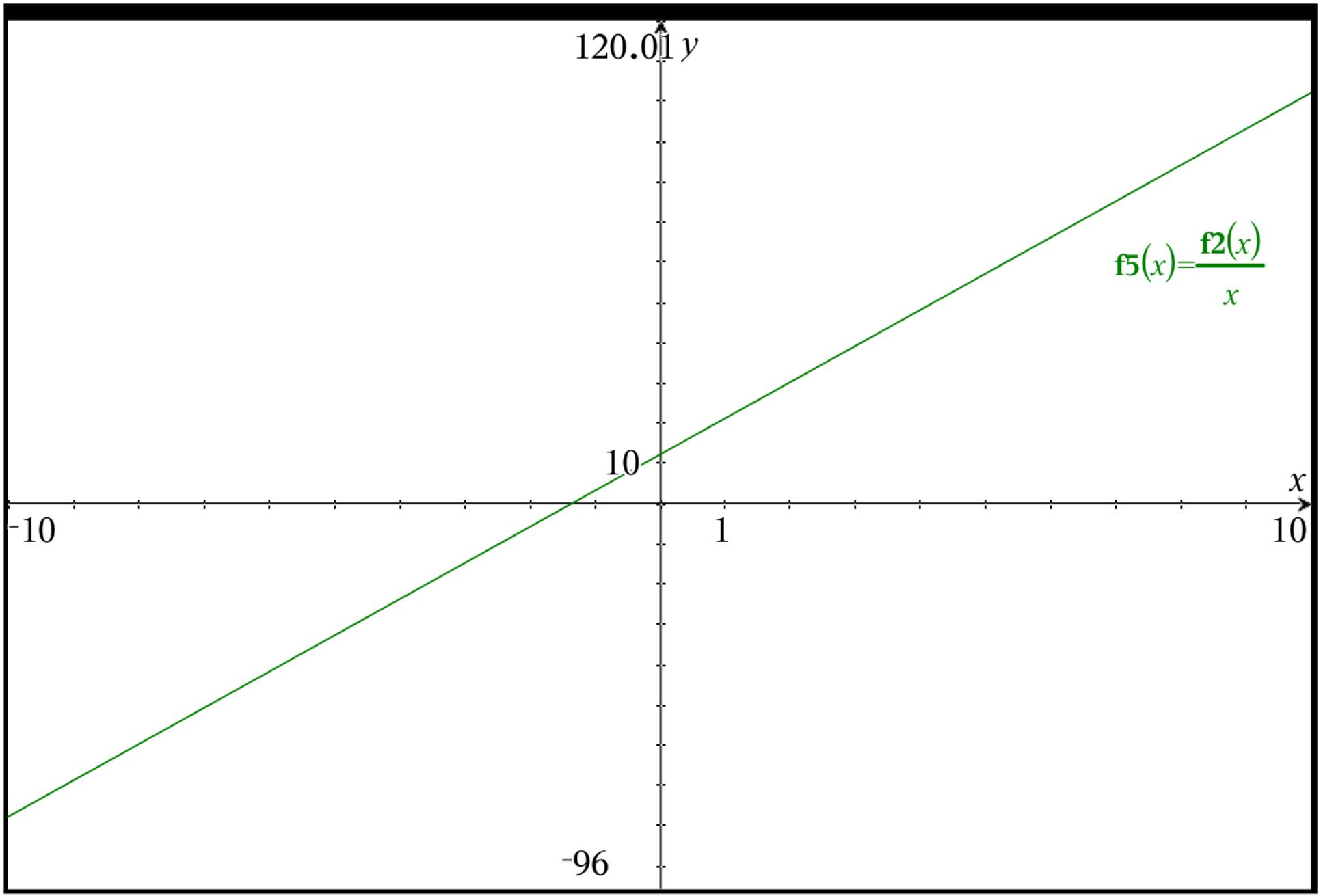
approximately 1556 units

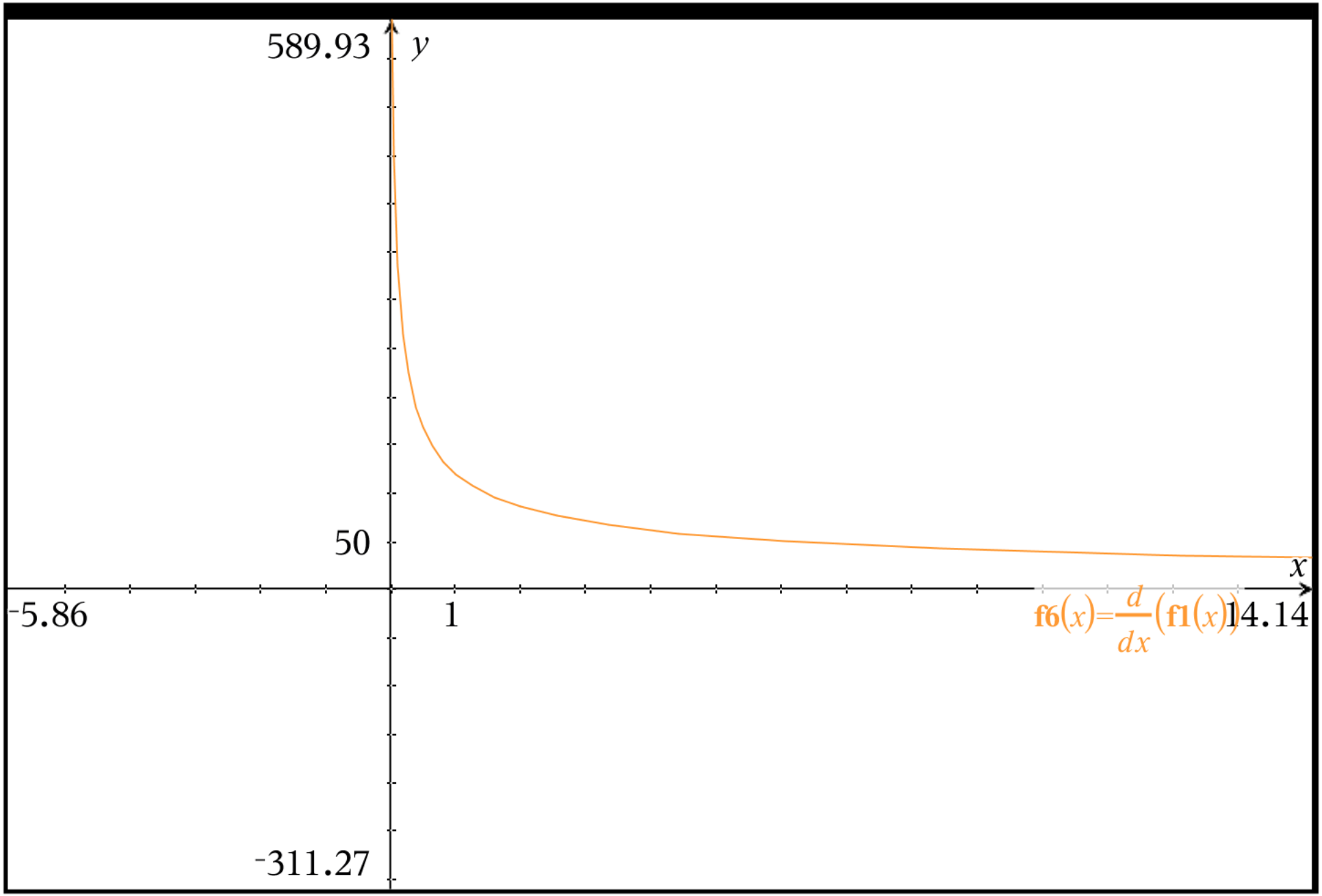


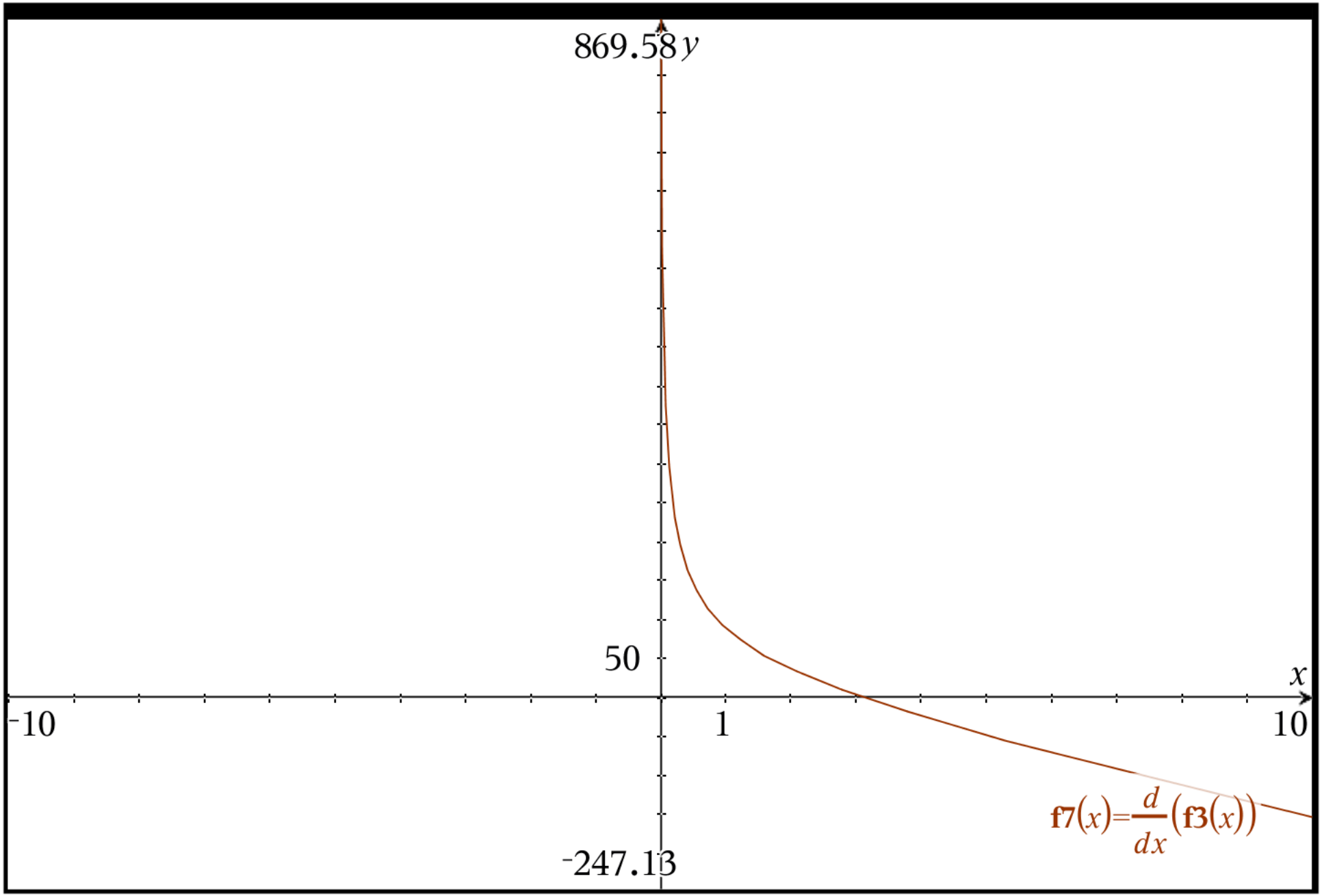

957.02
text
y
f2(x)=9·x^2+12·x
f1(x)=240·√x
(8.06,681)
100
x
-2.46
(0,0)
15.15
-395.36


58.42
y
(3.1123, 299)
20
x
-0.86
0.5
(-8.06, 0)
10.86
f3(x)=f1(x)−f2(x)
31.77


228.02 y
f4(x)=d/dx(f2(x))
20
x
-10
1
10
-204


120.01 y
f5(x)=f2(x)/x
10
x
-10
1
10
-96


589.93
y
50
x
-5.86
1
14.14
f6(x)=d/dx(f1(x))
-311.27


869.58 y
50
x
-10
1
10
-247.13
f7(x)=d/dx(f3(x))