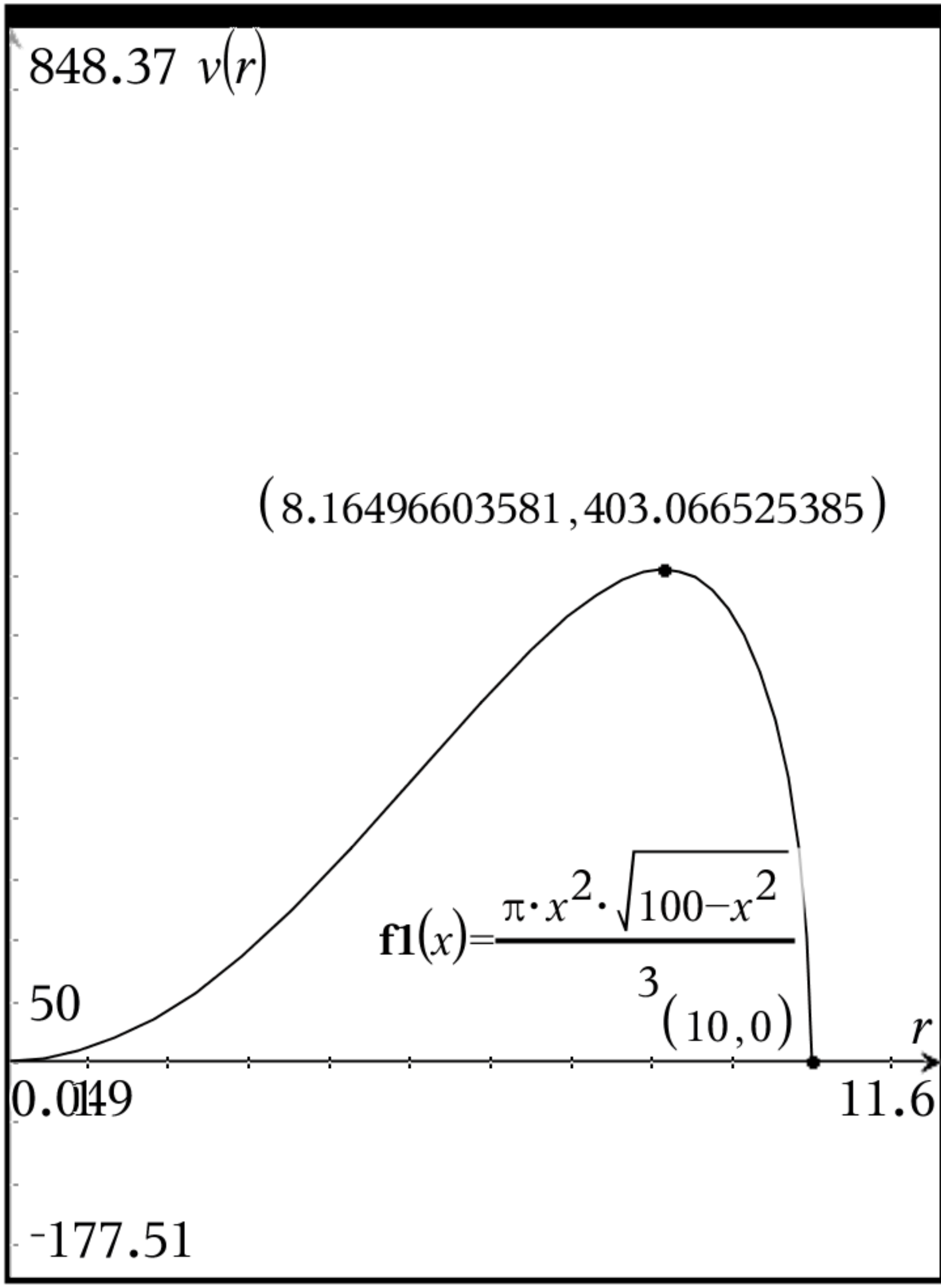
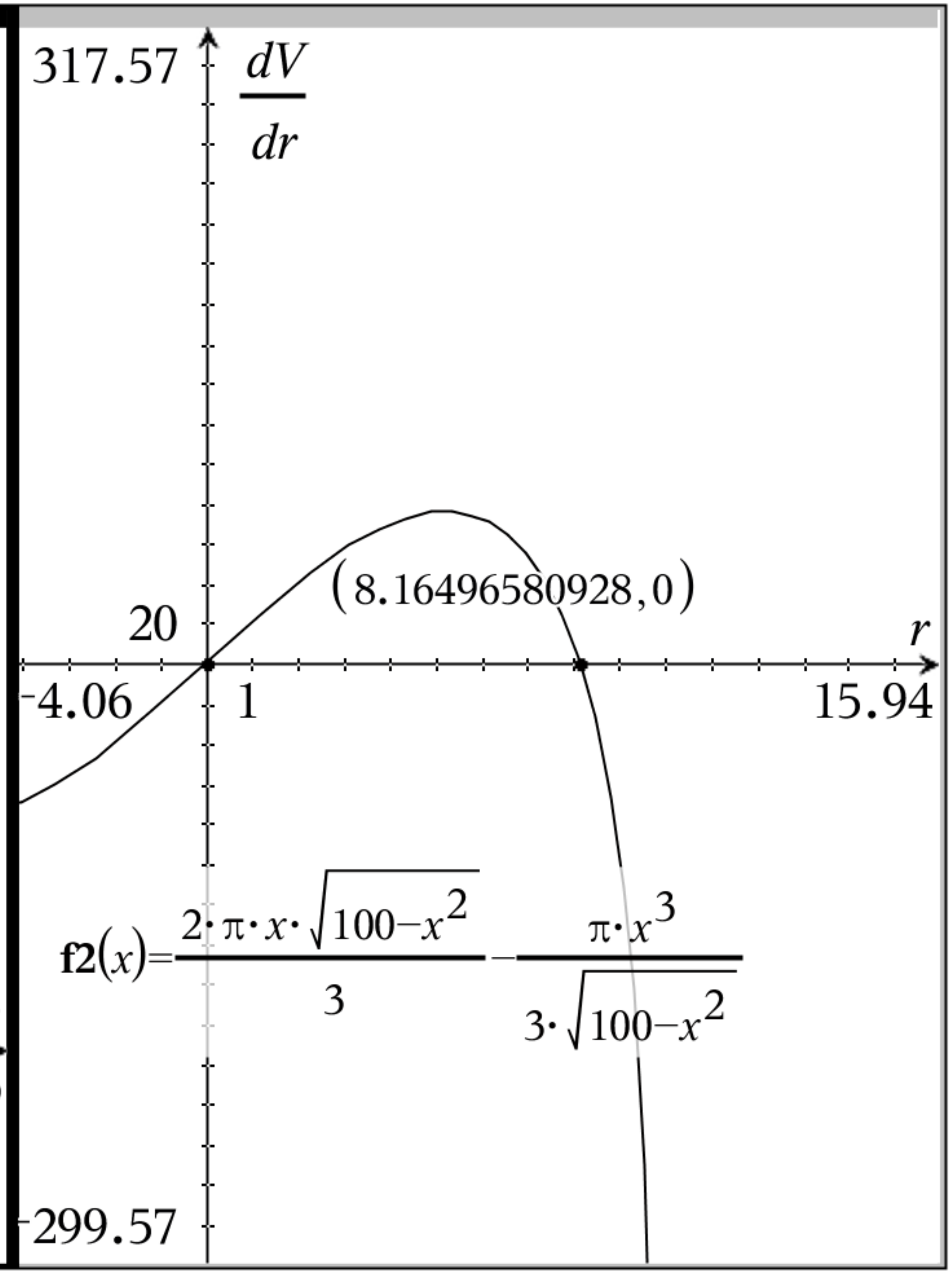

848.37 v(r)
(8.16496603581,403.066525385)
f1(x)=π·x²·√(100−x²)/3
50
(10,0)
r
0.0149
11.6
-177.51


317.57
dV/dr
(8.16496580928,0)
20
r
-4.06
1
15.94
f2(x)=2·π·x·√(100−x²)/3 − π·x³/(3·√(100−x²))
-299.57

$f1(x):=\frac{\pi\cdot x^2\cdot\sqrt{100-x^2}}{3}$	*Done*
$\frac{d}{dx}(f1(x))$	$\frac{2\cdot\pi\cdot x\cdot\sqrt{100-x^2}}{3}-\frac{\pi\cdot x^3}{3\cdot\sqrt{100-x^2}}$
$f2(x):=\frac{2\cdot\pi\cdot x\cdot\sqrt{100-x^2}}{3}-\frac{\pi\cdot x^3}{3\cdot\sqrt{100-x^2}}$	*Done*
$\text{solve}(f2(x)=0,x)$	$x=\frac{^{-}10\cdot\sqrt{6}}{3}$ or $x=0$ or $x=\frac{10\cdot\sqrt{6}}{3}$
$\text{solve}(f2(x)=0.,x)$	$x=^{-}8.16497$ or $x=0.$ or $x=8.16497$
$f1(8.165)$	403.067
$f5(x):=\sqrt{100-x^2}$	*Done*

$V(r) = \frac{\pi \cdot r^2 \cdot \sqrt{100-r^2}}{3}$

Feasible Domain of r: $0 \le r \le 10$

$$\frac{dV}{dr} = \frac{2\cdot \pi \cdot r \cdot \sqrt{100-r^2}}{3} - \frac{\pi \cdot r^3}{3\cdot \sqrt{100-r^2}}$$

If V(r) has a maximum over its feasible domain then it occurs at one of the following:

V(0), V(10) these are valies of volume at the extremes

Or at the solutions of $\frac{dV}{dr} = 0$

$V(0) = 0$

$V(10) = 0$

or at $r = \sqrt{\frac{200}{3}} = \frac{10\cdot \sqrt{6}}{3} = 8.16497$

$V\left(\sqrt{\frac{200}{3}}\right) = \frac{2000\cdot \pi \cdot \sqrt{3}}{27} = 403.067$

Volume formula in terms of radius V(r) $=\frac{\pi\cdot r^2\cdot\sqrt{100-r^2}}{3}$

Feasible Domain of r: $0 \le r \le 10$

$$\frac{dV}{dr}=\frac{2\cdot\pi\cdot r\cdot\sqrt{100-r^2}}{3}-\frac{\pi\cdot r^3}{3\cdot\sqrt{100-r^2}}$$

The maximum volume for this scenario occurs at r = $\sqrt{\frac{200}{3.}} \approx 8.16497$

The height the maximizes the volume is h = $\sqrt{\frac{100}{3}}=\frac{10\cdot\sqrt{3}}{3}\approx 5.7735$

The maximum volume is V($\sqrt{\frac{200}{3}}$) = $\frac{2000\cdot\pi\cdot\sqrt{3}}{27}=403.067$

$f3(x):=\frac{\pi}{3}\cdot\left(100-x^2\right)\cdot x$	*Done*
$\frac{d}{dx}\left(f3(x)\right)$	$\frac{^-\pi\cdot\left(3\cdot x^2-100\right)}{3}$
$\text{expand}\left(f3(x)\right)$	$\frac{100\cdot\pi\cdot x}{3}-\frac{\pi\cdot x^3}{3}$
$f4(x):=\frac{d}{dx}\left(f3(x)\right)$	*Done*
$\text{expand}\left(f4(x)\right)$	$\frac{100\cdot\pi}{3}-\pi\cdot x^2$
$\text{solve}\left(f4(x)=0,x\right)$	$x=\frac{^-10\cdot\sqrt{3}}{3}$ or $x=\frac{10\cdot\sqrt{3}}{3}$
$\sqrt{\frac{100}{3}}$	$\frac{10\cdot\sqrt{3}}{3}$

Volume formula in terms of radius V(h) $=\frac{100\cdot h\cdot\pi}{3}-\frac{h^3\cdot\pi}{3}$

Feasible Domain of h: $0 \le h \le 10$

$\frac{dV}{dh}=\frac{100\cdot\pi}{3}-h^2\cdot\pi$

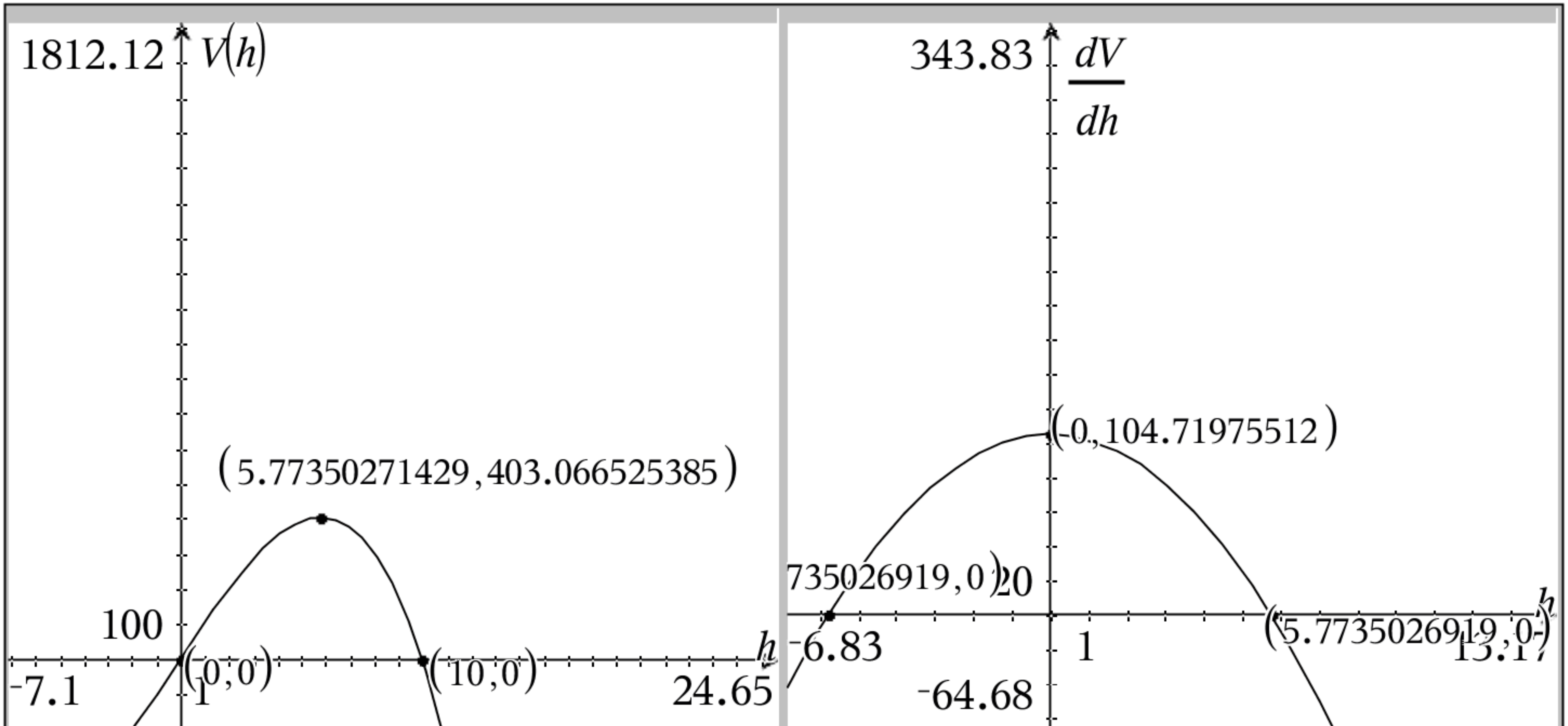
The maximum volume for this scenario occurs at h = $\sqrt{\frac{100}{3.}} \approx 5.7735$

The radius the maximizes the volume is r = $\frac{10\cdot\sqrt{6}}{3}\approx 8.16497$

The maximum volume is V($\sqrt{\frac{100}{3}}$) = $\frac{2000\cdot\pi\cdot\sqrt{3}}{27}=403.067$

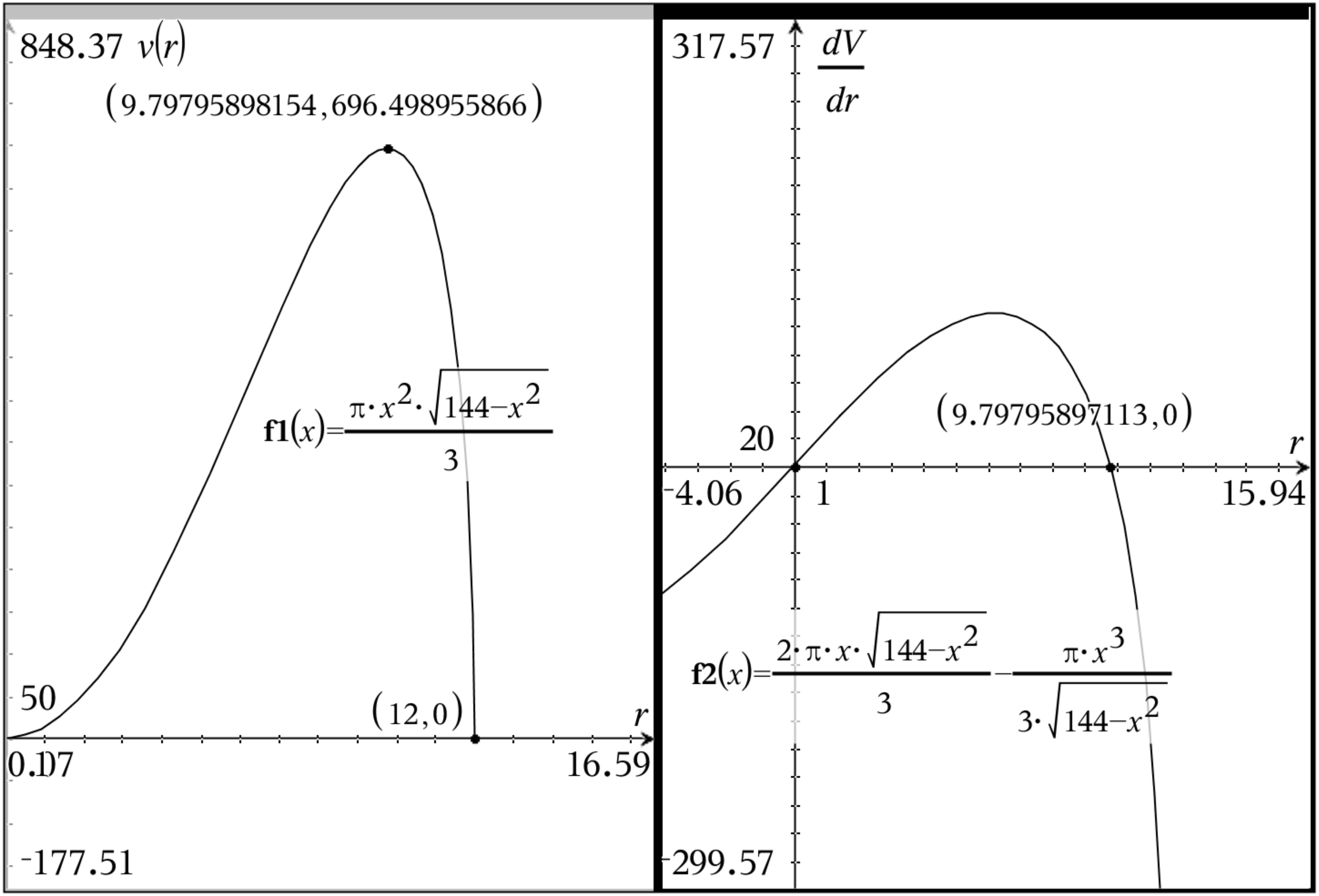
$\frac{dV}{dh}$ at x = 3

$\frac{dV}{dh}=\frac{73\cdot\pi}{3}\approx 76.4454$



Volume formula in terms of radius V(h) $= \frac{100 \cdot h \cdot \pi}{3} - \frac{h^3 \cdot \pi}{3}$

Feasible Domain of h: $0 \le h \le 10$ $\frac{dV}{dh} = \frac{100 \cdot \pi}{3} - h^2 \cdot \pi$


848.37 v(r)
(9.79795898154,696.498955866)
f1(x)=π·x²·√(144−x²)/3
50
(12,0)
r
0.07
16.59
-177.51
317.57
dV/dr
(9.79795897113,0)
20
r
-4.06
1
15.94
f2(x)=2·π·x·√(144−x²)/3 − π·x³/(3·√(144−x²))
-299.57

$f1(x):=\frac{\pi\cdot x^2\cdot\sqrt{144-x^2}}{3}$	*Done*
$\frac{d}{dx}(f1(x))$	$\frac{2\cdot\pi\cdot x\cdot\sqrt{144-x^2}}{3}-\frac{\pi\cdot x^3}{3\cdot\sqrt{144-x^2}}$
$f2(x):=\frac{2\cdot\pi\cdot x\cdot\sqrt{144-x^2}}{3}-\frac{\pi\cdot x^3}{3\cdot\sqrt{144-x^2}}$	*Done*
$\text{solve}(f2(x)=0,x)$	$x=^-4\cdot\sqrt{6}$ or $x=0$ or $x=4\cdot\sqrt{6}$
$\text{solve}(f2(x)=0.,x)$	$x=^-9.79796$ or $x=0.$ or $x=9.79796$
$f1(9.798)$	696.499
$f5(x):=\sqrt{144-x^2}$	*Done*

$V(r) = \frac{\pi \cdot r^2 \cdot \sqrt{144-r^2}}{3}$

Feasible Domain of r: $0 \le r \le 12$

$$\frac{dV}{dr} = \frac{2\cdot\pi\cdot r\cdot\sqrt{144-r^2}}{3} - \frac{\pi\cdot r^3}{3\cdot\sqrt{144-r^2}}$$

If V(r) has a maximum over its feasible domain then it occurs at one of the following:

V(0), V(12) these are values of volume at the extremes

Or at the solutions of $\frac{dV}{dr} = 0$

V(0) = 0

V(12) = 0

or at r = $\sqrt{48} = 4\cdot\sqrt{3} = 6.9282$ h at r = $\sqrt{96} = 4\cdot\sqrt{6} = 9.79796$

$V(\sqrt{48}) = 64\cdot\pi\cdot\sqrt{6} = 492.499$

Volume formula in terms of radius V(r) $= \frac{\pi \cdot r^2 \cdot \sqrt{144-r^2}}{3}$

Feasible Domain of r: $0 \le r \le 10$

$$\frac{dV}{dr} = \frac{2 \cdot \pi \cdot r \cdot \sqrt{144-r^2}}{3} - \frac{\pi \cdot r^3}{3 \cdot \sqrt{144-r^2}}$$

The maximum volume for this scenario occurs at r $= \sqrt{48.} \approx 6.9282$

The height the maximizes the volume is h $= \sqrt{48} = 4 \cdot \sqrt{6} \approx 9.79796$

The maximum volume is V($\sqrt{48}$) = $64 \cdot \pi \cdot \sqrt{6} = 492.499$

$f3(x):=\frac{\pi}{3}\cdot\left(144-x^2\right)\cdot x$	*Done*
$\frac{d}{dx}\left(f3(x)\right)$	$^-\pi\cdot\left(x^2-48\right)$
$\text{expand}\left(f3(x)\right)$	$48\cdot\pi\cdot x-\frac{\pi\cdot x^3}{3}$
$f4(x):=\frac{d}{dx}\left(f3(x)\right)$	*Done*
$\text{expand}\left(f4(x)\right)$	$48\cdot\pi-\pi\cdot x^2$
$\text{solve}\left(f4(x)=0,x\right)$	$x=^-4\cdot\sqrt{3}$ or $x=4\cdot\sqrt{3}$
$\sqrt{48}$	$4\cdot\sqrt{3}$

Volume formula in terms of radius V(h) $= 48 \cdot h \cdot \pi - \frac{h^3 \cdot \pi}{3}$

Feasible Domain of h: $0 \le h \le 10$

$\frac{dV}{dh} = 48 \cdot \pi - h^2 \cdot \pi$

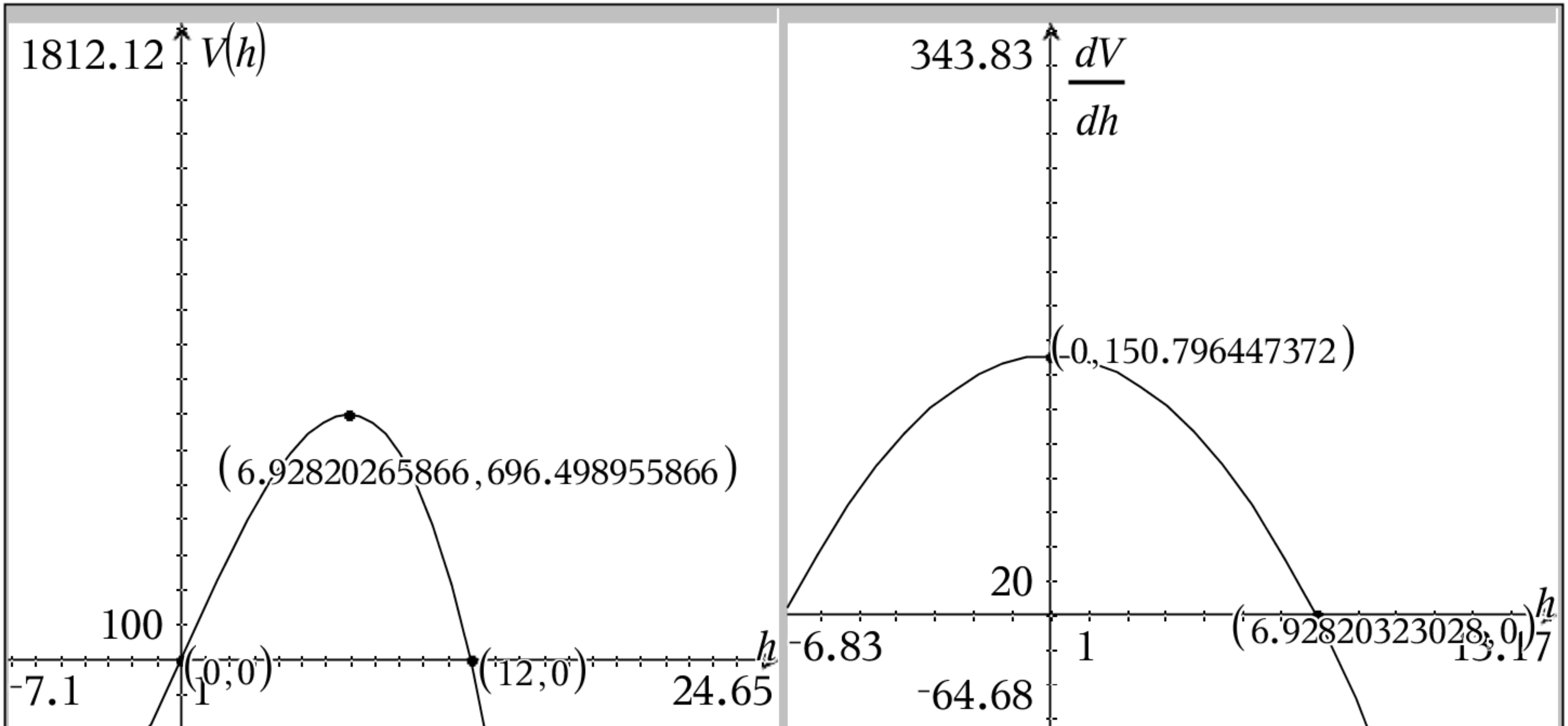
The maximum volume for this scenario occurs at h $= \sqrt{96.} \approx 9.79796$

The radius the maximizes the volume is r = $4 \cdot \sqrt{6} \approx 6.9282$

The maximum volume is V($\sqrt{96}$) = $64 \cdot \pi \cdot \sqrt{6} = 492.499$

$\frac{dV}{dh}$ at h = 4

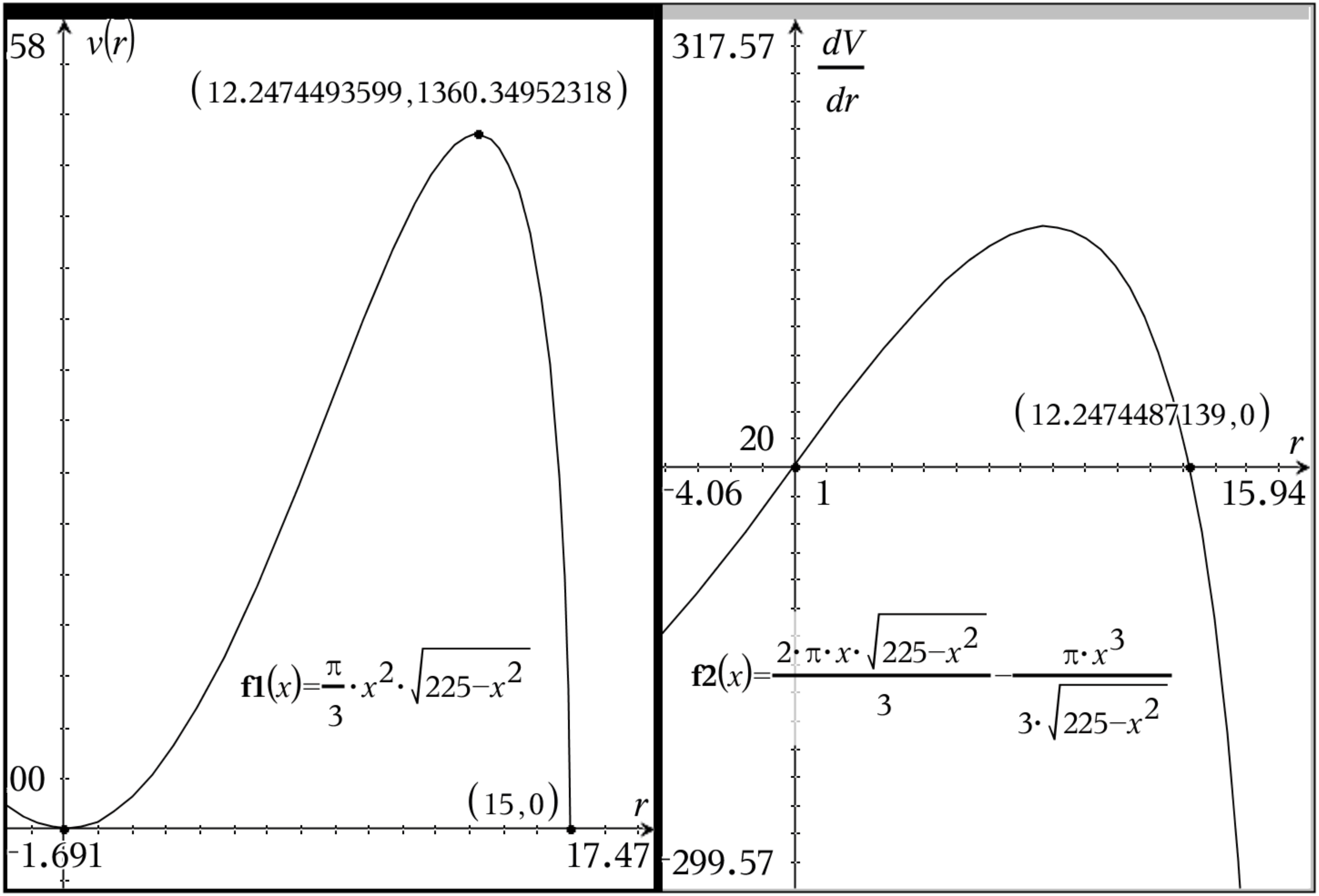
$\frac{dV}{dh} = 32 \cdot \pi \approx 100.531$



Volume formula in terms of radius V(h) = $48\cdot h\cdot \pi-\frac{h^{3}\cdot \pi}{3}$

Feasible Domain of h: 0 ≤ h ≤ 12 $\frac{dV}{dh}=48\cdot \pi-h^{2}\cdot \pi$

cone slant height 15



$f1(x)$	$\frac{\pi \cdot x^2 \cdot \sqrt{225-x^2}}{3}$
$f2(x):=\frac{2 \cdot \pi \cdot x \cdot \sqrt{225-x^2}}{3}-\frac{\pi \cdot x^3}{3 \cdot \sqrt{225-x^2}}$	*Done*
$\text{solve}(f2(x)=0,x)$	$x=^-5\sqrt{6}$ or $x=0$ or $x=5\sqrt{6}$
$\text{solve}(f2(x)=0.,x)$	$x=^-12.2474$ or $x=0.$ or $x=12.2474$
$f1(12.247)$	1360.35
$f3(x):=\sqrt{225-x^2}$	*Done*
$f3(12.247)$	8.66089

V(r) $=\dfrac{\pi\cdot r^2\cdot\sqrt{225-r^2}}{3}$

Feasible Domain of r: 0 ≤ r ≤ 15

$$\frac{dV}{dr}=\frac{2\cdot\pi\cdot r\cdot\sqrt{225-r^2}}{3}-\frac{\pi\cdot r^3}{3\cdot\sqrt{225-r^2}}$$

If V(r) has a maximum over its feasible domain then it occurs at one of the following:

V(0), V(15) these are valies of volume at the extremes

Or at the solutions of $\dfrac{dV}{dr}=0$

V(0) = 0

V(15) = 0

or at x = $\sqrt{150}=5\cdot\sqrt{6}=12.2474$

V($\sqrt{150}$) = $250\cdot\pi\cdot\sqrt{3}=1360.35$

Volume formula in terms of radius V(r) $=\dfrac{\pi\cdot r^2\cdot\sqrt{225-r^2}}{3}$

Feasible Domain of r: $0 \le r \le 15$

$$\frac{dV}{dr}=\frac{2\cdot\pi\cdot r\cdot\sqrt{225-r^2}}{3}-\frac{\pi\cdot r^3}{3\cdot\sqrt{225-r^2}}$$

The maximum volume for this scenario occurs at r $=\sqrt{150.} \approx 12.2474$

The height the maximizes the volume is h = $\sqrt{75} = 5\cdot\sqrt{3} \approx 961.912$

The maximum volume is V($\sqrt{150}$) = $250\cdot\pi\cdot\sqrt{3} = 1360.35$

$f3(x):=\frac{\pi}{3}\cdot\left(225-x^2\right)\cdot h$ | *Done*

$f3(x):=\frac{\pi}{3}\cdot\left(225-x^2\right)\cdot x$ | *Done*

$\frac{d}{dx}\left(f3(x)\right)$ | $^-\pi\cdot\left(x^2-75\right)$

$\text{expand}\left(f3(x)\right)$ | $75\cdot\pi\cdot x-\frac{\pi\cdot x^3}{3}$

$f4(x):=\frac{d}{dx}\left(f3(x)\right)$ | *Done*

$\text{expand}\left(f4(x)\right)$ | $75\cdot\pi-\pi\cdot x^2$

$\text{solve}\left(f4(x)=0,x\right)$ | $x=^-5\sqrt{3}$ or $x=5\sqrt{3}$

$\sqrt{75}$ | $5\cdot\sqrt{3}$

Volume formula in terms of radius V(h) $=75\cdot h\cdot \pi-\frac{h^3\cdot \pi}{3}$

Feasible Domain of h: $0 \le h \le 15$

$\frac{dV}{dh}=75\cdot \pi-h^2\cdot \pi$

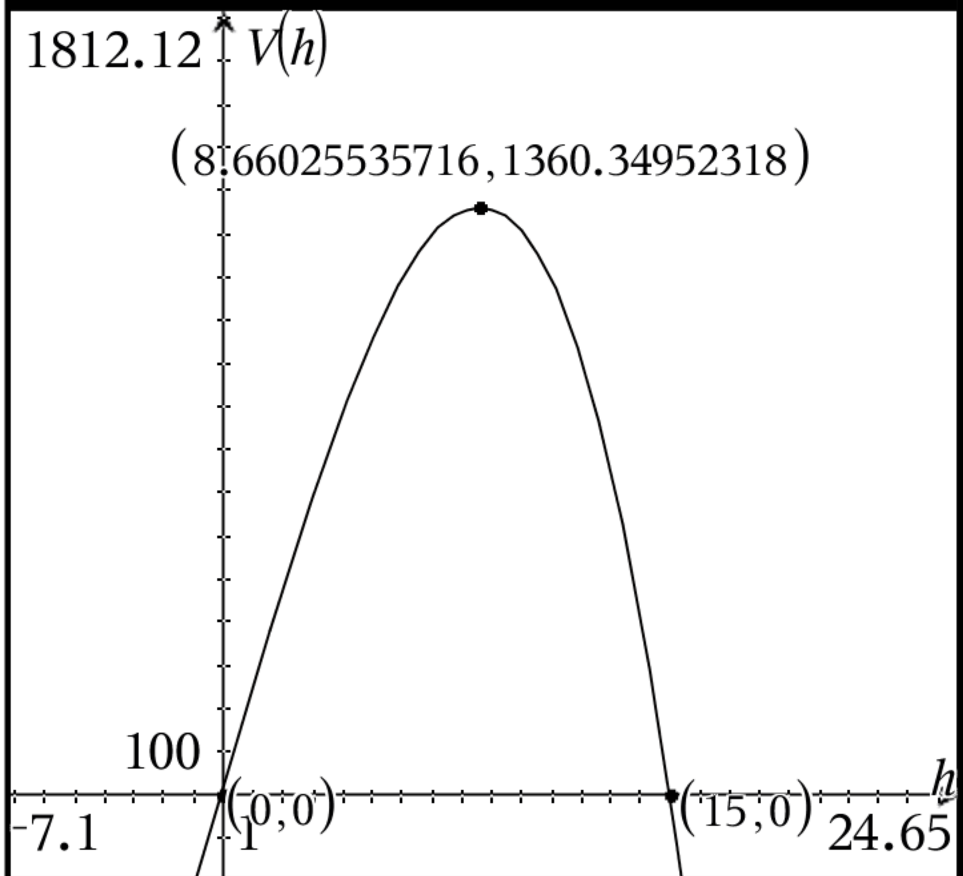
The maximum volume for this scenario occurs at h $=\sqrt{75.} \approx 8.66025$

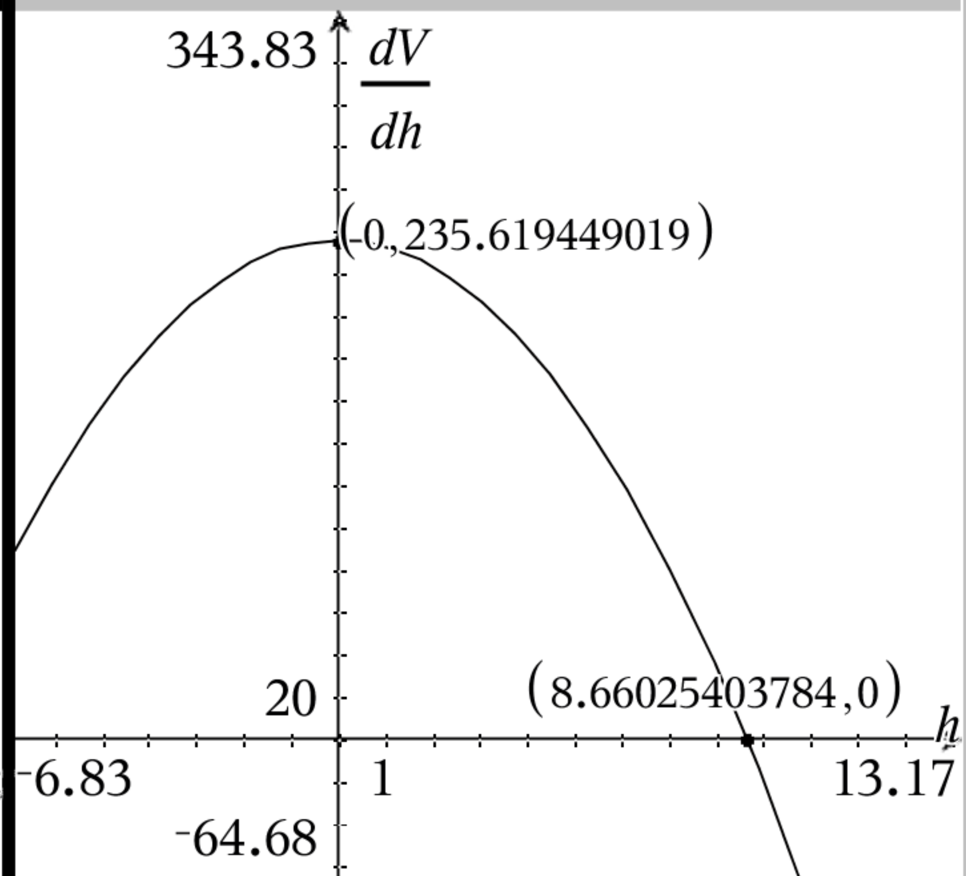
The radius that maximizes the volume is r = $\sqrt{150}=5\cdot \sqrt{6} \approx 12.2474$

The maximum volume is V($\sqrt{75}$) = $250\cdot \pi\cdot \sqrt{3}=1360.35$

$\frac{dV}{dh}$ at r = 5 h $=10\cdot \sqrt{2}$

$\frac{dV}{dh}=^{-}125\cdot \pi \approx ^{-}392.699$





Volume formula in terms of radius V(h) $= 75 \cdot h \cdot \pi - \frac{h^3 \cdot \pi}{3}$

Feasible Domain of h: $0 \le h \le 15$ $\quad \frac{dV}{dh} = 75 \cdot \pi - h^2 \cdot \pi$