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$$\text{solve} \left(\begin{cases} a \cdot x^2 + b \cdot x + c = 0 | x=0 \\ a \cdot x^2 + b \cdot x + c = -h | x=\frac{l}{2}, \{a, b, c\} \\ a \cdot x^2 + b \cdot x + c = 0 | x=l \end{cases} \right) \quad a = \frac{4 \cdot h}{l^2} \text{ and } b = \frac{-4 \cdot h}{l} \text{ and } c=0 \text{ or } a=\mathbf{c4} \text{ and } b=\mathbf{c3} \text{ and } c=0 \text{ and } h=0 \text{ and } l=0$$

$$a \cdot x^2 + b \cdot x + c | a = \frac{4 \cdot h}{l^2} \text{ and } b = \frac{-4 \cdot h}{l} \text{ and } c=0 \rightarrow y$$

$$\frac{4 \cdot h \cdot x^2}{l^2} - \frac{4 \cdot h \cdot x}{l}$$

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2

$$\triangle h0 \cdot \sqrt{1 + \left(\frac{d}{dx}(y) \right)^2}$$

$$\frac{h0 \cdot \sqrt{64 \cdot h^2 \cdot x^2 - 64 \cdot h^2 \cdot l \cdot x + (16 \cdot h^2 + l^2) \cdot l^2}}{l^2}$$

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3

$$\text{solve} \left(\frac{va \cdot l}{2} - h0 \cdot h - \frac{q \cdot l^2}{8} = 0, h0 \right) | va = \frac{q \cdot l}{2}$$

$$h0 = \frac{l^2 \cdot q}{8 \cdot h}$$

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$$\triangle \text{ expand } \left(\frac{h^0}{e \cdot a} \cdot \int_0^l \left(1 + \left(\frac{d}{dx}(y) \right)^2 \right) dx \right) \Big|_{h^0} = \frac{l^2 \cdot q}{8 \cdot h}$$

$$\frac{2 \cdot h \cdot l \cdot q}{3 \cdot a \cdot e} + \frac{l^3 \cdot q}{8 \cdot a \cdot e \cdot h}$$

□

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$$\text{solve}\left(\left\{\begin{array}{l} ra+rb=45 \\ 10+15 \cdot 2+20 \cdot 3=rb \cdot 4 \end{array}\right\},\{ra,rb\}\right)$$

$$ra=20 \text{ and } rb=25$$

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$$\frac{rb \cdot 20}{6} | rb=25 \rightarrow h$$

$$83.3333$$

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3

$$\text{solve}(ra \cdot 20 = h \cdot yc, yc) | ra=20 \text{ and } rb=25$$

$$yc=4.8$$

$$\text{solve}(ra \cdot 40 - 10 \cdot 20 = h \cdot yd, yd) | ra=20 \text{ and } rb=25$$

$$yd=7.2$$

$$4.8 \rightarrow yc$$

$$4.8$$

$$7.2 \rightarrow yd$$

$$7.2$$

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$$\sqrt{20^2 + \left(\frac{20}{8} - yc\right)^2} + \sqrt{20^2 + \left(yc + \frac{20}{8} - yd\right)^2} + \sqrt{20^2 + \left(yd + \frac{20}{8} - 6\right)^2} + \sqrt{20^2 + \left(\frac{20}{8} + 6\right)^2}$$

$$82.2028$$

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5

$$\text{solve}\left(\begin{cases} 10 \cdot 20 + 15 \cdot 40 + 20 \cdot 60 + h \cdot 10 = vb \cdot 80 \\ va + vb - 10 - 15 - 20 = 0 \end{cases}, \{va, vb\}\right)$$

$$va=9.58333 \text{ and } vb=35.4167$$

$$\sqrt{vb^2 + h^2} \mid vb=35.4167$$

$$90.5472$$

□

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$$\frac{100}{2 \cdot h} \cdot x^2 \rightarrow y$$

$$\frac{50 \cdot x^2}{h}$$

$$\text{solve}\left(\left\{\begin{array}{l} y=50|x=b \\ y=25|x=120-b \end{array}\right\}, \{b, h\}\right) | b \leq 120$$

$$b=70.2944 \text{ and } h=4941.3$$

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$$\text{solve}\left(\left\{\begin{array}{l} 25 \cdot h - 120 \cdot v_c + 100 \cdot 120 \cdot 60 = 0 \\ v_a + v_c = 120 \cdot 100 \end{array}\right\}, \{v_a, v_c\}\right) | h=4941.3$$

$$v_a=4970.56 \text{ and } v_c=7029.44$$

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$$\frac{100 \cdot 120^2}{8 \cdot 4941.1}$$

$$36.4291$$

$$\frac{36.429135212807}{120} \rightarrow n$$

$$0.303576$$

$$\frac{25}{120} \rightarrow tb$$

$$\frac{5}{24}$$

$\frac{4941.3 \cdot \left(1 + 16 \cdot n^2 + tb^2 + 8 \cdot n \cdot tb\right)^{\frac{1}{2}}}{-----3-2}$	8592.6
	1

$\frac{d}{dx}(y) _{h=4941.3}$	$0.020238 \cdot x$
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$\tan^{-1}(0.020237589298363 \cdot x) _{x=70.2944}$	0.958098
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$\frac{h}{\cos(0.9580975093683)} _{h=4941.3}$	8592.41
$-----4$	4

$120 \cdot \frac{\sqrt{120^2 + 25^2}}{120} \rightarrow l2$	$5 \cdot \sqrt{601}$
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$36.4291 \cdot \frac{120}{\sqrt{120^2 + 25^2}} \rightarrow h2$	35.6634
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$\frac{36.4291}{l2} \rightarrow n2$	0.297195
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$$12 \cdot \left(1 + \frac{8}{3} \cdot n2^2 - \frac{32}{5} \cdot n2^4 \right)$$

145.327



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$$\text{solve}\left(\left\{\begin{array}{l} 15 \cdot 6 - vc \cdot 10 = 0 \\ 0.2 \cdot 10 \cdot 5 + vc \cdot 10 = hc \cdot 6 \end{array}\right\}, \{vc, hc\}\right)$$

$$hc = 16.6667 \text{ and } vc = 9.$$

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$$1 \cdot 5 - \frac{0.2 \cdot 5^2}{2} \rightarrow hm$$

2.5

$$\frac{hm}{hc} | hc = 16.6667$$

0.15

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$$\text{solve}\left(\left\{\begin{array}{l} y = a \cdot x^2 + b \cdot x + c | x = 0 \text{ and } y = 0 \\ y = a \cdot x^2 + b \cdot x + c | x = 5 \text{ and } y = 3.15 \\ y = a \cdot x^2 + b \cdot x + c | x = 10 \text{ and } y = 6 \end{array}\right\}, \{a, b, c\}\right)$$

$$a = -0.006 \text{ and } b = 0.66 \text{ and } c = 0.$$

$$y = a \cdot x^2 + b \cdot x + c | a = -0.006 \text{ and } b = 0.66 \text{ and } c = 0.$$

$$y = 0.66 \cdot x - 0.006 \cdot x^2$$

$$0.66 \cdot x - 0.006 \cdot x^2 \rightarrow y1$$

$$0.66 \cdot x - 0.006 \cdot x^2$$

$$\tan^{-1}\left(\frac{6}{10}\right) \rightarrow \alpha \quad 0.54042$$

$$\frac{\alpha \cdot 180}{\pi} \quad 30.9638$$

$$\frac{d}{dx}(y1)_{|x=0} \quad 0.11958$$

$$\frac{0.11958049972942 \cdot 180}{\pi} \quad 6.85146$$

$$\alpha - \frac{d}{dx}(y1)_{|x=10} \quad 0.00042$$

$$\frac{4.1950027058\text{E-}4 \cdot 180}{\pi} \quad 0.024036$$

□

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$$\left(550 - \frac{rb}{2}\right) \cdot x - \frac{25 \cdot x^2}{2} \rightarrow m1$$

$$\left(550 - \frac{rb}{2}\right) \cdot x - \frac{25 \cdot x^2}{2}$$

$$m1 + 100 \cdot (x - 8) \rightarrow m2$$

$$\frac{-25 \cdot x^2}{2} + \left(650 - \frac{rb}{2}\right) \cdot x - 800$$

$$m2 + 100 \cdot (x - 16) \rightarrow m3$$

$$\frac{-25 \cdot x^2}{2} + \left(750 - \frac{rb}{2}\right) \cdot x - 2400$$

$$m3 + 50 \cdot (x - 24) \rightarrow m4$$

$$\frac{-25 \cdot x^2}{2} + \left(800 - \frac{rb}{2}\right) \cdot x - 3600$$

$$2 \cdot \left(\int_0^8 \frac{m1^2}{2 \cdot ei} dx + \int_8^{16} \frac{m2^2}{2 \cdot ei} dx + \int_{16}^{24} \frac{m3^2}{2 \cdot ei} dx + \int_{24}^{32} \frac{m4^2}{2 \cdot ei} dx \right) \rightarrow u$$

$$\frac{512 \cdot (16 \cdot rb^2 - 22325 \cdot rb + 7911500)}{3 \cdot ei}$$

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$$\triangle \text{ solve } \left(\frac{d}{drb}(u) = 0, rb \right)$$

$$rb = 697.656$$

$$550 - \frac{rb}{2} | rb = \frac{22325}{32} \quad 201.172$$

$$\text{-----} -3 \quad -3$$

$$m1 | rb = 697.65625 \rightarrow y1 \quad 201.172 \cdot x - \frac{25 \cdot x^2}{2}$$

$$m2 | rb = 697.65625 \rightarrow y2 \quad \frac{-25 \cdot x^2}{2} + 301.172 \cdot x - 800$$

$$m3 | rb = 697.65625 \rightarrow y3 \quad \frac{-25 \cdot x^2}{2} + 401.172 \cdot x - 2400$$

$$m4 | rb = 697.65625 \rightarrow y4 \quad \frac{-25 \cdot x^2}{2} + 451.172 \cdot x - 3600$$

$$fMax(y2, x) \quad x = 12.0469$$

$$y2 | x = \{ 8, 12.0469, 16 \} \quad \{ 809.375, 1014.09, 818.75 \}$$

$$y4 | x = \{ 24, 32 \} \quad \{ 28.125, -1962.5 \}$$

□

