



25)  $V = \frac{1}{4} \text{ m}^3/\text{min}$

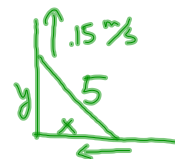
$\frac{2}{12} = \frac{1}{b}$
 $b = 6$

a)  $V_0 = \frac{1}{2}bh \cdot 6 = \frac{1}{2}(6)(1)(6) = 18 \text{ m}^3$

$V_p = \frac{1}{2}(2)(12)(6) + 1(12)(6) = 144$
 $96 = 18/144 = 12.5\%$

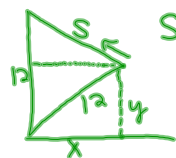
b) $V = \frac{1}{2}bh(6)$
 $V = 3(bh)h$
 $V = 18h^2$
 $V' = 36h \cdot h'$
 $\frac{1}{4} = 36(1)h'$
 $h' = \frac{1}{144} \text{ m/min}$

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28)  $x' = ? @ x = 2.5 \text{ m}$

$x^2 + y^2 = 25$
 $2xx' + 2yy' = 0$
 $2(2.5)x' + 2(\sqrt{18.75})(.15) = 0$
 $x' = \frac{-2\sqrt{18.75}(.15)}{5}$
 $x' = -.26 \text{ m/s}$

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29)  $S' = -.2 \text{ m/s}$
 $x' = ?$
 $y' = ?$

$x^2 + y^2 = 144$
 $x^2 + (12-y)^2 = S^2$

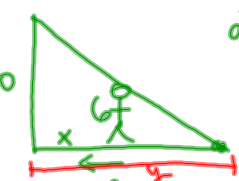
$2xx' + 2yy' = 0$
 $2xx' + 2(12-y)(-y') = 2S \cdot S'$
 $xx' + (12-y)(-y') = -.2S$

when $y = 6$
 $x^2 + 36 = 144$
 $x = 6\sqrt{3}$
 $x^2 + (12-y)^2 = S^2$
 $108 + 36 = S^2$
 $S = 12$

$6\sqrt{3}x' - 6y' = -.24$
 $6\sqrt{3}x' + 6y' = 0$

$12\sqrt{3}x' = -.24$
 $x' = \frac{-.24}{12\sqrt{3}} \approx -.115 \text{ m/s}$
 $6\sqrt{3}(-.115) + 6y' = 0$
 $y' = \frac{.115(6\sqrt{3})}{6} \approx .199 \text{ m/s}$

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30)  $x' = -5 \text{ ft/s}$

a) tip shadow y'
 b) length shadow L'
 @ $x = 10 \text{ ft}$

a) $\frac{20}{6} = \frac{y}{y-x}$
 $20y - 20x = 6y$
 $14y = 20x$
 $14y' = 20x'$
 $y' = \frac{20(-5)}{14} = -\frac{50}{7} \text{ ft/s}$

b) $L = y - x$
 $L' = y' - x'$
 $= -\frac{50}{7} - (-5)$
 $= -\frac{15}{7} \text{ ft/s}$

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44)  @ $X = 25$
 $F^2 + 10^2 = 25^2$
 $F^2 = 525$
 $F' = -1 \text{ ft/s}$

$$\tan \theta = \frac{10}{F} \rightarrow 10F^{-1}$$

$$\sec^2 \theta \cdot \theta' = -10F^{-2} \cdot F'$$

$$\left(\frac{625}{525}\right) \theta' = \frac{-10}{525} F'$$

$$\theta' = \frac{-10}{625} (-1) \approx .016 \text{ Rad/s}$$

39) sphere

$$S = 4\pi r^2$$

$$r' = \text{const?}$$

$$V' = K(4\pi r^2)$$

$$V = \frac{4}{3}\pi r^3$$

$$V' = 4\pi r^2 \cdot \frac{dr}{dt}$$

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