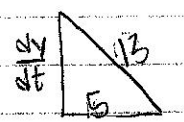
Karli Peters ordered a massive pizza from pizza Hut. A scientist added poison to the pepperoni, making the area increase at 4 inches^2/minute. Find the rate of change of the pepperoni when the radius is 48 inches.

K.K.

A hot dog is being thrown into the air straight up at a rate of 5 m/s. Blaise is sitting 10 m away from the person throwing the hot dog. What's the rate of change of the angle of elevation of the hot dog when the hot dog is 7 m off the ground?

K.K.

Karlie is moving in with Brandon & her bed won't fit through the door so she has to pull it up outside the building. Her bed is 13 feet long. The end of the couch is sliding along the ground at 5 m/sec. How fast is the end of the bed moving up the wall when the bed is 5 feet from the wall?

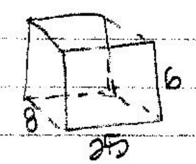


#2

K.P.

Maggie is having her legendary last day of school pool party but the pool needs to be filled. Her pool is 25 feet long, 8 feet wide, & 6 feet high. Water is being added at 120 ft^3/minute. How fast is the water level rising when the water is 4 feet deep?

(Maggie is a swimmer - there is no shallow end)



#4

K.P.

$A = \pi r^2$

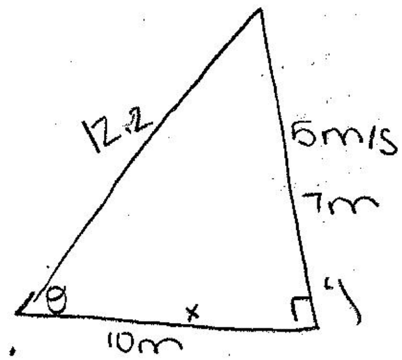
$A = 2\pi r$

$\frac{dA}{dt} = 2\pi r \frac{dr}{dt}$

$4 = 2\pi(48)\frac{dr}{dt}$

$\boxed{\frac{dr}{dt} = .013 \text{ in/min}}$

$\frac{dy}{dt} = 5 \text{ m/s} \quad Y = 7 \quad \frac{d\theta}{dt} = ? \quad X = 10$



$\tan\theta = \frac{Y}{10}$

$\sec^2\theta \frac{d\theta}{dt} = \frac{1}{10}\frac{dy}{dt}$

$\left(\frac{12.2}{10}\right)^2 \frac{d\theta}{dt} = \frac{1}{10}(5)$

$1.4884 \frac{d\theta}{dt} = \frac{1}{2}$

$\boxed{\frac{d\theta}{dt} = .336 \text{ rad/sec}}$

$X^2 + Y^2 = 13^2 \qquad 5^2 + Y^2 = 13^2$

$2X\frac{dx}{dt} + 2Y\frac{dy}{dt} = 0 \qquad Y = 12$

$2(5)(5) + 2(12)\frac{dy}{dt} = 0$

$2(12)\frac{dy}{dt} = -50$

$24\frac{dy}{dt} = -50$

$\frac{dy}{dt} = \boxed{-2.08 \text{ ft/sec}}$

$\frac{dV}{dt} = 120 \text{ ft}^3/\text{min} \quad \frac{dh}{dt} = ? \quad h = 4$

$V = 25h \cdot 8$

$V = 200h$

$\frac{dV}{dt} = 200\frac{dh}{dt}$

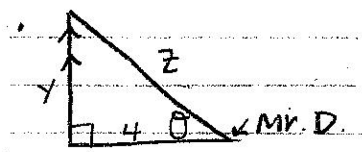
$120 = 200\frac{dh}{dt}$

$\boxed{.6 \text{ ft/min} = \frac{dh}{dt}}$

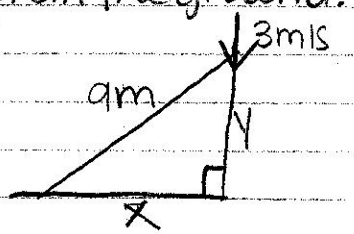
AF 3

(1) Hannah the vegetarian is looking at her tofu/veggie pizza and notices its growing at a rate of 12 mm per second! What is the rate of change in the ginormous pizza's area when the diameter is 42mm?

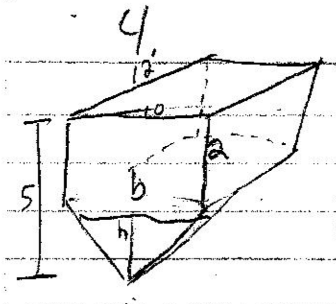
A balloon is floating up into the air at a rate of 2mi/hr. Mr. Duhrkopf is standing 4miles away from the point of where the balloon was released. What is the rate of change of the angle of elevation of the balloon when the balloon is 12miles off the ground?



(2) A Man is cleaning the window on a ladder that is 9ft long. It begins to fall down the wall at a rate of 3m/s but he doesnt notice. How fast will the end of the ladder be moving away from the wall when he is 4ft from the ground.



4.



The Rec pool is being filled up for the swimming lessons that evening. The pool is 12 ft across, 10 ft wide, and 5 ft deep. If the water is flowing into the tank at a rate of 4 cubic ft/min, find the rate of change of the depth of the water when the water is 2 feet deep.

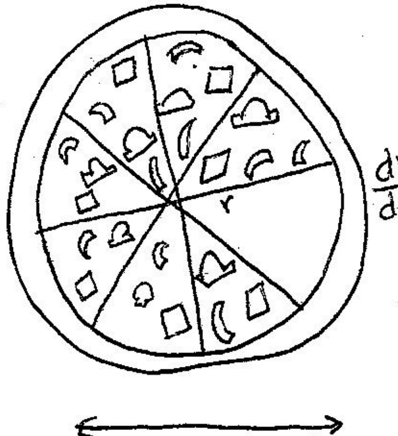
$A = \pi r^2$

$\frac{da}{dt} = 2\pi r \frac{dr}{dt}$

$12 = 2\pi 21 \frac{dr}{dt}$

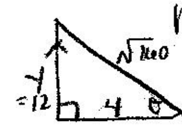
$12 = 42\pi \frac{dr}{dt}$

$\boxed{.09 = \frac{dr}{dt} \text{ mm/s}}$



$\frac{dr}{dt}$ when $r = 21$?

$12 mm/s = \frac{da}{dt}$



rate = 2mi/hr
when y = 12
$\frac{d\theta}{dt} = ?$

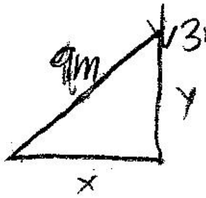
$\tan\theta = \frac{y}{4} \rightarrow \sec^2\theta \frac{d\theta}{dt} = \frac{1}{4}\frac{dy}{dt}$

$\left(\frac{\sqrt{160}}{4}\right)^2 \frac{d\theta}{dt} = \frac{1}{4}(2)$

$\frac{160}{16}\frac{d\theta}{dt} = \frac{1}{2}$

$10\frac{d\theta}{dt} = \frac{1}{2}$

$d\theta/dt = .05 \text{ rad/hr}$



$3 m/s = \frac{dy}{dt}$

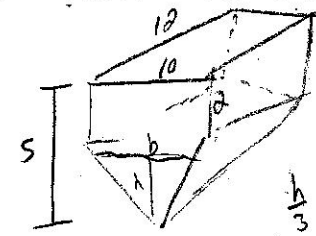
$\frac{dx}{dt} = $ y = 4
x = 8.06

$x^2 + y^2 = 9^2$

$\cancel{2x}\frac{dx}{dt} + \cancel{2y}\frac{dy}{dt} = 0$

$8.06\frac{dx}{dt} + 12 \rightarrow 8.06\frac{dx}{dt} = -12 \quad \frac{dx}{dt} = \boxed{-1.49 \text{ m/s}}$

E.B.



V = (Area of Base) · height depth

$V = \frac{1}{2}bh \cdot$ height depth

$V = 6\left(\frac{10h}{3}\right)h$

$\frac{h}{3} = \frac{b}{10}$ $\quad V = \frac{20\cancel{60}h^2}{\cancel{3}}$

$b = \frac{10h}{3}$ $\quad V = 40h$

h = 2

$\frac{dV}{dt} = 4 ft^3/min$

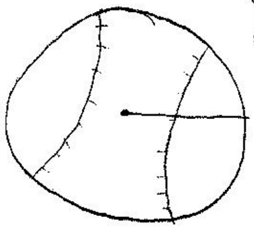
$4 = (40)(2)\frac{dh}{dt}$

$\frac{dh}{dt} = ?$

$\boxed{\frac{dh}{dt} = .05 \text{ ft/min}}$

KW

Elyse is playing softball. All of a sudden the ball's radius increases at 2 in/s Find the rate of change in the area when the radius is 3 in. 1+3

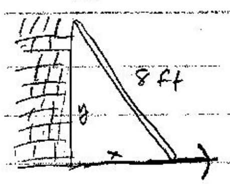


$\frac{dr}{dt} = 2$

$\frac{dA}{dt} = ?$ $r=3$

H.S.

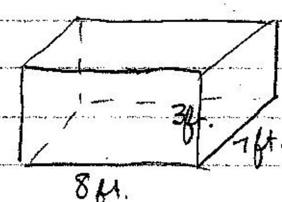
2



An 8 ft ladder is leaning against a wall. It starts to slide down the wall. The base of the ladder moves away from the wall at a rate of 1 ft/sec. How fast will the top of the ladder be moving down the wall when the base is 3 ft from the wall?

(3) Hannah is walking in the park one day and becomes mesmorized by a cloud shaped like a teddy bear hovering above her (it was lonely). Hannah is so amazed she stops walking, when she looks up again, th cloud is 15 ft away, and rising at a pace of 5ft per second. Looking up at the teddy bear, what is the rate of change of the angle of elevation $\angle$ (as seen by Hannah) when the teddy bear is 12 ft. above the ground?

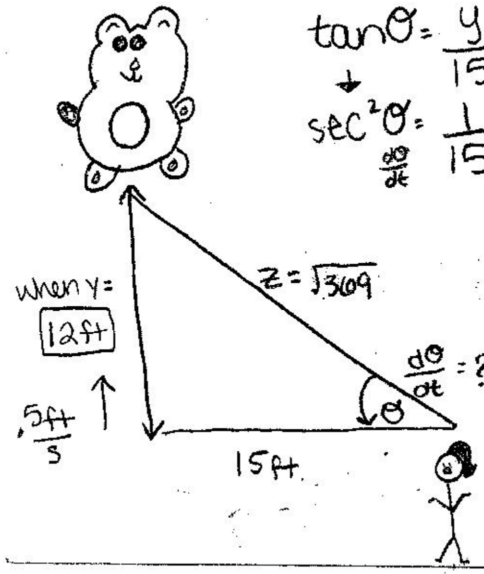
(4) The construction workers are laying cement in a 3 ft. high, 7 ft. long, and 8 ft wide frame. The cement is being poured in at 5 cubic ft per second. How fast is the cement height of the cement rising at 1.5 ft.



$$A = \pi r^2$$

$$\frac{dA}{dt} = 2\pi r \frac{dr}{dt}$$

$$\frac{dA}{dt} = 2\pi 3 \cdot 2 \qquad \frac{dA}{dt} = \boxed{37.7 \text{ in/s}}$$



$\frac{d\theta}{dt} = ?$ when $\boxed{Y = 12 \text{ ft.}}$

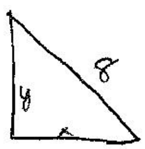
$$\tan\theta = \frac{y}{15}$$

$$\sec^2\theta \frac{d\theta}{dt} = \frac{1}{15}\frac{dy}{dt}$$

$$\left(\frac{\sqrt{369}}{15}\right)^2 \frac{d\theta}{dt} = \frac{1}{15} \cdot \frac{5}{1}$$

$$\frac{369}{225}\frac{d\theta}{dt} = \frac{1}{3}$$

$$\boxed{\frac{d\theta}{dt} = .20 \frac{\text{radian}}{\text{sec.}}}$$



$x = 3$

$\frac{dx}{dt} = 1$

$\frac{dy}{dt} = ?$

static equation - $x^2 + y^2 = 8^2$

$$2x\frac{dx}{dt} + 2y\frac{dy}{dt} = 0$$

$$2(3)(1) + 2(\sqrt{55})\frac{dy}{dt} = 0$$

$$2(\sqrt{55})\frac{dy}{dt} = -6$$

$$\frac{dy}{dt} = \frac{\cancel{-6}\ -3}{\cancel{2}\sqrt{55}}$$

$$\boxed{\frac{dy}{dt} = .40 \text{ ft/sec}}$$

KiW

V = (area of base) height

V = 56h

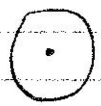
$$\frac{dV}{dt} = 56\frac{dh}{dt} \rightarrow 5 = 56\frac{dh}{dt} \rightarrow$$

$$\frac{dh}{dt} = \boxed{.09 \text{ ft/second}}$$

E.B.

AF 1

A circular clock has a radius that is increasing at 3 in/min. Find the rate in change of area when the radius is 6 in.



rate = 3 in/min

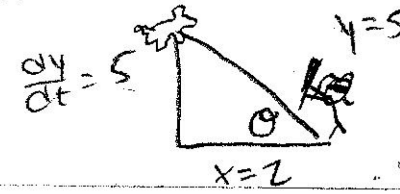
r = 6 in

$A = \pi r^2$

$\frac{dA}{dt} = 2\pi r \frac{dr}{dt}$ / $\frac{dA}{dt} = 2\pi(6)(3)$

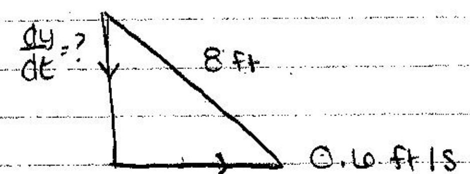
+3

It's Hannah's birthday and it's time to break open the piñata! If the piñata is rising at 5 m/s and Hannah is standing 2 meters away, what is the rate of change of the angle of the elevation of the piñata when the piñata is 5 m off the ground?

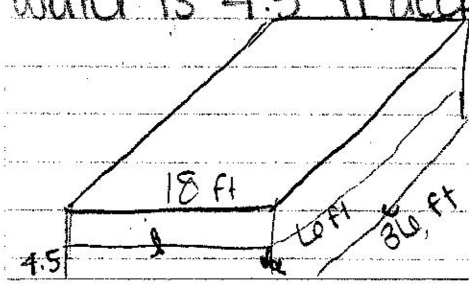


H.S.

A 8 ft board was leaning against a wall and started to slide across the floor at a rate of 0.6 ft/s. At what rate will the top of the board slide down the wall when the bottom of the board is 5 ft from the wall.



A pool is 18 ft wide, 36 ft long, and 6 ft deep. If water is filling the pool at 110 cubic ft/min, how fast is the water level rising when the water is 4.5 ft deep



$$\frac{dA}{dt} = 113.1 \text{ in/min}$$

$$\tan\theta = \frac{y}{2}$$

$$2^2 + 5^2 = z^2$$

$$4 + 25 = z^2$$

$$29 = z^2$$

$$z = 5.39$$

$$\sec^2\theta \frac{d\theta}{dt} = \frac{1}{2}\frac{dy}{dt}$$

$$\left(\frac{5.39}{2}\right)^2 \frac{d\theta}{dt} = \frac{1}{2}\cdot\frac{5}{1}$$

$$\frac{29.05}{4}\frac{d\theta}{dt} = \frac{5}{2}$$

$$\frac{d\theta}{dt} = \frac{20}{58.1}$$

$$\frac{d\theta}{dt} = \boxed{.34}$$

$$x^2 + y^2 = 64 \qquad \text{when } x = 5,\ y = \sqrt{39} \text{ or } 6.2^2$$

$$2x\frac{dx}{dt} + 2y\frac{dy}{dt} = 0$$

$$5(0.6) + 6.2\frac{dy}{dt} = 0$$

$$6.2\frac{dy}{dt} = -3$$

$$\frac{dy}{dt} = 0.48 \text{ m/s}$$

$$V = L \cdot W \cdot h$$

$$V = 36 \cdot 18 \cdot h \qquad V = 648h$$

$$\frac{dV}{dt} = 648\frac{dh}{dt}$$

$$110 = 648\frac{dh}{dt}$$

$$\frac{dh}{dt} = 0.17 \text{ ft/min}$$

4

Nick Langel

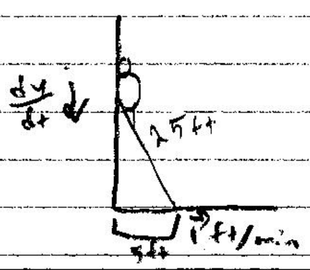
The oranges from Jarret's Magical tree increase in volume at 15 cubic in/min. At what rate is the radius of the oranges growing when the radius is 5 in.

Nick Langel

Chris invented a jet pack that rises at 12 m/s. Jon is standing 8 m away from Chris when he begins his flight. What is the rate of change in the angle of elevation of Chris when he is 6 m off the ground?

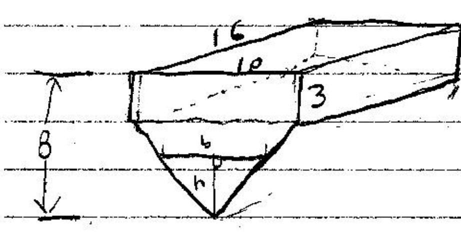
2 [illegible]

A 25 foot ladder is leaning against a wall. The Painter is really fat so the bottom of the ladder is sliding at at a rate at 1 ft/min. How fast is the ladder moving down the wall when it is 5 ft from the wall?



#4 HORSLEY

Indy is hosting a disco pool-party. The pool is 16 ft across, 10 ft wide, and 8 ft deep. If the water is add to the pool at 3 cubic feet/min, find the rate of change of depth of water when water is 5 ft deep.

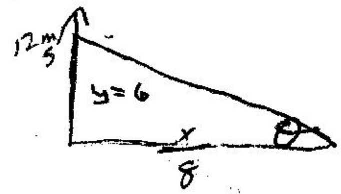


$$V = \frac{4}{3}\pi r^3$$

$$\frac{dV}{dt} = 4\pi r^2 \frac{dr}{dt}$$

$$15 = 4\pi\, 5^2 \frac{dr}{dt}$$

$$\frac{dr}{dt} = \frac{15}{314} = .048 \text{ in/min}$$



$$\tan\theta = \frac{y}{8}$$

$$\sec^2\theta \frac{d\theta}{dt} = \frac{1}{8}\frac{dy}{dt}$$

$$\sec = \frac{10}{8}$$

$$\left(\frac{10}{8}\right)^2 \frac{d\theta}{dt} = \frac{1}{8} \cdot 12$$

$$\frac{d\theta}{dt} = \frac{24}{25} = .96 \text{ rad/sec}$$

$$x^2 + y^2 = 25^2$$

$$y = \sqrt{625 - 25}$$

$$y = 24.5$$

$$2x\frac{dx}{dt} + 2y\frac{dy}{dt} = 0$$

$$10 + 49\frac{dx}{dt} = 0$$

$$49\frac{dx}{dt} = -10$$

$$\frac{dy}{dt} = -0.204 \text{ ft/min}$$

$$\frac{dv}{dt} = 3 \text{ ft}^3\text{/min} \qquad \frac{dh}{dt} = ?\ @\ h = 5$$

$$V = \tfrac{1}{2} bh\, 16$$

$$V = 8bh$$

$$V = 8(2h)h$$

$$V = 16h^2$$

$$\frac{h}{5} = \frac{b}{10}$$

$$5b = 10h$$

$$b = 2h$$

$$\frac{dv}{dt} = 32(h)\frac{dh}{dt}$$

$$3 = (32)(5)\frac{dh}{dt}$$

$$.0188 \text{ ft/min} = \frac{dh}{dt}$$

CJ

1

A guacamole balloon is being filled. The volume is increasing at 4 cubic in/min. At what rate is the radius increasing when the radius is 5 in. Assume the guacamole stays within the balloon.

4. Justin B.

A conical tank is 14 feet across top and 17 feet deep. If milk is flowing into tank at a rate of 13 cubic feet/min, find rate of change of depth of milk when milk is 7 feet deep.

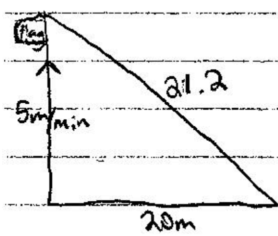
2 Justin B.

A 8 ft. board leaned against a wall and begins to slide down wall at a rate of 3 ft/sec. How fast will bottom of board move away from wall when top of board is 4 ft. above ground?

CJ

3

A flag is being raised at 5m/min. Henry is standing 20m from the flagpole. What is the rate of change of the angle of elevation of the flag when it's 7m off the ground?



$y = 7m$

○ $4\ \text{in}^3/\text{min} \rightarrow \quad \frac{dv}{dt} = 4 \quad \frac{dr}{dt} = ? \quad r = 5$

$\frac{dv}{dt} = 4\pi r^2 \frac{dr}{dt}$

$4 = 4\pi (5)^2 \frac{dr}{dt}$

$\downarrow$

$100\pi \qquad \frac{4}{100\pi} = \frac{dr}{dt} = .126\ \text{in/min}$

$\frac{r}{7} = \frac{h}{17}$

$r = \frac{7h}{17}$

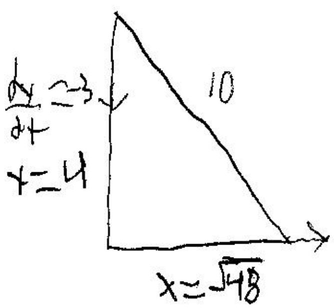
$V = \frac{1}{3}\pi r^2 h$

$V = \frac{\pi}{3}\left(\frac{7h}{17}\right)^2 h$

$V = \frac{49\pi}{867} h^3$

$\frac{dV}{dt} = \frac{147\pi}{867} h^2 \frac{dh}{dt}$

$13 = \frac{147\pi}{867}(7)^2 \frac{dh}{dt} \qquad \frac{dh}{dt} = 0.5\ \text{ft/min}$



$\frac{dx}{dt} = ?$

$x^2 + y^2 = 8^2$

$2x \frac{dx}{dt} + 2y \frac{dy}{dt} = 0$

$2(4\sqrt{3}) \frac{dx}{dt} + 2(-3)(4) = 0$

$\frac{dx}{dt} = \frac{3}{\sqrt{3}} = 1.73\ \text{ft/sec}$

$\tan\theta = \frac{y}{20}$

$\sec^2\theta \frac{d\theta}{dt} = \frac{1}{20}\frac{dy}{dt}$

$(\sec\theta)^2 = \frac{1}{20} \cdot 5$

$\left(\frac{21.2}{7}\right)^2 \frac{d\theta}{dt} = \frac{1}{20}(5)$

$\downarrow$

$\frac{9.17}{9.17}\frac{d\theta}{dt} = \frac{\frac{1}{4}}{9.17}$

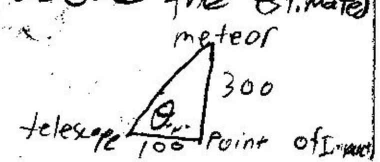
$\frac{d\theta}{dt} = .027\ \frac{\text{rad}}{\text{min}}$

Jordon white

Arthur, the artist is using a pottery wheel to make a bowl. The pot is increasing in diameter at 1 inch per minute. At what rate is the surface area of the bottom of the pot increasing when the diameter is 3 inches?

Jordon White

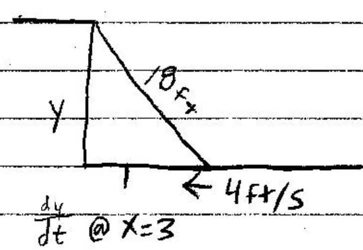
A meteor is speeding toward earth at 11 km/s. Astronomers are tracking the meteor at a point 100km away from the estimated point of impact on earth. At what rate is the angle of elevation of the telescope that the astronomers are watching the meteor when the meteor is 300 km above the estimated point of impact.



#2

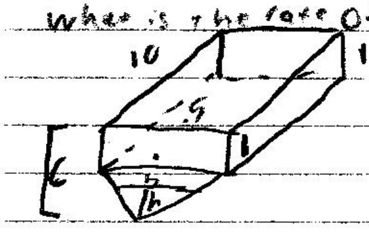
HORSLEY

A construction worker is trying to pull a 18ft pole up a building. He is pulling as a rate of 4 ft/s against the ground. How fast is the top of the pole moving when the bottom is 3 ft away from the building.



4

Katt Melly is filling a pool for his party later, at 3 ft³/s. His Pool is 5 foot by 10 foot and 6 foot deep. If the water is already 3 feet deep what is the rate of change of depth of the water?



$\pi r^2 = A$ $\frac{dr}{dt} = .5$

$2r\frac{dr}{dt}\cdot\pi = \frac{da}{dt}$ $r = 1.5$

$3\frac{dr}{dt}\cdot\pi = \frac{da}{dt}$

$1.5\pi = \frac{da}{dt}$

$\boxed{\frac{da}{dt} = 4.71\ \text{in/min}}$

$300 = x$

$\frac{dy}{dt} = -11$

$100 = x$

$\tan\theta = \frac{x}{100}$

$\sec^2\theta\,\frac{d\theta}{dt} = \frac{1}{100}\frac{dy}{dt}$

$\sec = \left(\frac{\sqrt{100000}}{100}\right)^2$

$\frac{100000}{10000}\frac{d\theta}{dt} = -\frac{11}{100}$

$\boxed{\frac{d\theta}{dt} = .011\,\frac{rad}{s}\ \text{or}\ \frac{11}{1000}\,\frac{rad}{s}}$

$4\ \text{ft/s} = \frac{dx}{dt}$

$\frac{dy}{dt} = ?\ @\ x = 3$

$x^2 + y^2 = 18^2$

3^2 $y = 17.7$

$2x\frac{dx}{dt} + 2y\frac{dy}{dt} = 0$

$3(-4) + (17.7)\left(\frac{dy}{dt}\right)$

$0.678\ \text{ft/s} = \frac{dy}{dt}$

$\frac{b}{5} = \frac{h}{5}$

$b = h$

$V = 5bh$

$V = 5h^2$

$\frac{dV}{dt} = 10h\,\frac{dh}{dt}$

$3 = 10(3)\frac{dh}{dt}$

$\frac{dh}{dt} = 1/10\ \text{ft/s}$

1

BR

A helium balloon is being filled at a rate of $5\,in^3/min$. Find the rate of change when the radius is 4 in.

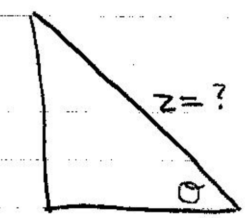
3

BR

Rock Climbers climb the side of a mountain going straight up at 3m/s. Chad is standing 15m away. What is the climber rate of change when they are 20m off the ground.

$\frac{dy}{dt} = 3m/s$

$y = 20m$

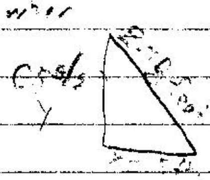


$\frac{d\theta}{dt} = ?$

2)

MK

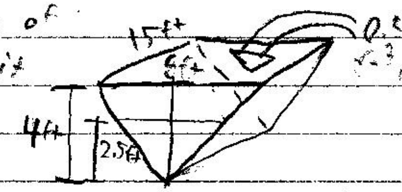
Katt Melly is moving into his new house. He is pulling his 18-foot couch up the side of his building. He is pulling at a rate that the couch is moving up the side of his house at 0.5 feet/sec. How fast is the end of his couch moving along the ground when the couch is 5 feet from the wall?



4)

MK

Katt Melly wishes to have his hot tub filled with hot nacho cheese at 0.5 cubic feet per minute. His hot tub is 4 feet deep, and in the shape of a triangular prism. It is 15 feet long and 8 feet across. Find the rate of change of the depth of the hot nacho cheese when it is 2.5 ft deep.



$\frac{dv}{dt} = 5 in/min \quad r = 4 in \quad \frac{dr}{dt} = ?$

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

$\frac{dV}{dt} = 4\pi(2)(4)^2 \frac{dr}{dt}$

$5 = 4\pi(4)^2 \frac{dr}{dt}$

$\frac{5}{201.1} = 201.1 \frac{dr}{dt}$

$\frac{dr}{dt} = .0249 \frac{\text{radons}}{\text{min}}$

$\tan^{-1}(\theta) \frac{20}{15} \quad \theta = 53.13 \quad z = 25$

$\tan\theta = \frac{y}{15}$

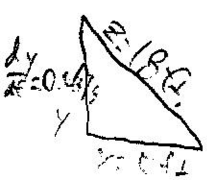
$\sec^2\theta \frac{d\theta}{dt} = \left(\frac{1}{15} \cdot \frac{dy}{dt}\right)$

$\sec^2\theta \frac{d\theta}{dt} = \left(\frac{1}{15} \cdot 3\right)$

$\left(\frac{25}{15}\right)^2 \frac{d\theta}{dt} = \frac{3}{15}$

2.8

$\frac{d\theta}{dt} = .07 \frac{\text{rads}}{\text{second}}$



$x^2 + y^2 = z^2 \quad y = \sqrt{z^2 - x^2}$

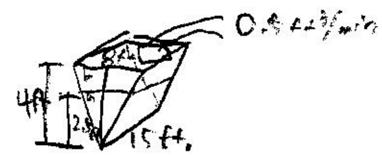
$x^2 + y^2 = 18^2 \quad x = 17.3 ft$

$2x\frac{dx}{dt} + 2y\frac{dy}{dt} = 0$

$x\frac{dx}{dt} = -y\frac{dy}{dt}$

$\frac{(5)\frac{dx}{dt}}{5} = \frac{-(17.3)(0.5)}{5}$

$\boxed{\frac{dy}{dt} = 1.73 ft/s}$



$\frac{b}{8} = \frac{h}{4}$

$b = 2h$

$V = \frac{1}{2} b \cdot h \cdot l$

$V = \frac{1}{2} b \cdot h \cdot 15$

$V = \frac{1}{2}(2h) \cdot h \cdot 15$

$V = h^2 \cdot 15$

$\frac{dV}{dt} = 30h\frac{dh}{dt}$

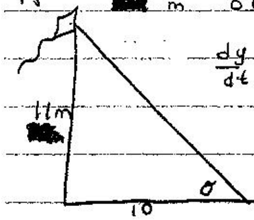
$0.5 = 30(2.5)\frac{dh}{dt}$

$\boxed{\frac{dh}{dt} = 0.0067 ft/min.}$

(2-D) 1)

A ball of yarn has a radius that is increasing at 7 in/min. Find the rate of change in the Area when the radius is 35 inches.

A kite is rising at a rate of 7 meters/minute. Carl is standing 10 meters away from the kite when it starts to rise. What is the rate of change of the angle of elevation of the kite, when the kite is 11 [redacted] m off the ground?



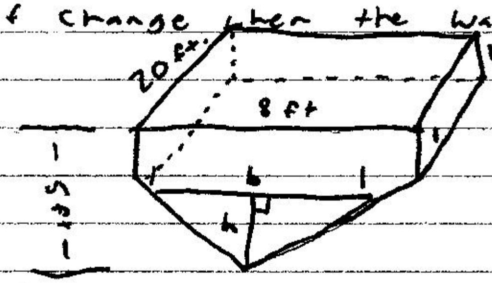
$\frac{dy}{dt} = 7$ m/min

#2 Tyle P|5 Jon Oeyeri

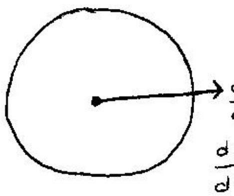
Jon is playing Pool. He sets his pool stick 2 feet away from the wall. It falls and slides along the floor at 4 ft/s. How fast is the Pool stick falling along the wall if the tip is 4 feet off the ground? and the Pool stick is 4.5 feet long.

#4 Tyle P|5 Jon Oeyeri

Jon is filling up his Pool for the Summer. The Pool is 20 ft. across, 8 ft wide, and 5 ft deep. If the water is flowing into the pool at a rate of 10 cubic feet/min, find the rate of change when the water is 2 feet deep?



PI



$\frac{dr}{dt} = 7 \text{ in/min}$

$\frac{dA}{dt} = ?$ $r = 35$ in

$A = \pi r^2$

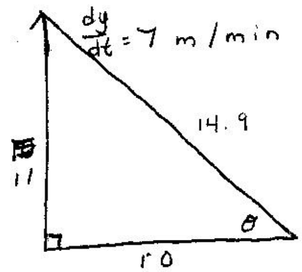
$\frac{dA}{dt} = \pi 2r \frac{dr}{dt}$

$\frac{dA}{dt} = \pi\, 2(35)(7)$

$\boxed{\frac{dA}{dt} = 1539.38 \text{ in}^3/\text{min}}$

as on sphere: $6{,}157.5 \text{ in}^2/\text{min}$

PI



$\frac{dy}{dt} = 7$ m/min

14.9

11

θ

10

$11^2 + 10^2 = 14.8$

$\tan\theta = \frac{y}{10}$

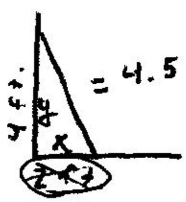
$\sec^2\theta \frac{d\theta}{dt} = \frac{1}{10} \frac{dy}{dt}$

$\sec\theta = \frac{14.9}{10}$

$\left(\frac{14.9}{10}\right)^2 \frac{d\theta}{dt} = \frac{1}{10}(7)$

$\boxed{\frac{d\theta}{dt} = .\ \text{rad/min}}$

.32



= 4.5

4 ft.

y

x

4ft/s

$\frac{dy}{dt} = ?$ $y = 4$ ft.

$y\left(\frac{dy}{dt}\right) = x\left(\frac{dx}{dt}\right) + c$

$4\left(\frac{dy}{dt}\right) = 2(4) + 4.5$

$\boxed{\frac{dy}{dt} = 8.5 \text{ ft/s}}$

$y = 4^2 \; x^2 = 4.5^2$ $x^2 + y^2 = 4.5^2$

$\cancel{2}x \frac{dx}{dt} + \cancel{2}y \frac{dy}{dt} = 0$

$(2.1)(4) + (4)\frac{dy}{dt} = 0$

$4\frac{dy}{dt} = -8.4$ $\boxed{\frac{dy}{dt} = -2.1 \text{ ft/s}}$

$V = \frac{1}{2} b \cdot h^2 \cdot 20$

$V = 10\, b \cdot h^2$

$V = 20 \cdot h^2$

$V' = 40 \cdot h\left(\frac{dh}{dt}\right)$

$\frac{dv}{dt} = 40 \cdot h\left(\frac{dh}{dt}\right)$

$10 = 40 \cdot 2\left(\frac{dh}{dt}\right)$

$\boxed{\frac{1}{8} = \frac{dh}{dt} \text{ or } \frac{1}{8} \text{ ft/min}}$

$B = \frac{8}{4}$ or 2

H = 2 feet

A spool of wire is spun and gains one foot to its radius every hour. Find the rate of change in area when the radius is 15 feet?

A magical tree grows at an incredible rate of 25 meters an hour. What is the rate of change of the angle of elevation when the tree is 85 meters tall and Nick is observing from 20 meters away?

problem [redacted] KT

Sam is filling up her swimming pool. It is 13 ft. across, 9 ft wide, and 7 ft deep. If the water is flowing i into the tank at a rate of 5 cubic feet/min, find the rate of change of the depth of the water when the water is 3[redacted]ft deep.

Jarret White

$$\frac{da}{dt} = \pi r^2 \qquad \frac{dr}{dt} = 1.0 \qquad r = 15$$

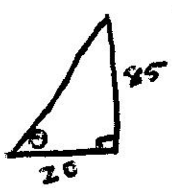
$$\frac{da}{dt} = 2\pi r \frac{dr}{dt}$$

$$\frac{da}{dt} = 2\pi 15(1)$$

$$\frac{da}{dt} = 30\pi$$

$$\frac{da}{dt} = 94.2 \text{ ft}^2/\text{hr}$$

Jarret White



$\uparrow$ 5 m/h

$$\sqrt{85^2 + 20^2} = 87.3$$

① $\tan\theta = \frac{85}{20}$

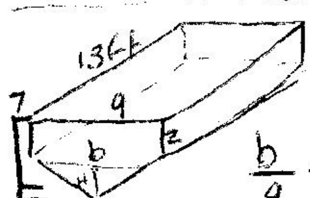
② $\sec^2\theta \frac{d}{td} = \frac{4}{20}$

③ $\sec^2\theta \frac{d\theta}{dt} = \frac{1}{25}\frac{dy}{dt}$

$$\sec^2\theta \frac{d\theta}{dt} = \frac{25}{20} \rightarrow \frac{76.8}{76.8}\frac{d\theta}{dt} = \frac{25}{20}\frac{1}{76.8}$$

$$\boxed{\frac{d\theta}{dt} = .016 \text{ rad/hour}}$$

Detailed Solution)



$$\frac{dV}{dt} = 5 \text{ ft}^3/\text{min} \qquad V = \tfrac{1}{2} bh \cdot 13$$

$$V = 6.5\, bh$$

$$\frac{b}{9} = \frac{h}{5}$$

$$b = \frac{9h}{5}$$

$$V = \frac{58.5}{5} h^2$$

$$\frac{dV}{dt} = \frac{117}{5}(h)\frac{dh}{dt}$$

$$5 = \frac{117}{5}(3)\frac{dh}{dt}$$

$$\frac{dh}{dt} = .0712 \text{ ft/min}$$