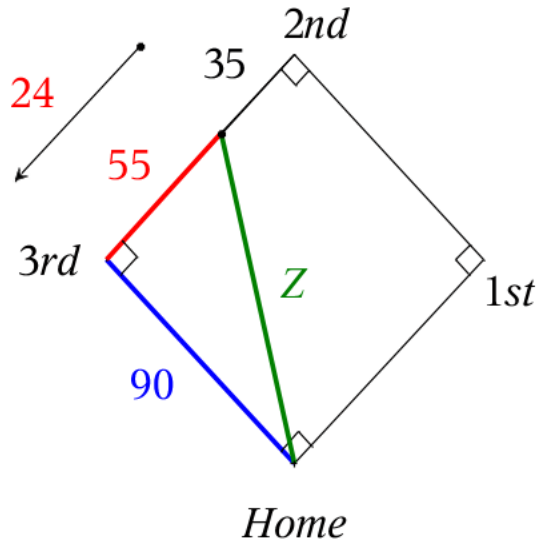
	A	B	C	D	E
=					
1	distance to third	35			
2	x	55	dx/dt	24	
3	y	90	dy/dt	0	
4	z	?	dz/dt	?	
5					
6					
7					
8					

A1 "distance to third"



1. At what rate is the player's distance from home base changing when he is 35 feet away from SECOND base to THIRD base provided that player's running speed is 24 ft./sec and is running towards THIRD base?

$$x^2+y^2=z^2$$

$$\frac{d}{dx}\left(x^2+y^2=z^2\right)\rightarrow 2x\cdot\frac{dx}{dt}+2y\cdot\frac{dy}{dt}=2z\cdot\frac{dz}{dt}$$

$$x = 90-35 = 55$$

$$z = \sqrt{[(90)^2+(55)^2]} = \sqrt{11125}$$

$$=5\cdot\sqrt{445}\approx 105.475$$

$$2(55)(24)+2(90)(0)=2\sqrt{11125}\,\frac{dz}{dt}$$

$$2640=2\sqrt{11125}\,\frac{dz}{dt}$$

$$\frac{dz}{dt}=2640/[2\sqrt{11125}]=\frac{264\cdot\sqrt{445}}{445}$$

$$\approx 12.5148\ \frac{ft}{sec}$$

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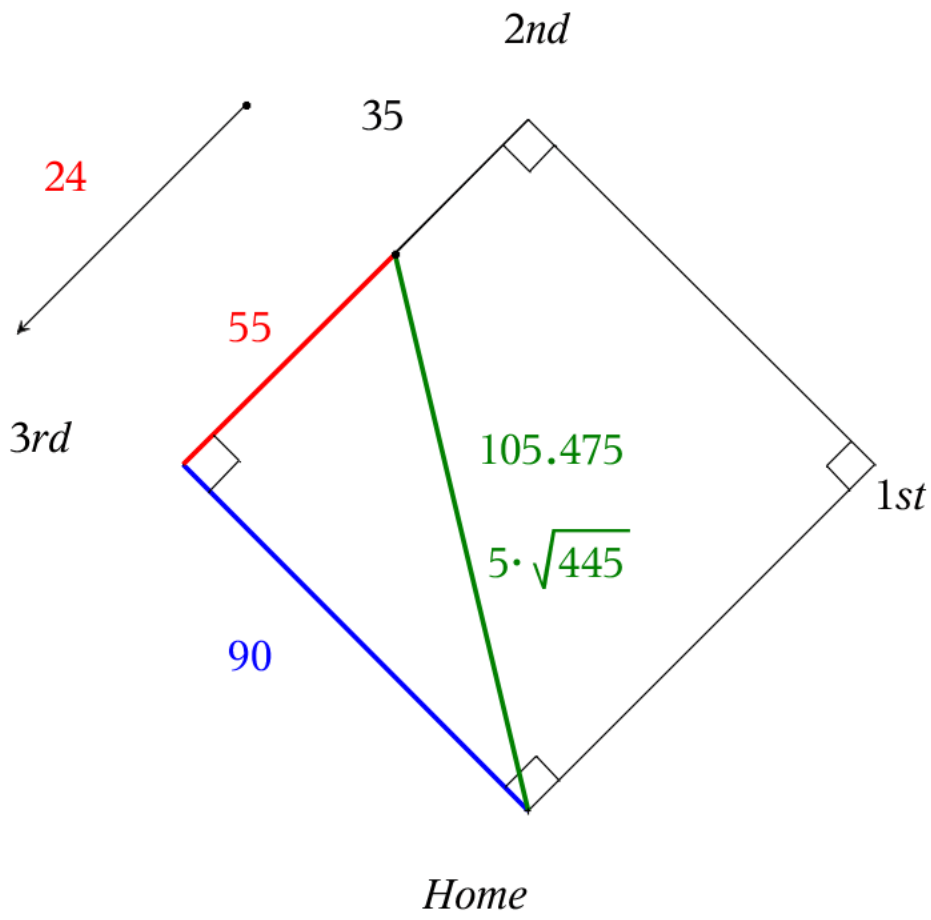
$$\approx 12.5148 \ \frac{ft}{\text{sec}}$$

Why is the rate of change negative?

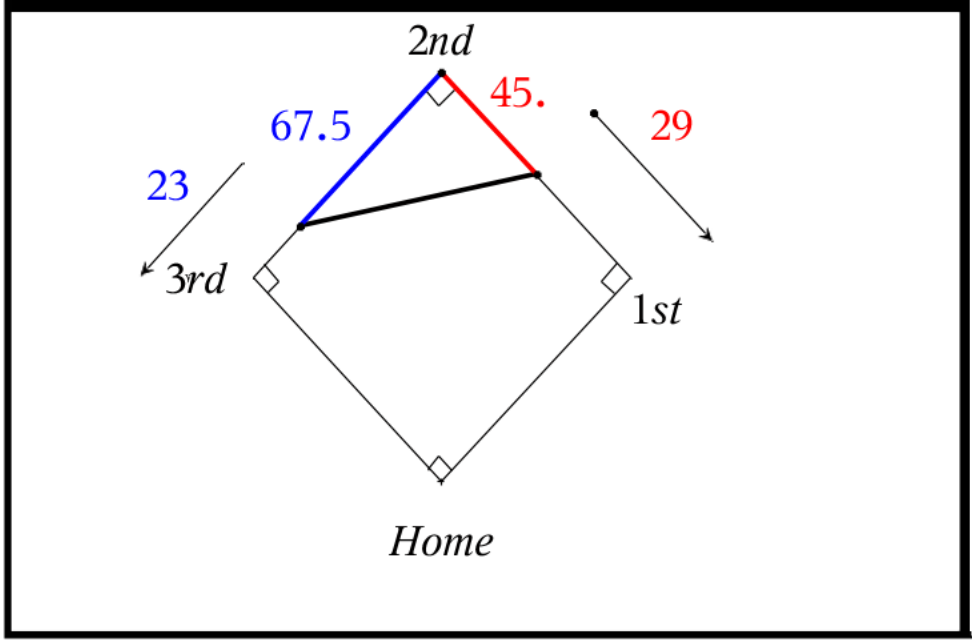
The distance to home is decreasing

failure to mention this caused a 1/2 point deduction either through the use of "−" or word decreasing



	A	B	C	D	E
=					
1	distance to first	45.			
2	distance to third	67.5			
3	x	45.	dx/dt	29	
4	y	67.5	dy/dt	23	
5	z	?	dz/dt	?	
6					
7					
8					

A1 "distance to first "



2. A ball is hit directly to second base, Player A, who was heading to second base from first base turns around and heads back to first base at a rate of 29 ft./sec. Player B was in the process of stealing third base from second base and his rate was 23 ft./sec. he continues to run toward third base. What is the rate of change in the distance between Player A and Player B if Player A was $\frac{1}{2}$ of the way to second and Player B was $\frac{3}{4}$ ths of the way to third base when the ball reached second base?

$$x^2+y^2=z^2$$

$$\frac{d}{dx}\left(x^2+y^2=z^2\right)\rightarrow 2x\cdot\frac{dx}{dt}+2y\cdot\frac{dy}{dt}=2z\cdot\frac{dz}{dt}$$

$$z=\sqrt{\left[(67.5)^2+(45.)^2\right]}=\sqrt{6581.}$$

$$=81.12\approx 81.1249$$

$x^2+y^2=z^2$

$$\frac{d}{\mathbf{dx}}\left(x^2+y^2=z^2\right)\rightarrow 2x\cdot\frac{\mathbf{dx}}{dt}+2y\cdot\frac{\mathbf{dy}}{dt}=2z\cdot\frac{\mathbf{dz}}{dt}$$

$z = \sqrt{6581.25} = 81.12 \approx 81.1249$

$$2(45.)(29)+2(67.5)(23)=2\sqrt{6581.25}\,\frac{\mathbf{dz}}{dt}$$

$$2610.+3105.=2\sqrt{6581.25}\,\frac{\mathbf{dz}}{dt}$$

$$5715.=2\sqrt{6581.25}\,\frac{\mathbf{dz}}{dt}$$

$$\frac{\mathbf{dz}}{dt}=5715./[2\sqrt{6581.}\,]=35.22$$

$$\approx 35.2235\ \frac{ft}{\text{sec}}$$

Why is this positive?

The distance between runners is increasing