

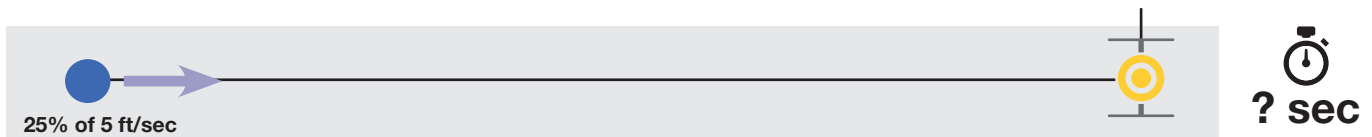
# FORMULA DRT- SOLUTIONS



Gyro JiJi Blue needs to go a distance of 15 feet. Gyro JiJi Blue travels at a speed of 3 feet/second. How long should Gyro JiJi Blue travel to end up under the laser box, so it will pop the balloon?

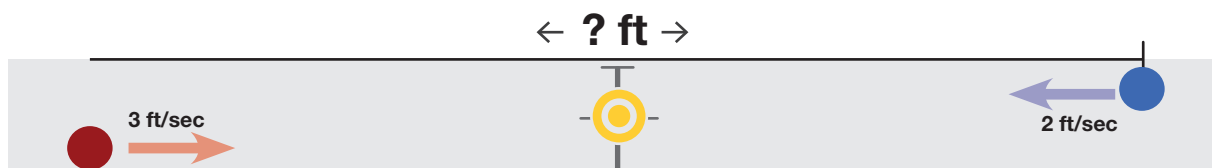
Intuitive Solution: Every second, Gyro JiJi Blue travels 3 feet. Counting by 3's to get to 15, it takes 5 seconds (counting by three's 5 times) to travel 15 ft.

Algebraic Solution: For distance, constant rate, and time we use the formula that  $distance = rate \times time$  or  $d = rt$ . For this problem,  $d = 15\text{feet}$  and  $r = 3\frac{\text{feet}}{\text{second}}$ . This gives,  $15 = 3t$ . So  $t = \frac{15}{3} = 5$  seconds.



The max speed of Gyro JiJi Red is 5 feet/second. If Gyro JiJi Red needs to travel 10 feet and travels at 25% of its max speed, how long does it take to end up under the laser box, so it will pop the balloon?

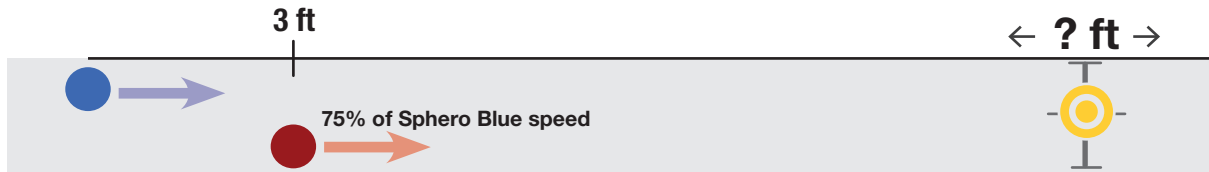
Solution: Gyro JiJi Red is travelling at  $1.25\frac{\text{feet}}{\text{second}}$  because  $(0.25) \times 5 = 1.25$ . Using the same  $d = rt$  equation as above,  $10 = 1.25t$  and so  $t = \frac{10}{1.25} = 8$  seconds.



Gyro JiJi Red travels at 3 feet/second. Gyro JiJi Blue travels at 2 feet/second. Gyro JiJi Red and Gyro JiJi Blue are 15 feet apart. They both start at the same time. Where should you place the balloon popper, so both Gyro JiJis pass under it at the same time and pop the balloon?

Solution: Both balls travel for the same amount of time. Each second, the two roll closer to each other and use up a total of 5 feet. So, they are moving together at a speed of  $5\frac{\text{feet}}{\text{second}}$ . There are 15 total feet to travel, so it takes 3 seconds for the balls to meet. Each ball, travels for 3 seconds. This means that we need the popper 9 feet away from Gyro JiJi Red and 6 feet away from Gyro JiJi Blue because of the equation  $d = rt$ .

$$d_{red} = rt = 3 \times 3 = 9 \text{ and } d_{blue} = rt = 2 \times 3 = 6.$$



Gyro JiJi Red is 3 feet ahead of Gyro JiJi Blue and travels at 75% of Gyro JiJi Blue's speed. They both start at the same time. Where should you place the balloon popper so both Gyro JiJi pass under it at the same time?

Intuitive Solution: The extra speed that Gyro JiJi Blue has needs to use up 3 feet, this extra speed is 25% of its own speed. Because they are both rolling for the same amount of time, the 25% additional speed means 25% additional distance. So, we need that 25% gives us 3 feet. Proportionally, 50% gives us 6 feet, 75% gives us 9 feet, and 100% gives us 12 feet. Gyro JiJi Blue will travel 12 feet and then the two will be at the same popper. Gyro JiJi Red will have to travel just 9 feet.

Algebraic Solution: We will use letters to represent the respective distances, rates, and times for each Gyro JiJi.

$d_r$  = distance for Gyro JiJi Red

$r_r$  = rate for Gyro JiJi Red

$t_r$  = time for Gyro JiJi Red

$d_b$  = distance for Gyro JiJi Blue

$r_b$  = rate for Gyro JiJi Blue

$t_b$  = time for Gyro JiJi Blue

What we know:

$d_b = d_r + 3$ . Gyro JiJi Blue needs to travel 3 more feet than Gyro JiJi Red.

$t_b = t_r$ . Since they are the same, let's just use  $t$  for time and save the hassle of red versus blue.

$r_r = (0.75)r_b$ . Gyro JiJi Red travels at 75% of Gyro JiJi Blue's speed.

Using the formula for  $distance = rate \times time$  and using  $t$  for both gyro JiJi's we have:

$$d_b = d_r + 3$$

$$r_b t = r_r t + 3$$

$$r_b t - r_r t = 3$$

$$(r_b - r_r)t = 3$$

$$(r_b - (0.75)r_b)t = 3$$

$$(0.25)r_b t = 3$$

$$\left(\frac{1}{4}\right)r_b t = 3$$

$$r_b t = 3 \times 4. \text{ Remember that } d_b = r_b \times t$$

$$d_b = 12$$

Gyro JiJi Blue travels 12 feet.