Opposite Direction Travel:

Two people start at the same spot and travel in opposite directions. What is true about the distances traveled?

The distance they are apart equals the SUM of their distances.

Opposite Direction Travel

Omar heads due east in his boat and sails for 4 hours. Dwayne heads due west in his boat 5 faster than Omar and sails for 3 hours.
When they both have stopped they are 127 miles apart.
How fast were they both sailing?
What do you do with their distances? Add them and set equal to 127

	Distance =	Rate •	Time
Omar	4r	r	4
Dwayne	3(r + 5)	r + 5	3

$4r + 3(r + 5) = 127$
$4r + 3r + 15 = 127$
$7r + 15 = 127$
$-15 \quad -15$
$7r = 112$
$r = 16$

Omar is sailing 16 mph
Dwayne is sailing 21 mph

You left the house traveling 20 mph. Your brother left the house 15 minutes later traveling 25 mph. Set up equations that would help find the amount of time it would take your brother to catch you. Distances are equal

	Distance =	Rate •	Time
you	20t	20	t
brother	25(t - 0.25)	25	t- 0.25

$20t = 25(t - 0.25)$
$20t = 25t - 6.25$
$-25t \quad -25t$
$\frac{-5t}{-5} = \frac{-6.25}{-5}$
$t = 1.25$

Brother's time = t - 0.25 = 1.25 - 0.25
= 1 hour

Your drive to work in the morning took 1 1/2 hours. On the way home there was an accident so the drive took 2 hours and you traveled 15 mph slower. How fast did you drive in the morning? Distances are equal

	Distance =	Rate •	Time
To work	1.5r	r	1.5
To home	2(r - 15)	r - 15	2

$1.5r = 2(r-15)$
$1.5r = 2r - 30$
$-2r \quad -2r$
$-0.5r = -30$
r = 60mph to work in the moring.

60 mph

Two planes leave the same airport at the same time traveling in opposite directions. One plane travels 40 mph slower than the other plane. After 6 hours they are 4560 miles apart. Find how fast each plane is traveling. Add distances and set = 4560

	Distance =	Rate •	Time
1st	6x	x	6
2nd	6(x - 40)	x - 40	6

1st plane flew 400 mph
2nd plane flew 400-40 = 360 mph

$$6x + 6(x - 40) = 4560$$
$$6x + 6x - 240 = 4560$$
$$12x - 240 = 4560$$
$$+240 \quad +240$$
$$\frac{12x}{12} = \frac{4800}{12}$$
$$x = 400 \text{ mph}$$