

# Systems - Uniform Motion

#10

Why did the camper...

① opposite = add  $h = \text{hrs}$ , until 60

|         | r | t | d  |          |
|---------|---|---|----|----------|
| Camel 1 | 9 | h | 9h | km apart |
| Camel 2 | 7 | h | 7h |          |

$9h + 7h = 60$

$16h = 60$

$h = 3.75$

In 3.75 hrs, they will be 60 km apart.

② opposite = add

|         | r   | t | d      |                          |
|---------|-----|---|--------|--------------------------|
| Camel 1 | r   | 4 | 4r     | r = rate of slower camel |
| Camel 2 | r+3 | 4 | 4(r+3) |                          |

$4r + 4(r+3) = 68$

$4r + 4r + 12 = 68$

$8r = 56$

$r = 7$

The faster camel's rate is 10 km/hr.

③ opposite = add

|       | r  | t   | d       |                |
|-------|----|-----|---------|----------------|
| Car A | 9  | d   | 9d      | d = days car A |
| Car B | 10 | d-5 | 10(d-5) | waiting        |

$9d + 10(d-5) = 800$

$9d + 10d - 50 = 800$

$19d = 850$

$d = 44.7$

Car A will have traveled 44.7 days.

④ same = set =

|         | r   | t   | d        |                     |
|---------|-----|-----|----------|---------------------|
| plane 1 | 370 | h   | 370h     | h = hours 1st plane |
| plane 2 | 450 | h-2 | 450(h-2) | flies               |

$370h = 450(h-2)$

$370h = 450h - 900$

$-180h = -900$

$h = 5$

2nd plane will catch up after 3 hrs.

⑤ same = set =

|        | r  | t   | d       |                  |
|--------|----|-----|---------|------------------|
| Torque | 12 | h   | 12h     | h = hours Torque |
| broken | 39 | h-3 | 39(h-3) | rides            |

$12h = 39(h-3)$

$12h = 39h - 117$

$-27h = -117$

$h = 4\frac{1}{3}$

Torque had been riding 4 1/3 hrs

⑥  $12(4\frac{1}{3}) = 52$

Torque traveled 52 miles

⑦ round trip = set =

|      | r  | t  | d       |                              |
|------|----|----|---------|------------------------------|
| UP   | 4  | h  | 4h      | h = hours riding up mountain |
| down | 20 | 3h | 20(3-h) | mountain                     |

$4h = 20(3-h)$

$4h = 60 - 20h$

$24h = 60$

$h = 2.5(4) = 10$

She went 10 miles up the mountain.

⑧ round trip = set =

|      | r   | f     | d        |
|------|-----|-------|----------|
| east | 200 | h     | 200h     |
| west | 300 | (4-h) | 300(4-h) |

h = hours flying each

$$200h = 300(4-h)$$

$$200h = 1200 - 300h$$

$$500h = 1200$$

$$h = 2.4(200) = \boxed{720}$$

The plane traveled 720 km from the airport.

⑨ round trip = set =

|            | r  | f     | d       |
|------------|----|-------|---------|
| west car   | 12 | h     | 12h     |
| downstream | 20 | (4-h) | 20(4-h) |

h = hours traveling upstream

$$12h = 20(4-h)$$

$$12h = 80 - 20h$$

$$32h = 80$$

$$h = 2.5(12) = \boxed{30}$$

The boat can travel 30 miles upstream.

# Systems - Uniform Motion

#7

Kuber

① round trip = set =

|         | r | t | d  |
|---------|---|---|----|
| to Guam | r | 3 | 3r |
| back    | 4 | 4 | 24 |

$r = \text{speed of trip there}$

$3r = 24$

$r = 8$

The speed there was 8 mph.

② round trip = set =

|              | r   | t | d    |
|--------------|-----|---|------|
| to Las Vegas | 432 | h | 432h |
| back         | 480 | 9 | 4320 |

$h = \# \text{ hrs. to Las Vegas}$

$432h = 4320$

$h = 10$

It took 10 hrs. to get to Las Vegas.

③ same = set =

|              | r  | t  | d   |
|--------------|----|----|-----|
| Carlu train  | r  | 18 | 18r |
| diesel train | 45 | 4  | 180 |

$r = \text{Carlu train speed}$

$18r = 180$

$r = 10$

The Carlu train's speed was 10 mph.

④ same = set =

|      | r  | t   | d       |
|------|----|-----|---------|
| Jose | 40 | h+t | 40(h+t) |
| Rob  | 48 | 5   | 240     |

$h = \text{hrs. Jose drove}$

$40(h+t) = 240$

$40h + 200 = 240$

$40h = 40$

$h = 1$

Jose drove for 1 hr. before Rob caught up.

⑤ round trip = set =

|       | r   | t   | d        |
|-------|-----|-----|----------|
| there | 200 | h   | 200h     |
| back  | 200 | h+1 | 200(h+1) |

$h = \text{hrs. to get there}$

$200h = 200(h+1)$

$200h = 200h + 200$

$200h = 200$

$h = 1$

The trip there took 1 hrs

⑩ opposite = add

|      | r  | t   | d       |
|------|----|-----|---------|
| Kali | 40 | h   | 40h     |
| Matt | 50 | h-1 | 50(h-1) |

$h = \text{hrs. Kali travels}$

$40h + 50(h-1) = 400$

$40h + 50h - 50 = 400$

$90h = 450$

$h = 5$

Matt needs to travel 4 hrs

⑦ same = set =

|           | r  | t | d       |
|-----------|----|---|---------|
| Ryan      | r  | 5 | 5r      |
| Gabriella | 40 | 2 | 2(40+r) |

$r = \text{Ryan's speed}$

$5r = 2(40+r)$

$5r = 80 + 2r$

$3r = 80$

$r = 28$

Ryan's speed was 28 mph.

⑧ opposite = add

|          | r  | t  | d                 |
|----------|----|----|-------------------|
| sub      | r  | 11 | 11r               |
| aircraft | 25 | 9  | 225               |
|          |    |    | $11r + 225 = 280$ |
|          |    |    | $11r = 55$        |
|          |    |    | $r = 5$           |

r = submarine's speed

The submarine's speed was 5 mph.

⑨ opposite = add

|         | r  | t | d                  |
|---------|----|---|--------------------|
| Museu   | 34 | h | 34h                |
| Jasmine | 65 | h | 65h                |
|         |    |   | $34h + 65h = 59.4$ |
|         |    |   | $99h = 59.4$       |
|         |    |   | $h = .6$           |

h = hrs. until 59.4 km apart

Jasmine should travel .6 hours

⑩ same = subtract =

|      | r    | t   | d                  |
|------|------|-----|--------------------|
| Jose | r    | 3.3 | 3.3r               |
| Kyle | r+35 | 1.2 | 1.2(r+35)          |
|      |      |     | $3.3r = 1.2(r+35)$ |
|      |      |     | $3.3r = 1.2r + 42$ |
|      |      |     | $2.1r = 42$        |
|      |      |     | $r = 20$           |

r = Jose's speed

Jose traveled at 20 mph.

# Systems - Uniform Motion #8

What happened when General

① opposite = add

|         | r   | t | d    |       |
|---------|-----|---|------|-------|
| train 1 | 83  | h | 83h  | UD mi |
| train 2 | 107 | h | 107h | apart |

83h + 107h = 600  
 $190h = 600$   
 $h = 3.16$

After 4 hrs, they'll be 600 mi apart.

② opposite = add

|         | r  | t   | d       |                      |
|---------|----|-----|---------|----------------------|
| train 1 | 50 | h   | 50h     | h = hours<br>train 1 |
| train 2 | 70 | h-1 | 70(h-1) | traveled             |

50h + 70(h-1) = 350  
 50h + 70h - 70 = 350  
 $120h = 420$   
 $h = 3.5$

The 1st train traveled 3.5 hrs.

③ opposite = add

|         | r   | t | d    |                               |
|---------|-----|---|------|-------------------------------|
| plane 1 | 170 | h | 170h | h = hrs, until<br>planes pass |
| plane 2 | 210 | h | 210h |                               |

170h + 210h = 950  
 $380h = 950$   
 $h = 2.5$

The planes will pass in 2.5 hrs.

General

④ opposite = add

|        | r | t   | d      |                            |
|--------|---|-----|--------|----------------------------|
| Romeo  | 5 | s   | 5s     | s = seconds<br>after Romeo |
| Juliet | 4 | s-3 | 4(s-3) | 500 Juliet                 |

5s + 4(s-3) = 87  
 5s + 4s - 12 = 87  
 $9s = 99$   
 $s = 11$

They met 11 seconds later.

⑤ S(11) = 55

He ran 55 meters

⑥ same = set =

|       | r  | t   | d       |                        |
|-------|----|-----|---------|------------------------|
| cow 1 | 30 | h   | 30h     | h = hours 1st<br>cow 1 |
| cow 2 | 40 | h-2 | 40(h-2) | traveled               |

30h = 40(h-2)  
 30h = 40h - 80  
 $-10h = -80$   
 $h = 8$

The 1st cow 1 traveled 8 hrs.

⑦ same = set =

|         | r   | t   | d        |                   |
|---------|-----|-----|----------|-------------------|
| Bart    | 70  | h   | 70h      | h = hours<br>Bart |
| Policia | 100 | h-5 | 100(h-5) | traveled          |

70h = 100(h-5)  
 70h = 100h - 500  
 $-30h = -500$   
 $h = 16.67$

Bart traveled 16.67 hrs. when policia

⑧ opposite = add

|       |   |      |         |             |
|-------|---|------|---------|-------------|
|       | r | f    | d       | s = seconds |
| Belle | 2 | 5    | 25      | Belle swims |
| Max   | 5 | 5-10 | 5(s-10) |             |

$$25 + 5(s-10) = 230$$

$$25 + 5s - 50 = 230$$

$$75 = 280$$

$$s = 40$$

Belle swims 40 seconds when  
Max reaches her.

⑨  $40 - 10 = 30 \text{ sec. } (s) = \boxed{150}$

Max will have swum 150 feet.