**Section 1–4C: Motion Problems**

**Physics Review:**

* $Distance\left(d\right)=Rate\left(r\right)∙Time\left(t\right)$

**Example 1:**

Fill out this chart:

|  |  |  |  |
| --- | --- | --- | --- |
| 　 | **RATE** | **TIME** | **DISTANCE** |
| **A** | 50 mph | 3 hours | **?** |
| **B** | 100 mph | **?** | 200 miles |
| **C** | **?** | 2 hours | 100 miles |

1. $distance=rate∙time=50 \frac{miles}{hour}∙3 hours=150 miles$
2. $distance=rate∙time \rightarrow time=\frac{distance}{rate}=\frac{200 miles}{100 \frac{miles}{hour}}=2 hours$
3. $distance=rate∙time \rightarrow rate=\frac{distance}{time}=\frac{100 miles}{2 hours}=50 \frac{miles}{hour}$

**Example 2:**

Fill out this chart:

|  |  |  |  |
| --- | --- | --- | --- |
| 　 | **RATE** | **TIME** | **DISTANCE** |
| **A** | *x* | 4 | **?** |
| **B** | *x* + 10 | 3 | **?** |
| **C** | 40 | t | **?** |

1. $distance=rate∙time=x∙4=4x$
2. $distance=rate∙time=\left(x+10\right)∙3=3x+30$
3. $distance=rate∙time=40∙t=40t$

When you encounter a math word problem and you don’t know where to start, it is always a great idea to draw a picture to visualize the problem. See Examples 3.

**Example 3:**

Car A travels west at 42 mph. Car B travels east at 48 mph. When will they be 270 miles apart?

**Diagram:**



Let ***t* = time** the cars traveled.

$$Distance Apart = Distance Car A Traveled + Distance Car B Traveled$$

$$270 miles=42\frac{miles}{hour}∙t+48\frac{miles}{hour}∙t$$

$$270 miles=90\frac{miles}{hour}∙t$$

$$t=\frac{270 miles}{90 \frac{miles}{hour}}$$

$$t=3 hours$$

\*\*You should always check the unit(s) of your answer. For example, you should have seconds, minutes, or hours for the unit of time and miles, meters, or kilometers for the unit of distance. If your answer does not contain an appropriate unit(s), then your answer might be incorrect.