```
In[•]:= Remove["Global`*"]
```

# Parallel Trains in One Dimension

## Define the equations and solve them

```
In[•]:= x1 = (1/2) a1 t^2;  x2 = v0 t - (1/2) a2 t^2;
        soln = Solve[x1 == x2, t]
        tFinite = Part[Part[soln, 2], 1]
```

$$\text{Out[•]= } \left\{\{t \to 0\}, \left\{t \to \frac{2\ v0}{a1 + a2}\right\}\right\}$$

$$\text{Out[•]= } t \to \frac{2\ v0}{a1 + a2}$$

## Check the solutions

```
In[•]:= x1Meet = x1 /. tFinite
```

$$\text{Out[•]= } \frac{2\ a1\ v0^2}{(a1 + a2)^2}$$

```
In[•]:= x2Meet = x2 /. tFinite
```

$$\text{Out[•]= } -\frac{2\ a2\ v0^2}{(a1 + a2)^2} + \frac{2\ v0^2}{a1 + a2}$$

```
In[•]:= Simplify[x2Meet]
```

$$\text{Out[•]= } \frac{2\ a1\ v0^2}{(a1 + a2)^2}$$

## Put in the numbers

```
In[•]:= vals = {a1 → 0.5, a2 → 0.2, v0 → 20};
        x1Meet /. vals
Out[•]= 816.327

In[•]:= t /. tFinite /. vals
Out[•]= 57.1429
```