


## Algebra Type of Problems in AMC

<p><b>AMC 8 – Beginner Level</b></p> <p>Jenny is driving from home to work. If she drives at 50 miles per hour, she will arrive 15 minutes late. However, if she drives at 60 miles per hour, she will arrive 10 minutes early. How far is Jenny's workplace from her home?</p>	<p>Let <math>d</math> miles be the distance to work.</p> $\frac{d}{50} - \frac{d}{60} = \frac{1}{4}$ $\frac{6d-5d}{300} = \frac{1}{4}$ $d = 75$
<p><b>AMC 8 – Intermediate Level</b></p> <p>Jeremy's father drives him to school in rush hour traffic in 20 minutes. One day there is no traffic, so his father can drive him 18 <u>miles per hour</u> faster and gets him to school in 12 minutes. How far in miles is it to school?</p> 	<p>Let <math>d</math> miles be the distance.</p> <p>Let <math>x</math> mph be the speed.</p> $\frac{d}{x} = \frac{20}{60} \dots\dots \textcircled{1}$ $\frac{d}{x+18} = \frac{12}{60} \dots \textcircled{2}$ $\frac{\textcircled{1}}{\textcircled{2}} = \frac{x+18}{x} = \frac{20}{12} = \frac{5}{3}$ $3x + 54 = 5x$ $x = 27$ $d = 27 \times \frac{1}{3} = 9$
<p><b>AMC 8 – Advanced Level (AMC 10)</b></p> <p>Tom is driving to a meeting located 75 miles away. At his usual speed, he would arrive 10 minutes late. However, if he increases his speed by 15 miles per hour, he would arrive 15 minutes early. How much faster than his usual speed does Tom need to drive to arrive exactly on time?</p>	<p>Let <math>x</math> mph be his normal speed.</p> <p>Let <math>t</math> hr be the time needed to be perfectly on time.</p> $10 \text{ min} = \frac{1}{6} \text{ hr}$ $15 \text{ min} = \frac{1}{4} \text{ hr}$ $\frac{75}{x} = t + \frac{1}{6} \dots\dots \textcircled{1}$ $\frac{75}{x+15} = t - \frac{1}{4} \dots \textcircled{2}$ $\textcircled{1} - \textcircled{2}$ $\frac{75}{x} - \frac{75}{x+15} = \frac{5}{12}$ $\frac{15}{x} - \frac{15}{x+15} = \frac{1}{12}$ $x(x+15) = 180(15) = 45 \times 60$ $x = 45$ $t = 1.5 \text{ hr}$ $\frac{75}{1.5} = 50$ $50 - 45 = 5 \text{ mph faster}$