

Although not required on a daily basis, it is often necessary to make various calculations relating to the rapid motion of the axes. Such calculations are often used, for example, during program optimization, to be included in time studies, or even to find the rapid rate of the machine itself. In the following exercises, 100% rapid override setting is assumed (control panel) and reasonable rounding is allowed when required. For all formulas, two of three variable data must be known, the third one has to be calculated. The formulas are based on:

- ❑ Rapid rate per minute for a selected axis (uses **R** in the formula)
- ❑ Length of axis motion (uses **L** in the formula)
- ❑ Time in seconds required to make a motion (uses **T** in the formula)

Make sure that the units entered into a formula are consistent. You must complete the first three question before proceeding with the remaining ones:

#	Question	Answer
1	Develop a formula for L - if R and T are known	
2	Develop a formula for T - if L and R are known	
3	Develop a formula for R - if L and T are known	
4	If the machine rapid rate is 25000 mm/min and the time required for axis motion is 1.5 seconds, <i>... what is the axis motion length?</i>	
5	If length of axis motion is 650 mm and the machine rapid traverse rate is 20000 mm/min, <i>... what is the time in seconds to complete the motion?</i>	

6	<p>If the length of axis motion is 14.734 inches and the time required for its completion is 2.21 seconds,</p> <p>... what is the rapid traverse rate of the machine?</p>	
7	<p>A tool takes 2.13 seconds to move between locations X107.6Y63.85 and X711.1 Y355.45 (absolute coordinates);</p> <p>... what is the rapid traverse rate of the machine?</p>	
8	<p>If it takes 1.78 seconds at a rapid rate of 18000 mm/min,</p> <p>... what is the axis motion length?</p>	
9	<p>If it takes 1.89 seconds to move the axis 18.9 inches,</p> <p>... what is the rapid traverse rate of the machine?</p>	
10	<p>A tool rapids simultaneously 403.33 mm along the X axis and 285.75 mm along the Y axis at 22000 mm/min rate;</p> <p>... what is the time in seconds to complete the motion?</p>	