

# Answers to Exercises

If you are attending a class that uses this text, your instructor may ask you not to look at these answers prior to submitting your work. (Each exercise can be removed from this text without removing any content.) On the other hand, if you are reading this text on your own, you can use these answers to check your work.

## Exercise 1: Machine Configurations

- |   |  |
|---|--|
| 1) true   | 8) M03 - spindle on forward<br>M04 - spindle on reverse<br>M05 - spindle off |
| 2) true   |  |
| 3) false  | 9) c. S word   |
| 4) Answers can include chucking style, twin spindle horizontal style, vertical style, twin spindle vertical style, engine lathe style, and gang style. We also mentioned Swiss style turning centers.                         | 10) b. F word  |
| 5) a. The X axis is the motion direction perpendicular to the spindle centerline. It is the diameter-controlling axis.<br>b. The Z axis is the motion direction to the spindle centerline. It is the length-controlling axis. |  |
| 6) a. X plus (for most machines) is the direction opposite the spindle centerline (getting bigger in diameter).<br>b. Z plus is the direction opposite the chuck face.  |  |
| 7) The T word has a four digit format. The first two digits specify the tool station number. The second two digits specify the wear offset number.  |  |

### Extension question answers:

- 11) This process breaks an important rule of basic machining practice which states “you should rough everything before you finish anything. The finish face and turn operation should not be done until after the drilling and rough boring is completed.
- 12) We cannot provide answers to this question. Your company or school could have a bar feeder, steady-rest, tool touch-off probe, part catcher, live tooling, automatic tool changer, and many other programmable devices.

## Exercise 2: Visualizing Program Execution

- |  |   |
|--|---|
| 1) a. the operation being performed<br>b. the material being machined<br>c. the material of the cutting tool | 7) true   |
| 2) in surface feet per minute (meters per minute in metric)  | 8) false  |
| 3) in per-revolution fashion   | 9) true   |
| 4) $\text{rpm} = \text{sfm times } 3.82 \text{ divided by cut}$  | 10) G96 S400 M03  |
| 5) a. in surface feet per minute (or meters per minute): G96<br>b. in rpm: G97                               | 11) G97 S550 M04  |
| 6) a. in per-revolution fashion (ipr or mmpr): G99<br>b. in per-minute fashion (ipm or mppm):                | 12) a. easy to program spindle speeds<br>b. finish is consistent throughout workpiece<br>c. tool life is improved |