

MN213

MACHINERY'S HANDBOOK



**STUDENT STUDY MANUAL FOR
CHALLENGE EXAMINATION**

Revised Fall 2008



Department: **Apprenticeship Training**
Course Title: **MN-213 Machinery's Handbook**

A. Course Description

Industrial workers learn to use the handbook to solve problems involving square roots, circle formulas, tapers, threads, oils, coolants, and steel fabrication.

B. Student Performance Objectives

1. Given a test on powers, roots, and reciprocals of numbers, the student will solve the problems with an accuracy of 90%.
2. Given a test on the area, radius, diameter, and circumference of a circle, the student will solve the problems with 90% accuracy.
3. Given a test on the chordal dimensions and segments of a circle, the student will solve the problems with 90% accuracy.
4. Given a test on spheres and spherical segments, the student will solve the problems with accuracy of 90%.
5. Given a test on formulas, the student will solve the problem by transposing numbers with 90% accuracy.
6. Given a test on areas and volumes of geometric figures, the student will solve the problems with 90% accuracy.
7. Given a test on angles and functions of angles, the student, using a trigonometric function table, will solve the problems with 90% accuracy.
8. Given a test involving the solution of right triangles and oblique triangles, the student, using trigonometric tables and formulas, will solve the problems with accuracy of 85%.
9. Given a test on taper per inch and foot, the student will solve the problems with 85% accuracy.
10. Given a test on machine parts, the student will give allowance and tolerance for each part with 90% accuracy.

11. Given a test on screw thread, the student will identify screw threads with 90% accuracy.
12. Given a test on cutting speeds and feeds for machining of metal, the student will solve the problems with accuracy of 90%.

C. Testing Conditions/Recommended Materials

1. Machinery's Handbook, 27th edition
2. Calculator
3. Machinery's Handbook Guide

D. Test Norm Levels

	Points Per Problem	Total Points Needed
25 Questions	4	72

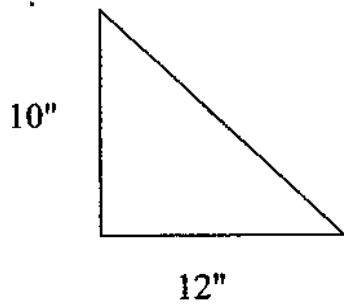
E. Test Format and Procedures

The test is to be completed within a three-hour period. Multiple choice format. Because the test is an open-book format, it is not necessary to memorize any of the formulas or calculations. However, because time is limited, you should have a good understanding of where material is located in the Handbook and how to apply the formulas.

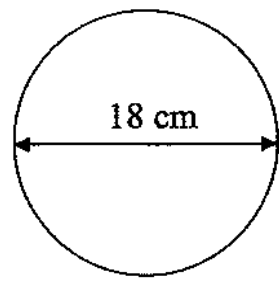
Name _____

Date _____

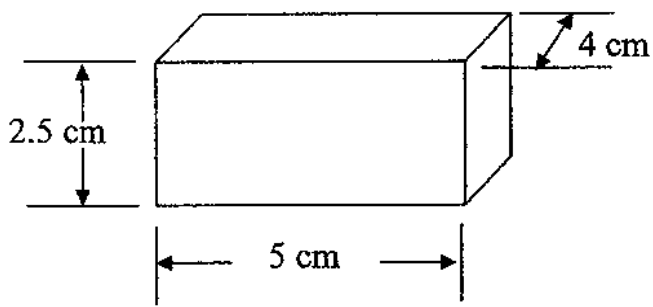
1. Using a Cutting Speed of 80 SFM, what is the correct RPM (revolutions per minute) to turn a shaft on a lathe that measures 2.5 inches in diameter?
2. What is the correct RPM and IPM (inches per minute) for a 4 flute, $\frac{1}{2}$ diameter end mill using a Cutting Speed of 200 SFM, and a chip load of .004 per tooth?
3. What is the correct tap drill for $\frac{1}{4}$ -20 NC tapped hole?
4. What is the correct clearance drill for a $\frac{3}{8}$ SHCS (normal fit)?
5. What diameter is a "Q" drill?
6. What is the diameter of a circle with an area of 33.18307 in² ?
7. What is the TPI (taper per inch) of a 12 inch long shaft that measures .625 at one end and 1.350 at the other end?



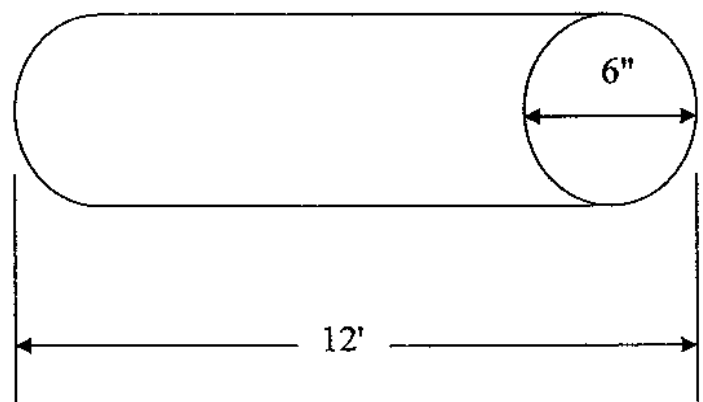
Area = _____



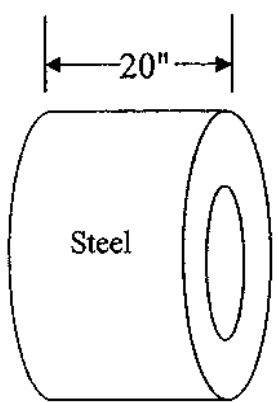
Area = _____



Volume = _____



Volume = _____



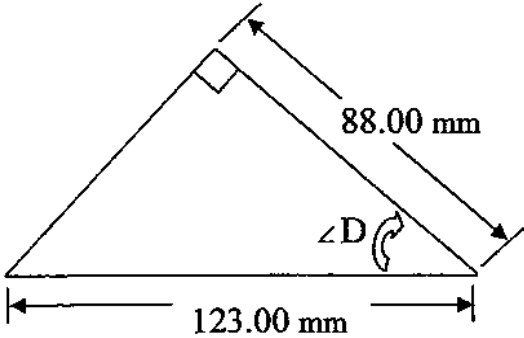
O.D. = 4.5'

I.D. = 18"

Volume = _____

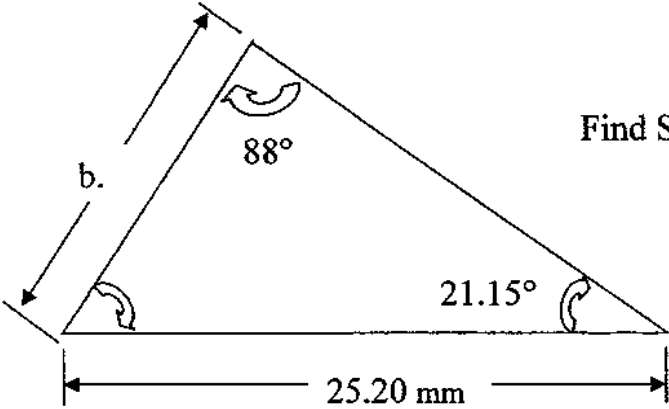
Weight (lbs) = _____

Right Angle Trigonometry



Determine $\angle D$ _____

Law of Sines



Find Side b : _____

Handbook Questions – Answers

1. 128 RPM (\pm depending on formula used)
2. 1600 RPM (\pm depending on formula used)
25.6 IMP (\pm depending on calculated RPM)
3. #7 drill
4. 13/32 drill
5. .332 inch diameter
6. 6.5 inch diameter
7. .0604 inches
8. Area of triangle = 60 in²
9. Area of circle = 254.469 cm²
10. Volume of rectangle = 50 cm³
11. Volume of cylinder = 4071.5 in³ or 2.36 ft³
12. Volume of coil = 40,715 in³ or 23.6 ft³
Weight of coil = 11,563.07 lbs (\pm depending on variable used for weight per unit)
13. Angle D = 44.320° or 44° 19' 13"
14. Side b = 9.098 mm