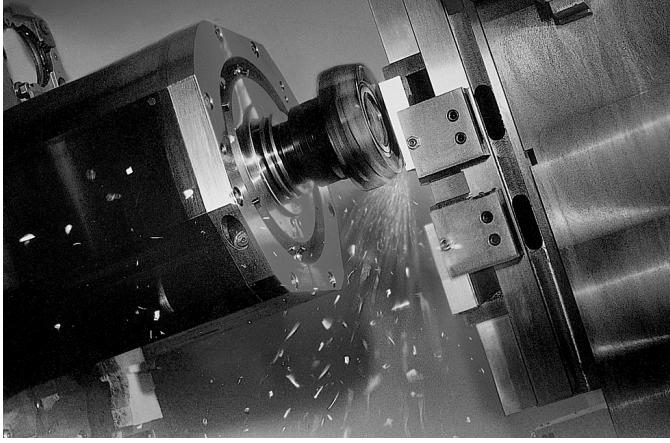




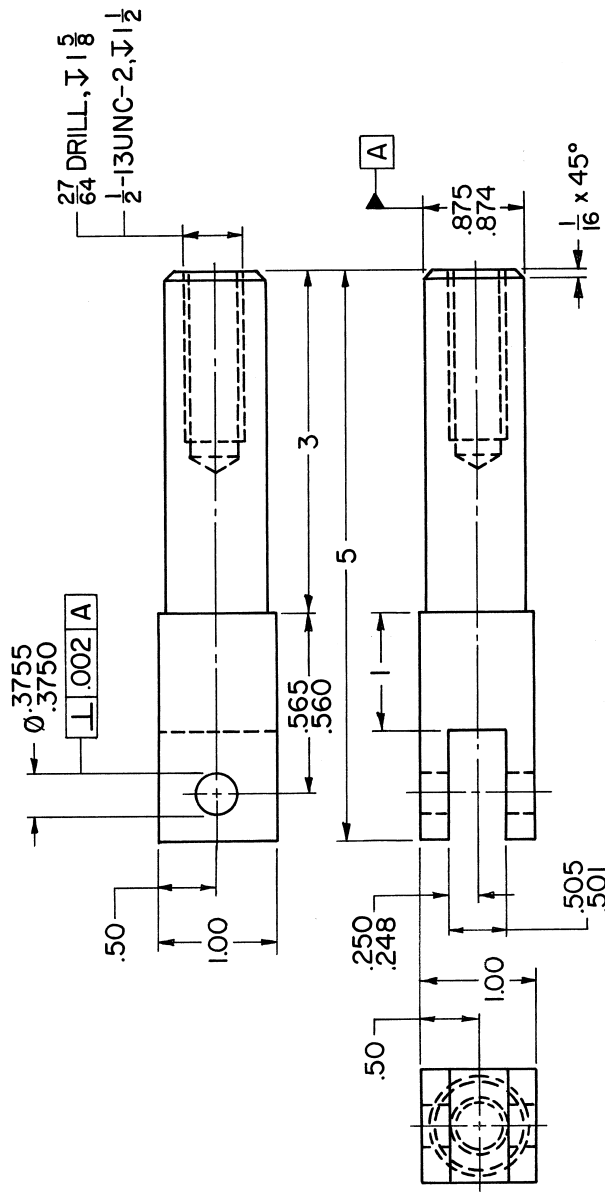
Correlation Chart

The following chart correlates the NTMA's Level I *Duties and Standards for Machining Skills* to the *Machining Fundamentals* text. The duty areas and titles are correlated by chapter and section numbers.

MACHINING SKILLS—LEVEL I ASSIGNMENTS

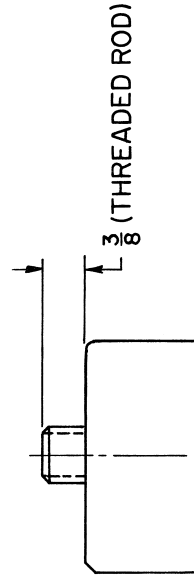
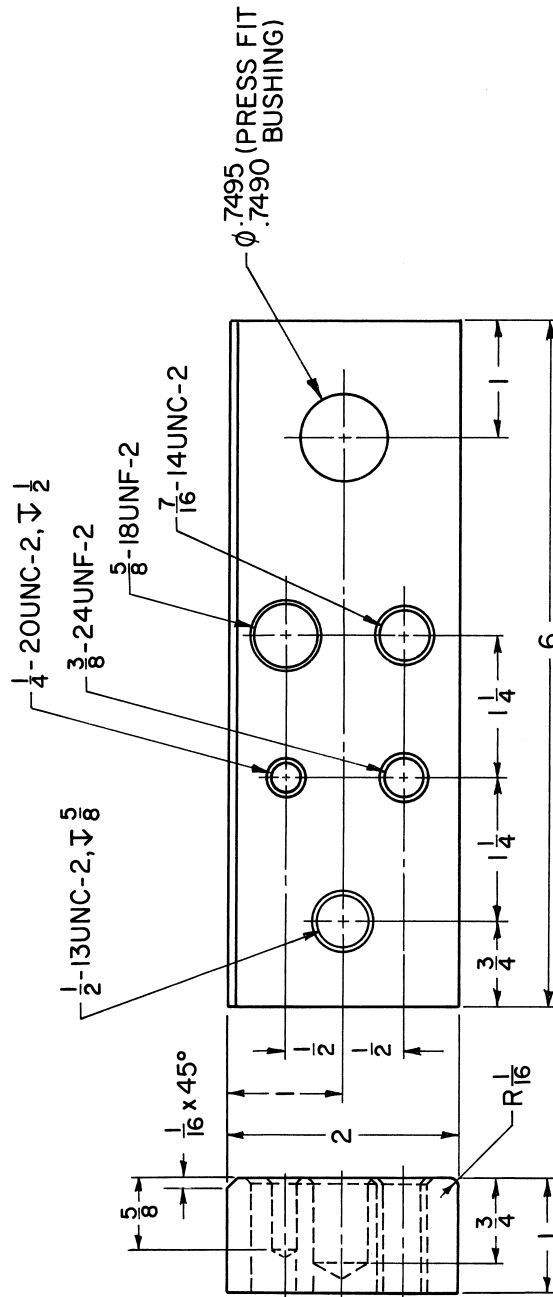
Duty Area	Duty	<i>Machining Fundamentals</i>	Drawing Nos.
1. Job Planning and Management	1.1 Job Process Planning Develop a process plan for a part requiring milling, drilling, turning, or grinding. Fill out an operation sheet detailing the process plan and required speeds and feeds.	Chapter 3, 29–54.	B234789
2. Job Execution	2.1 Manual Operations: Benchwork Tap holes. Use files, scrapers, and coated abrasives to deburr parts. Use arbor presses to perform press fits. Use bench vises and hand tools appropriately.	Chapter 2, 23–28; Chapter 3, 29–54; Chapter 6, Sections 6.1.1 Vises, 6.7 Hacksaw, 6.8 Files, 6.10 Hand Threading, 6.11 Polishing.	B234790
2. Job Execution	2.2 Manual Operations: Layout Lay out the location of hole centers and surfaces within an accuracy of $\pm .015$.	Chapter 2, 23–28; Chapter 3, 29–54; Chapter 4, 55–80; Chapter 5, 81–90.	B234791
2. Job Execution	2.3 Turning Operations: Turning Between Centers Set up and carry out between centers turning operations for straight turning.	Chapter 2, 23–28; Chapter 3, 29–54; Chapter 4, Sections 4.1 The Rule, 4.2 Micrometers, 4.3 Vernier Calipers, 4.4.4 Thread Gages, 4.5 Dial Indicators, 4.6.7 Screw Pitch Gages; Chapter 9, 149–152; Chapter 11, 183–190; Chapter 13, 201–240; Chapter 14, 241–260.	B234792
2. Job Execution	2.4 Turning Operations: Chucking Set up and carry out chucking operations for turning.	Chapter 2, 23–28; Chapter 3, 29–54; Chapter 4, 55–80; Chapter 9, 149–152; Chapter 13, 201–240; Chapter 14, 241–260.	B234793
2. Job Execution	2.5 Power Feed Milling Set up and operate a horizontal or vertical milling machine using power feeds. Perform routine milling.	Chapter 2, 23–28; Chapter 3, 29–54; Chapter 4, 55–80; Chapter 9, 149–152; Chapter 17, 285–316; Chapter 18, 317–352.	B234794

Duty Area	Duty	Machining Fundamentals	Drawing Nos.
2. Job Execution	2.6 Vertical Milling Set up and operate vertical milling machines. Perform routine milling and location of hole centers within $\pm .005''$.	Chapter 2, pages 23–28; Chapter 3, 29–54; Chapter 4, 55–80; Chapter 9, 149–152; Chapter 17, 285–317.	B234795
2. Job Execution	2.7a Surface Grinding: Grinding Wheel Safety Ring test grinding wheels, perform visual safety inspection, mount and dress a grinding wheel in preparation for surface grinding.	Chapter 2, 23–28; Chapter 19, 149–152.	
2. Job Execution	2.7b Surface Grinding: Horizontal Spindle Reciprocating Table Set up and operate manual surface grinders with a 10" and smaller diameter wheel. Perform routine surface grinding, location of surfaces, and squaring of surfaces. Perform wheel dressing.	Chapter 2, 23–28; Chapter 3, 29–54; Chapter 4, 55–80; Chapter 9, 149–152; Chapter 19, 353–382.	B234796
2. Job Execution	2.8 Drill Press Set up and operate drill presses. Perform routine drill press operations.	Chapter 2, 23–28; Chapter 3, 29–54; Chapter 4, 55–80; Chapter 9, 149–152; Chapter 10, 153–182.	B234797, B234798
2. Job Execution	2.9 Power Saw Operations Set up and operate power saws for cutoff operations.	Chapter 2, 23–28; Chapter 3, 29–54; Chapter 4, Section: 4.1 The Rule; Chapter 12, 191–200.	B234799
3. Quality Control and Inspection	3.1 Part Inspection Develop an inspection plan and inspect simple parts using precision tools and techniques. Prepare reports on the compliance of parts.	Chapter 3, 29–54; Chapter 4, 55–80; Chapter 23, 435–450.	
3. Quality Control and Inspection	3.2 Process Control Follow a sampling plan. Inspect the samples for the required data. Enter the data on appropriate charts. Graph the data. Respond to the warning conditions indicated by process charts.	Chapter 3, 29–54; Chapter 4, 55–80; Chapter 23, 435–450.	
5. General Maintenance	5.3 Tooling Maintenance Keep the duty station clean and safe for work. Keep the tools, workbenches, and manual equipment clean, maintained, and safe for work.	Chapter 2, 23–28; Chapter 4, 55–80; Chapter 10, Section: 10.8 Sharpening Drills; Chapter 11, 183–190; Chapter 13, Section: 13.6 Cutting Tools and Tool Holders; Chapter 17, Section: 17.4 Milling Cutters; Chapter 19, Sections 19.8 Universal Tool and Cutter Grinder and 19.9 Tool and Cutter Grinding Wheels.	
7. Career Management and Employment Relations	7.1 Career Planning Develop and explain a short-term career plan and resume.	Chapter 30, 547–556.	



NOTE -
MACHINED SURFACES $125 \sqrt{\text{MIN.}}$

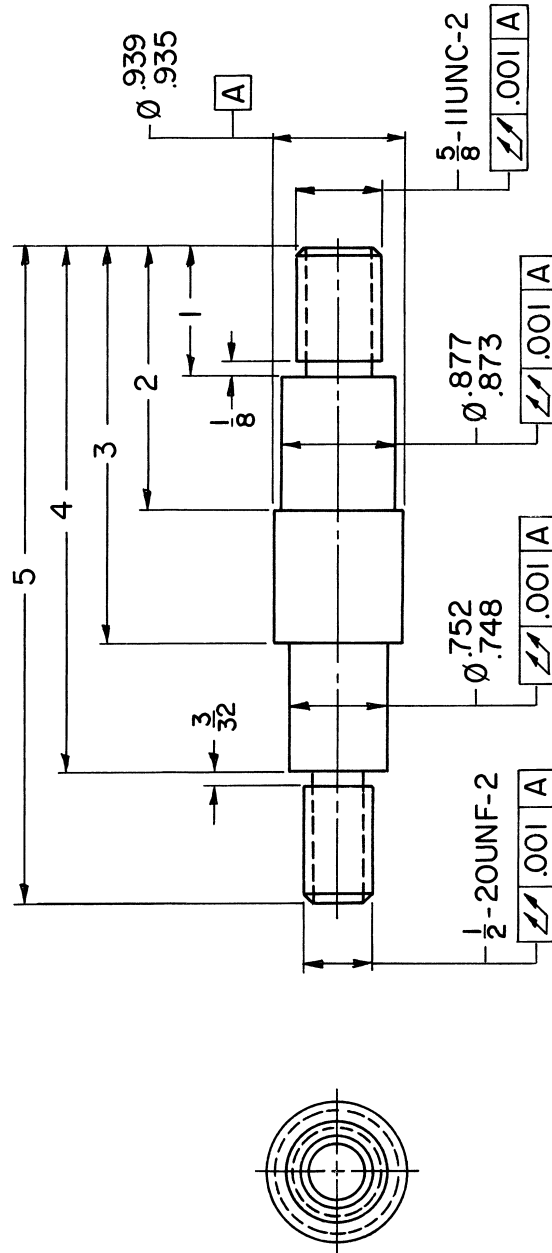
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON		DRAWN BY JRW		MACHINING SKILLS - LEVEL 1	
FRACTIONS $\pm 1/64$	DATE 8-8-XX	TITLE CLEVIS, UPPER		SCALE FULL	
DECIMALS ± 0.010	CHK'D MK	DRAWING NO. B234789		SHEET 1 OF 11	
ANGLES $\pm 1^\circ$	HEAT TREATMENT NONE				
MATERIAL C.F. STEEL AISI 1020					



FURNISHED-
1 x 2 x 6 PREPARED STEEL BAR STOCK
BUSHING
1/2-13UNC-2 x 1 1/2 LONG THREADED ROD

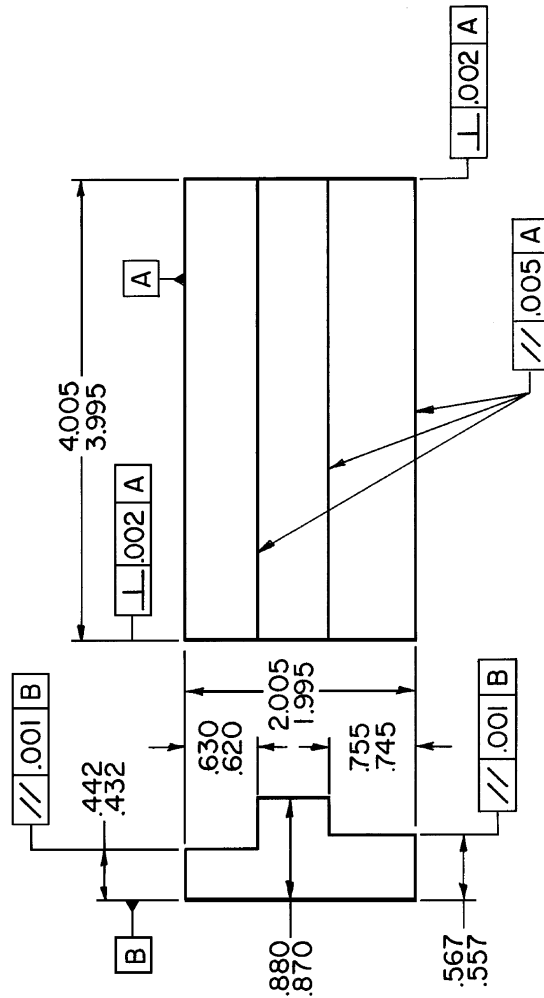
NOTE-
REMOVE ALL BURRS & SHARP EDGES.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES	DRAWN BY	MACHINING SKILLS - LEVEL 1	
	DATE	8-9-XX	TITLE
	CHK'D	MK	2.1 BENCHWORK
	MATERIAL	H.R. STEEL AISI 1018	SCALE FULL
		HEAT TREATMENT	SHEET 2 OF 11
		NONE	DRAWING NO. B234790



NOTES-
 MACHINED SURFACES $\sqrt{125}$ MIN.
 BREAK ALL SHARP EDGES.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON	DRAWN BY	MACHINING SKILLS - LEVEL 1	
	DATE	TITLE	
	8-11-XX	2.5 TURNING BETWEEN CENTERS	
	CHK'D	SCALE	DRAWING NO.
MATERIAL	H.R. STEEL AISI 1018	FULL	B234792
		SHEET	4 OF 11



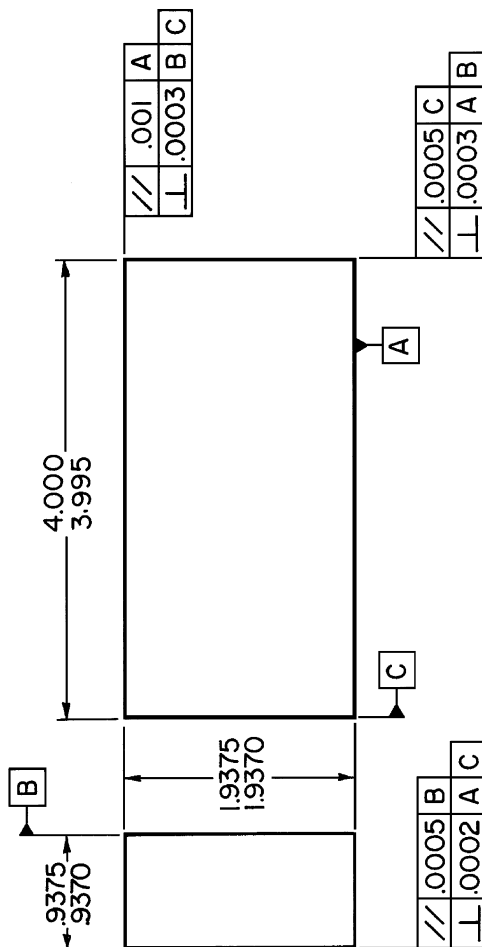
NOTES-

ALL SURFACES $125/\text{MIN.}$
 BREAK ALL SHARP EDGES.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON	DRAWN BY: JRW		MACHINING SKILLS - LEVEL 1	
	DATE	8-13-XX	TITLE	2.5 POWER FEED MILLING
	CHKD	MK	SCALE	FULL
	HEAT TREATMENT	NONE	SHEET	6 OF 11
MATERIAL: H.R. STEEL AISI 1018		DRAWING NO. B234794		



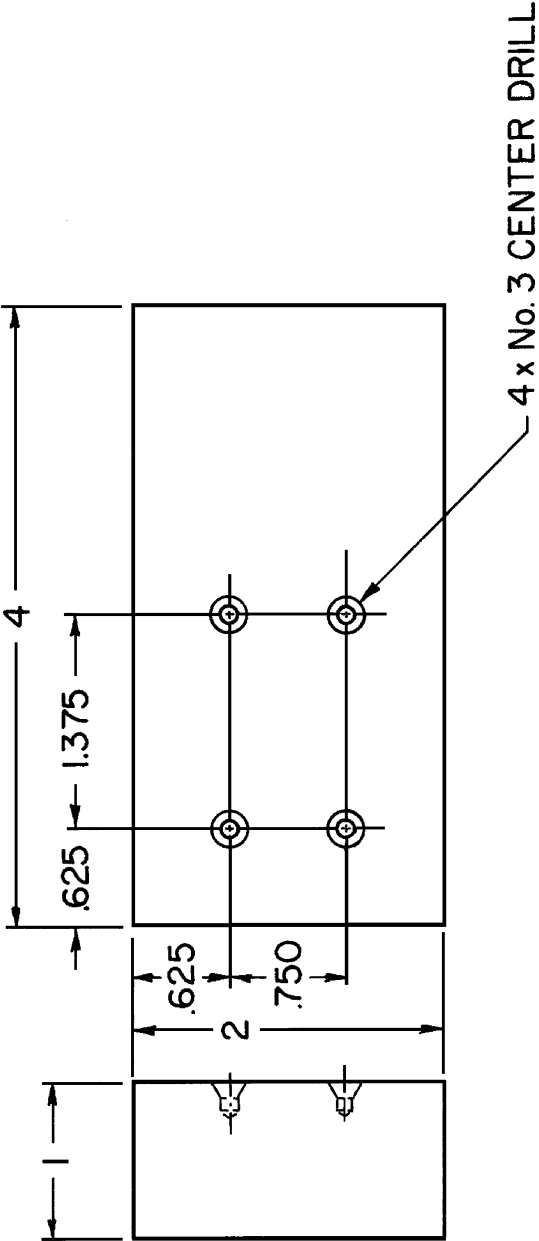
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON	DRAWN BY JRW	MACHINING SKILLS – LEVEL 1	
		TITLE 2.6 VERTICAL MILLING	
		SCALE FULL	DRAWING NO. B234795
FRACCTIONS DECIMALS ANGLES	DATE 8-14-XX	CHCK'D MK	SHEET 7 OF 11
MATERIAL H.R. STEEL AISI 1018	HEAT TREATMENT NONE		



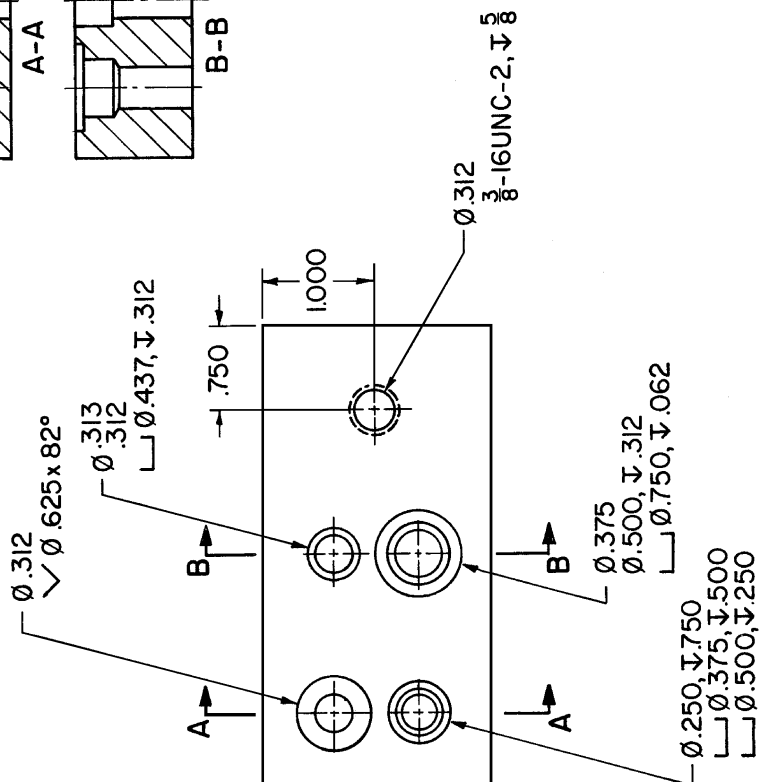
NOTES -

ALL SURFACES 32 / MIN.
NO SHARP EDGES.

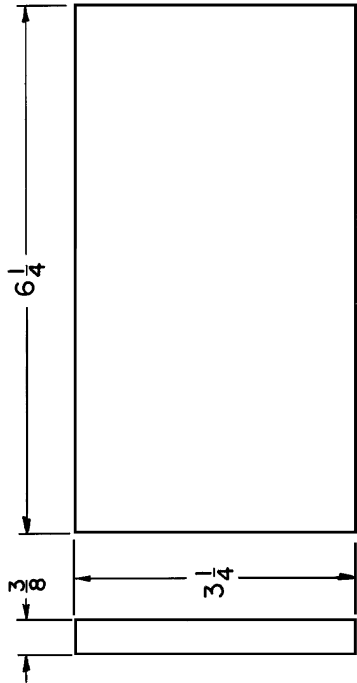
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON	DRAWN BY JRW		MACHINING SKILLS - LEVEL 1	
	DATE	8-15-XX	TITLE	2.7B SURFACE GRINDING
	CHK'D	MK	SCALE	FULL
	HEAT TREATMENT	NONE	SHEET	8 OF 11
MATERIAL H.R. STEEL AISI 1018		DRAWING NO. B234796		



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON	DRAWN BY JRW		MACHINING SKILLS - LEVEL 1	
	DATE	8-16-XX	TITLE	SEMI-FINISHED PART FOR
	CHK'D	MK		JOB 2.8 - DRILL PRESS
	HEAT TREATMENT	NONE	SCALE	FULL
FRACTIONS ± 1/64			SHEET	9 OF 11
DECIMALS ± 0.010			DRAWING NO.	B234797
ANGLES ± 1°				
MATERIAL	H.R. STEEL			
	AISI 1018			



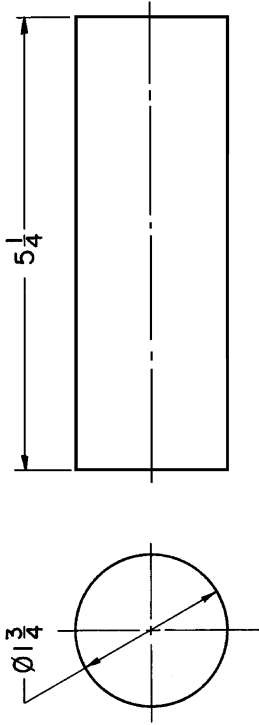
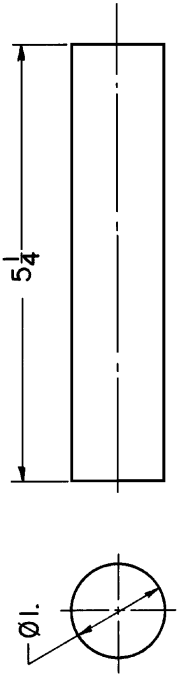
- FURNISHED, SEMI-FINISHED STOCK.
(SEE DWG. 2.8X)
- FINISH 125 $\sqrt{\text{MIN.}}$
- NO SHARP EDGES.
- MOUTHS OF ALL HOLES LIGHTLY
COUNTERSUNK.



2.2 LAYOUT

+

2.3 TURNING BETWEEN CENTERS



2.4 TURNING USING A CHUCK

NOTES—
ROUGH STOCK FOR LEVEL I MACHINING
ASSIGNMENTS.
REMOVE ALL SHARP EDGES.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES MATERIAL	DRAWN BY	MACHINING SKILLS – LEVEL 1		
	DATE	TITLE	2.9 POWER SAW OPERATIONS	
	CHK'D	SCALE	FULL	DRAWING NO.
	HEAT TREATMENT	SHEET	11 OF 11	B234799