Name: ________________________________ Date: _______________

P4-3) Fill in the given table for the following shaft and hole limits.

	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
Shaft Limits	5.970 5.940	79.990 79.971	16.029 16.018	25.061 25.048	120.000 119.780	2.000 1.994	30.000 29.987	8.000 7.991
Hole Limits	6.030 6.000	80.030 80.000	16.018 16.000	25.021 25.000	120.400 120.180	2.012 2.002	30.006 29.985	7.978 7.963

	Shaft	Hole
Limits		
Basic size		
Tolerance		
Upper Deviation		
Lower Deviation		
Fundamental Deviation		
IT Grade		
System (hole, shaft)		
Fit		

	Shaft	Hole
Limits		
Basic size		
Tolerance		
Upper Deviation		
Lower Deviation		
Fundamental Deviation		
IT Grade		
System (hole, shaft)		
Fit		

	Shaft	Hole
Limits		
Basic size		
Tolerance		
Upper Deviation		
Lower Deviation		
Fundamental Deviation		
IT Grade		
System (hole, shaft)		
Fit		

5.7) METRIC THREADS

Metric threads are identified, in a thread note, by "M" for Metric thread form, the *major diameter* followed by a lower case "x", *pitch*, *tolerance class*, whether the thread is *right* or *left* handed, and *thread depth* (internal only).

5.7.1) Metric thread note

The following is a list of components that should be included in a Metric thread note. The first three components (Metric form, major diameter, and pitch) should be included in all thread notes and the depth of thread should be included for all applicable internal thread notes. The other components are optional and are only used if additional refinement is needed.

1. Metric Form: Placing an "M" before the major diameter indicates the Metric thread form.

2. Major Diameter: This major diameter is the largest diameter for both internal and external.

3. Pitch: The pitch is given in millimeters per thread.

4. Tolerance Class: The tolerance class describes the looseness or tightness of fit between the internal and external threads. The tolerance class contains both a tolerance grade given by a number and tolerance position given by a letter. In a thread note, the pitch diameter tolerance is stated first followed by the crest diameter tolerance if it is different. The crest diameter tolerance would be a tolerance on the major diameter for an external thread and the minor diameter on an internal thread. Two classes of Metric thread fits are generally recognized. For general purpose, the fit "6H/6g" should be used. This fit is assumed if none is stated. For a closer fit, use "6H/5g6g".

    - Tolerance Grade: The tolerance grade is indicated by a number. The smaller the number the tighter the fit. The number "5" indicates good commercial practice. The number "6" is for general purpose threads and is equivalent to the thread class "2" used for Unified National threads.

    - Tolerance Position: The tolerance position specifies the amount of allowance and is indicated by a letter. Upper case letters are used for internal threads and lower case letters for external threads. The letter "e" is used for large allowances, "g" and "G" are used for small allowances, and "h" and "H" are used for no allowance.

5. Right handed or left handed thread: Right handed threads are indicated by the symbol "RH" and left handed threads are indicated by the symbol "LH". Right handed threads are assumed if none is stated.

6. Depth of thread: The thread depth is given at the end of the thread note and indicates the thread depth for internal threads, not the tap drill depth.

SP5-1) Write the thread notes for the following external threads. Also, what are the minor diameter and the pitch? Thread class = 2. The answer to this problem is given on the *Independent Learning DVD*.

Major ∅	7/16
Series Coarse	
Thread Note	
Minor diameter	
Pitch	

SP5-2) Write the thread notes for the following internal threads. Also, what are the tap drill size and/or diameter and the pitch? Thread class = 3. The answer to this problem is given on the *Independent Learning DVD*.

Major ∅	9/16
Series	Fine
Thread Note	
Tap drill size and/or diameter	
Pitch	

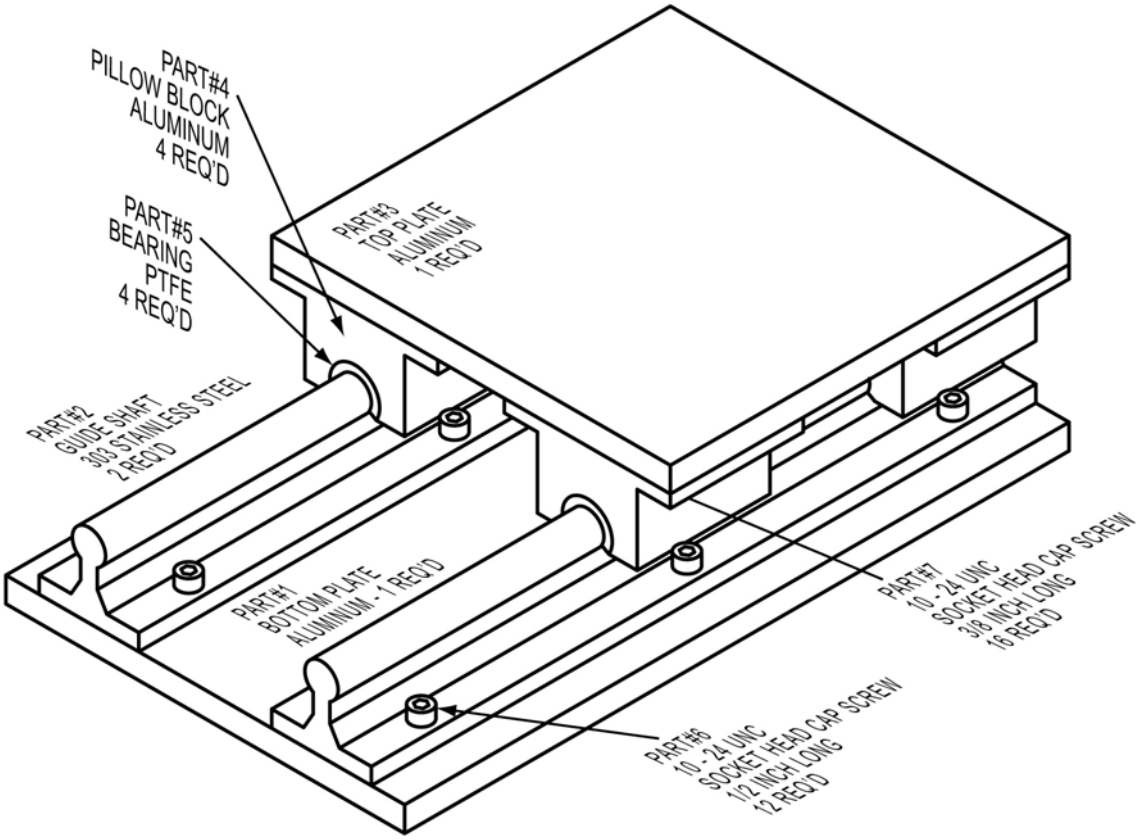
SP5-3) Write the thread notes for the following threads. Also, what is the major diameter in inches? The answer to this problem is given on the *Independent Learning DVD*.

Major ∅	#3
Series Coarse	
Thread note	
Major diameter	

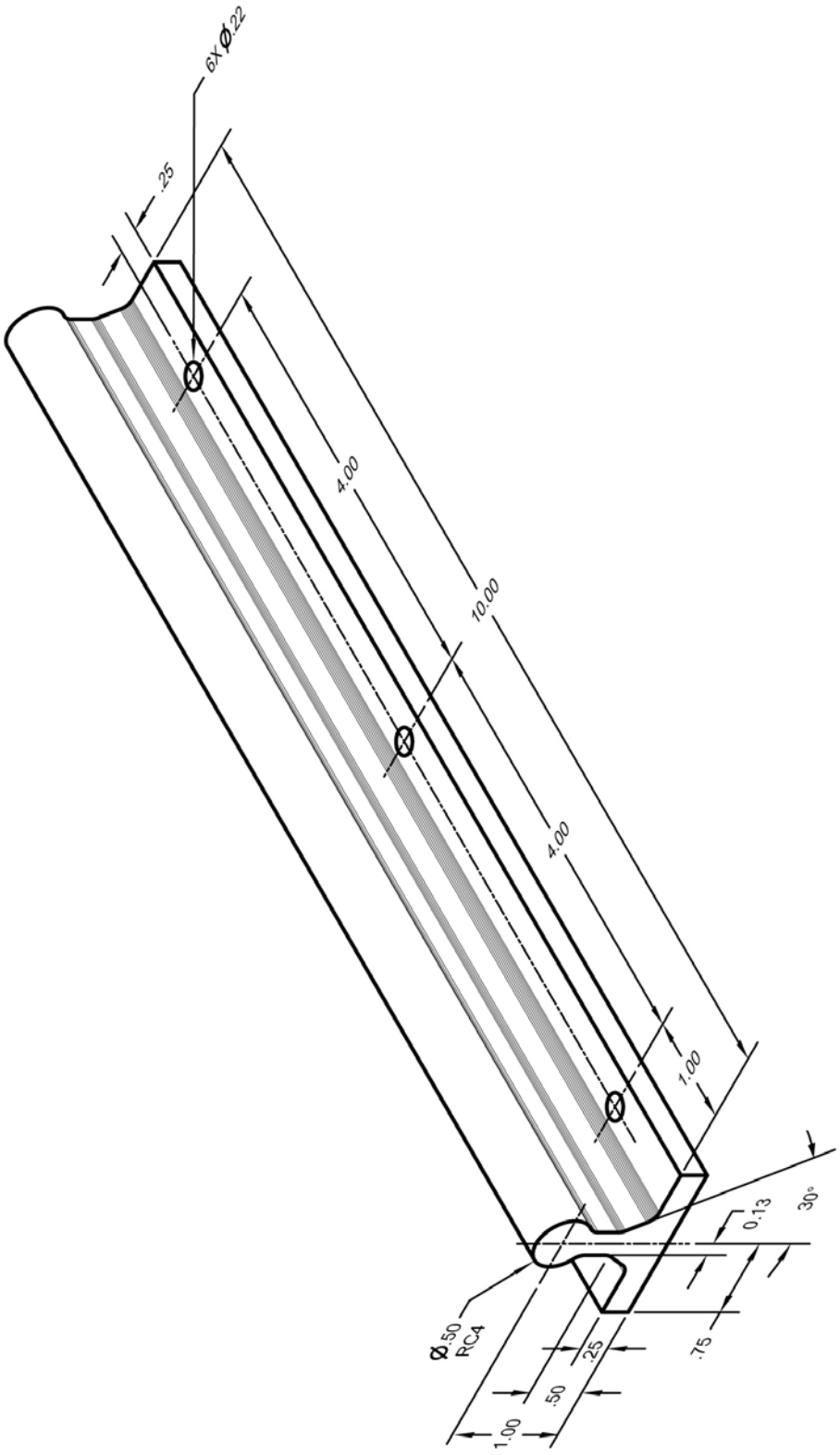
SP5-4) Write the thread notes for the following external threads. Also, what are the minor diameter and the number of threads per mm? The answer to this problem is given on the *Independent Learning DVD*.

Major ∅	M33
Series	Fine
Thread Note	
Minor diameter	
# of threads per mm	

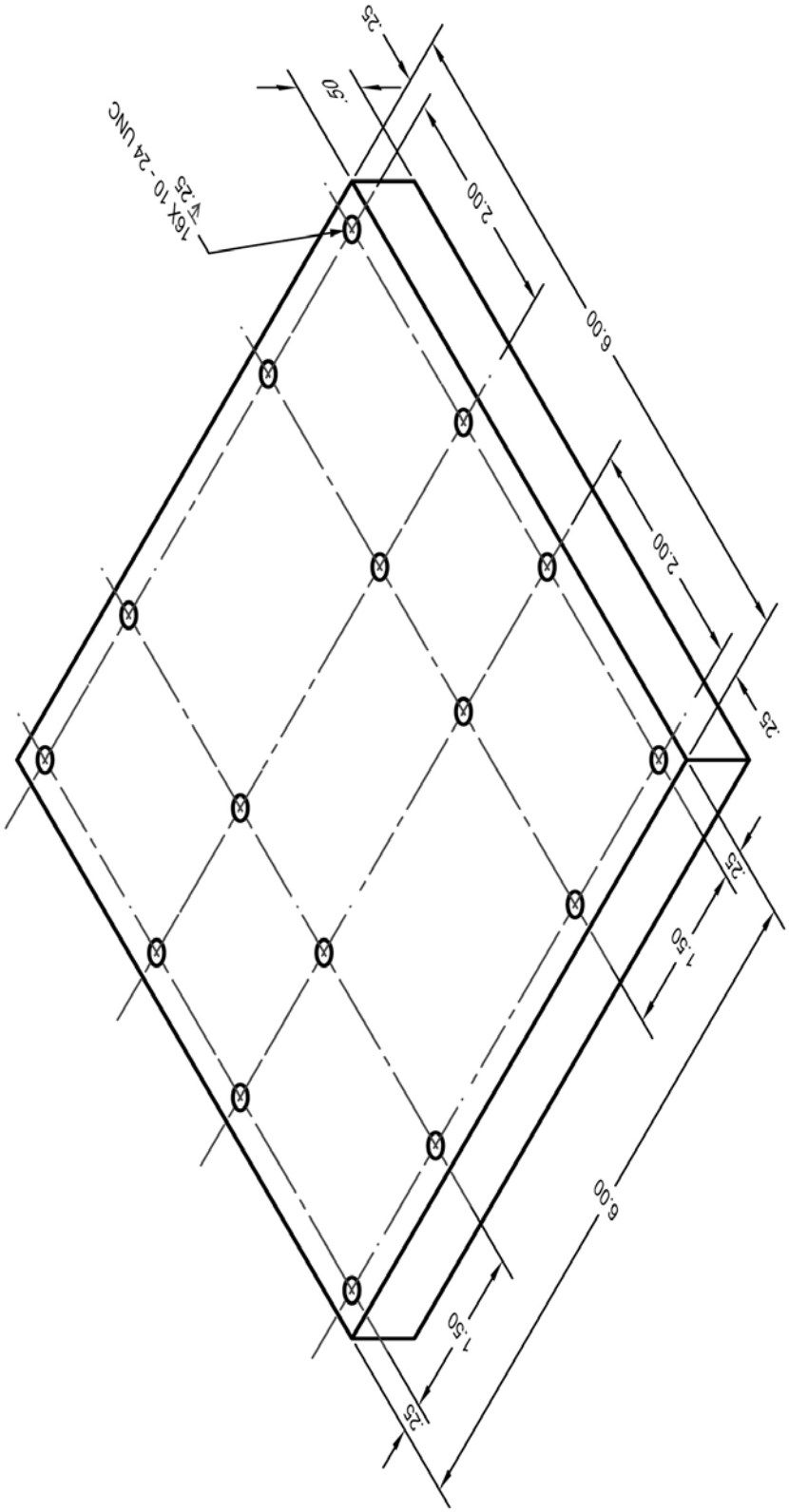
SP6-1) Create a working drawing package for the following *Linear Bearing*. The working drawing package should contain an assembly drawing, details of all the parts, and a standard parts sheet. Notice that some of the dimensioned isometric drawings are not dimensioned using proper dimensioning techniques. When drawing the detailed drawings use proper symbols and dimensioning techniques. The answer to this problem is given on the *Independent Learning DVD*.



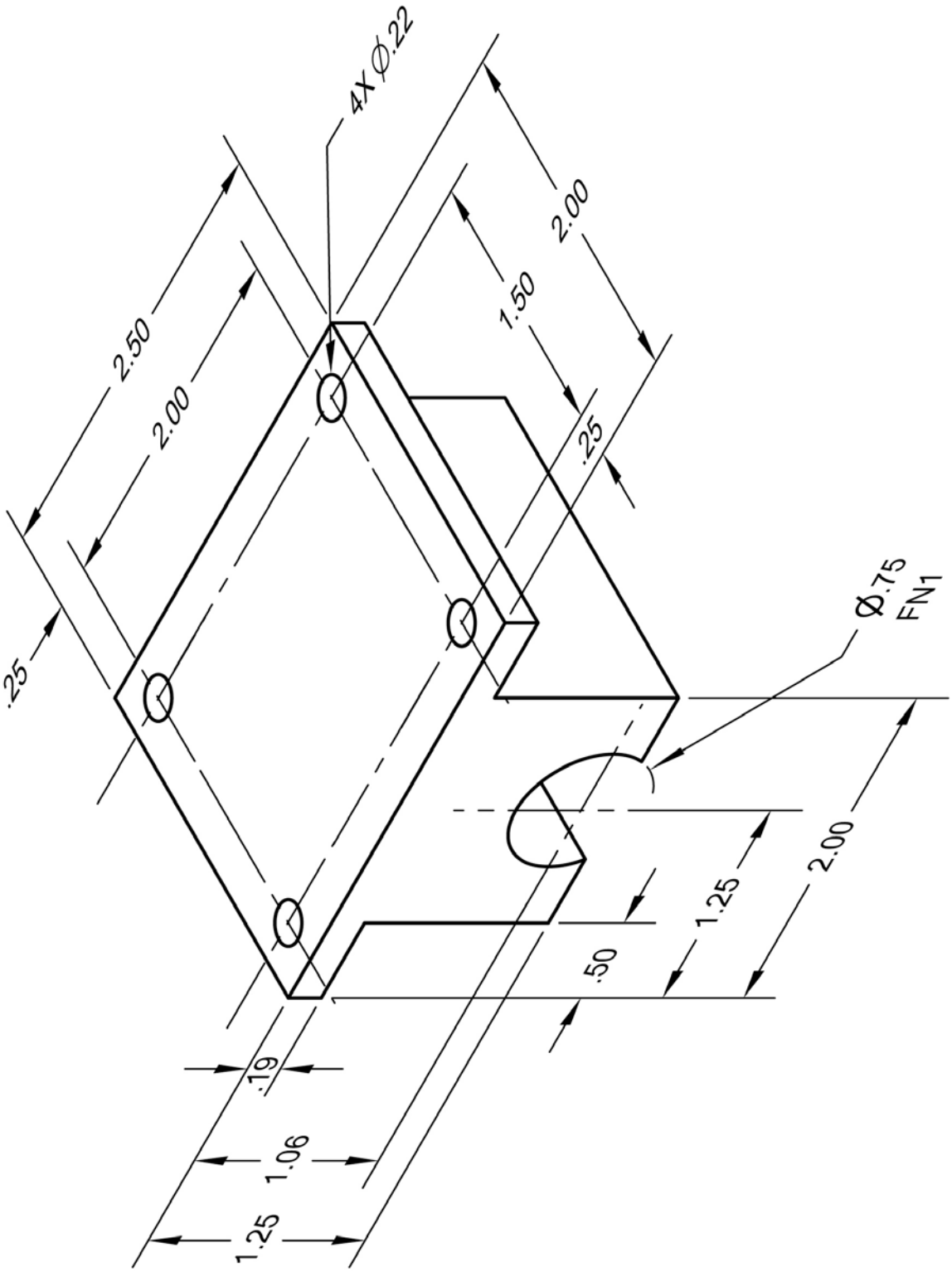
Part#2: Gui de Shaft If you are j ust studyi ng the basi cs and have not covered tolerancing, i gnore the RC4 to lerance. NOTE TO DRAFTER: Thi s part i s sym metric and all fillets are R.12.



Part#3: Top Plate If you are just studying the basics and have not covered threads and fasteners, replace the 16X 10 – 24 UNC dimension with a 16x ∅.19 dimension.



Part#4: P illow B lock If you are just studying the basics and have not covered tolerancing, ignore the FN1 tolerance.



Part#5: Bearing If you are just studying the basics and have not covered tolerancing, ignore the RC4 and FN1 tolerances.