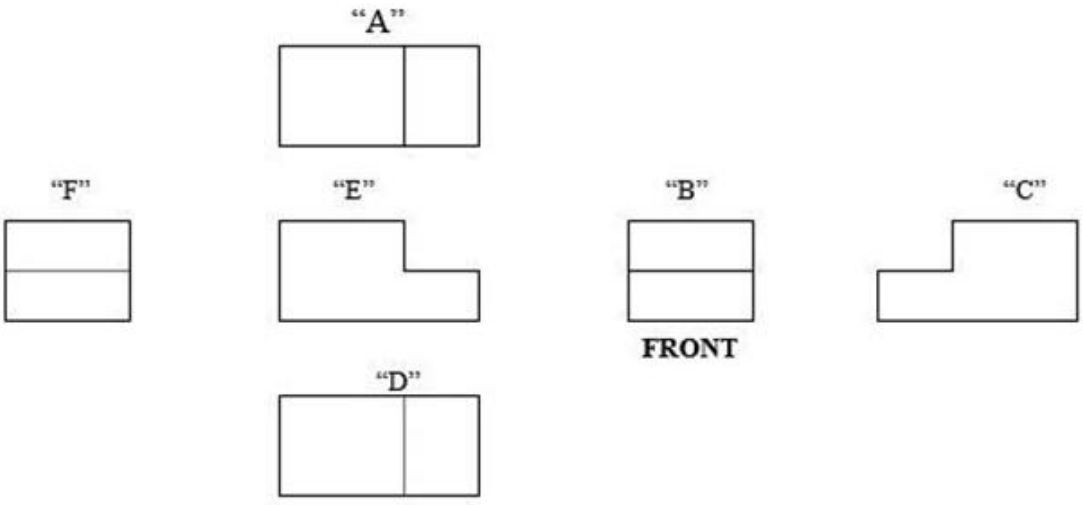
CNC MACHINIST CALCULATOR PRO

Machinist Proficiency Test

Section # 1
Engineering Drawings

THIRD ANGLE ORTHOGRAPHIC PROJECTION



IDENTIFY THE 5 REMAINING VIEWS

1). View "A" is

A. Bottom
B. Top
C. Left Side
D. Right Side

2). View "C" is

A. Front
B. Right Side
C. Left Side
D. Rear

3). View "D" is

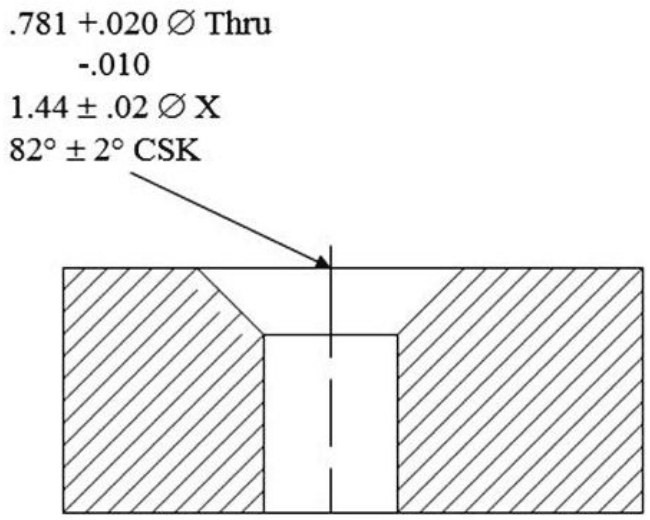
A. Rear
B. Top
C. Bottom
D. Front

4). View "E" is

A. Left Side
B. Right Side
C. Rear
D. Front

5). View "F" is

A. Left Side
B. Right Side
C. Front
D. Rear



6). The 1.44 ± .02 ⌀ is the
- A. ⌀ Of the Counterbore
- B. Depth of the Countersink
- C. Length of the Angle
- D. ⌀ Of the Countersink

7). The 82° ± 2° Countersink is:
- A. Included Angle
- B. Half Angle
- C. Supplemental Angle
- D. Complement Angle

8). The total tolerance of the .781⌀ is:
- A. .770 - .810
- B. .781 - .790
- C. .771 - .801
- D. .781 - .791

9). Unless Otherwise specified the diameter of a Countersink or chamfer is measured from:
- A. At the Datum Diameter
- B. At the intersection point of the angled surface and the adjacent surface.
- C. At the centerline of the corner radius
- D. At the point of tangency.

10). C'Bore or ⌴ is the abbreviation for:
- A. Countersink
- B. Counterbore
- C. "C" Shaped Bore
- D. A bore made with a "C" cutter

For Questions 11, 12 and 13 refer to the sketch below.

11). Dimension “A” the high and the low is:

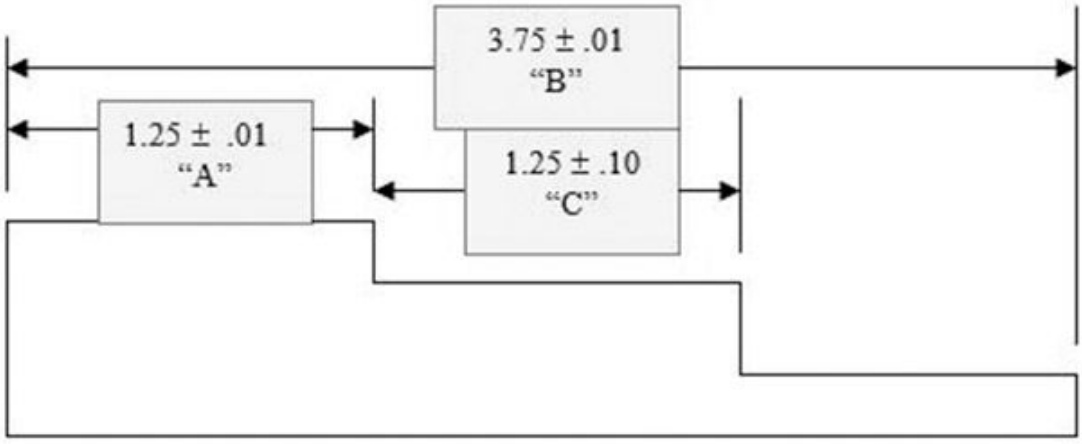
A. 1.53 High, 3.650 Low
B. 1.35 High, 1.150 Low
C. 1.26 High, 1.24 Low
D. 1.25 High, 1.26 Low

12). Dimension “B” the high and the low is:

A. 3.85 High, 3.65 Low
B. 3.76 High, 3.74 Low
C. 3.57 High, 3.56 Low
D. 3.85 High, 3.75 Low

13). Dimension “C” the high and the low is:

A. 1.35 High, 1.15 Low
B. 1.26 High, 1.24 Low
C. 1.24 High, 1.26 Low
D. 1.53 High, 1.51 Low



14). A 32 micro finish is smoother than:

A. 30
B. 64
C. 10
D. 20

15). A 63 finish is rougher than:

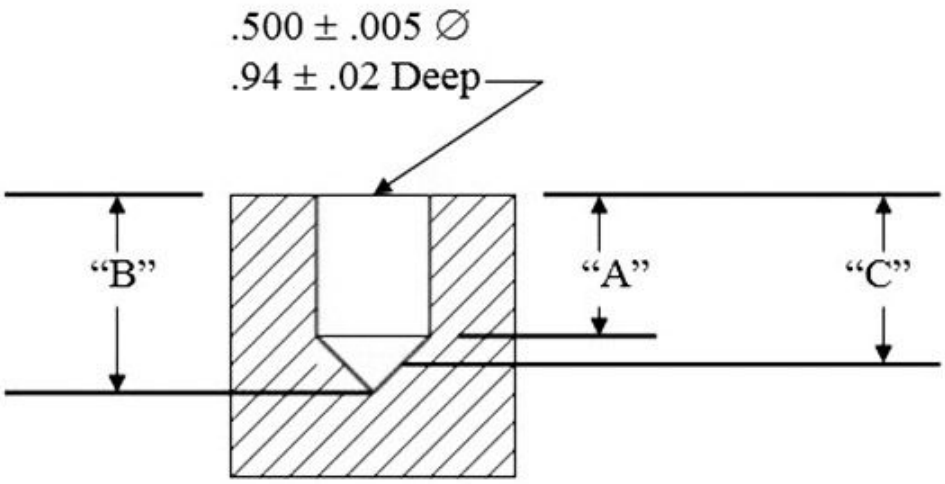
A. 45
B. 90
C. 75
D. 125

16). Unless otherwise specified the depth of a hole drilled with a standard 118° drill point is measured to:

A. Intersection point of the two surfaces – Example “A”
B. Drill Point – Example “B”
C. Datum Point – Example “C”
D. Drilled holes are not critical; any point in between example “A” and “B” is acceptable.

17). What could you use to confirm the depth of this hole?

A. Gage Pin & Calipers
B. Mold & Comparator
C. Depth Micrometer
D. Any of the above

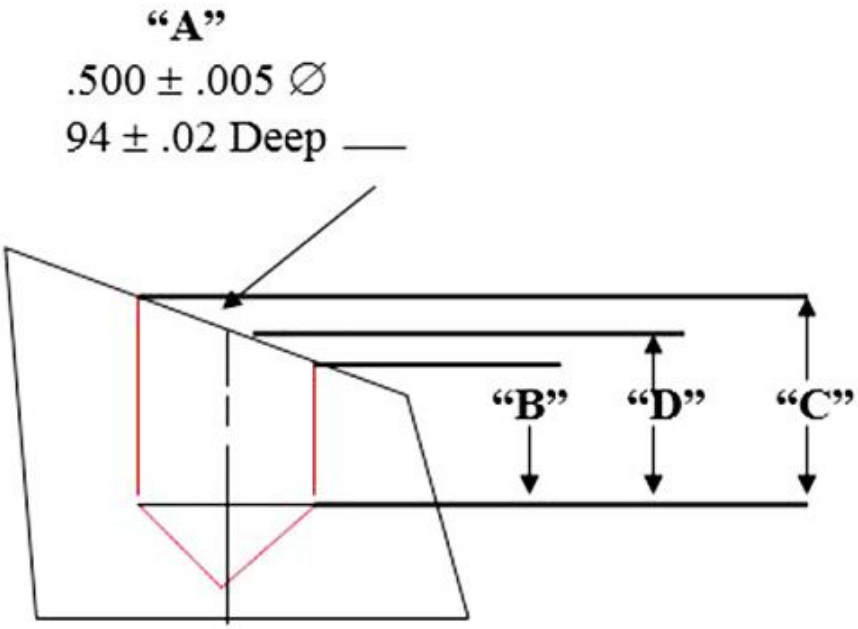


18). The depth of a tapped hole that is drilled into a cast surface, which is considered draft angle, is measured from:

A. Highest Point (Example “C”)
B. Lowest Point (Example “B”)
C. Where the arrow point touches (Example “A”)
D. Centerline of the hole (Example “D”)

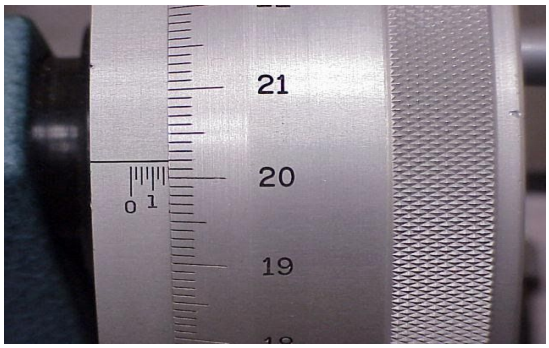
19). If a 118° Drill point were called out, what would you use to check it?

A. Mold & Comparator
B. Sine Plate
C. Indicator
D. Depth Gage



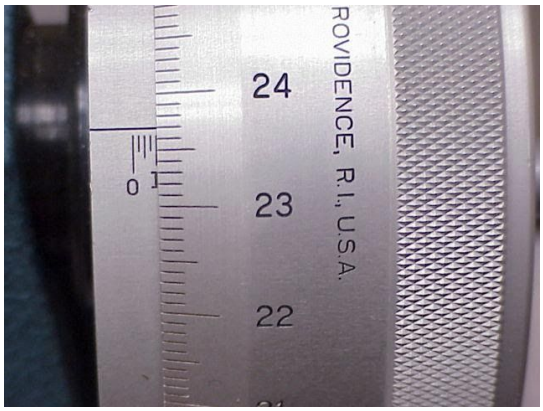
1.) The Bench Micrometer on the Left is reading:

A. .1270
B. .1262
C. .1298
D. .0126



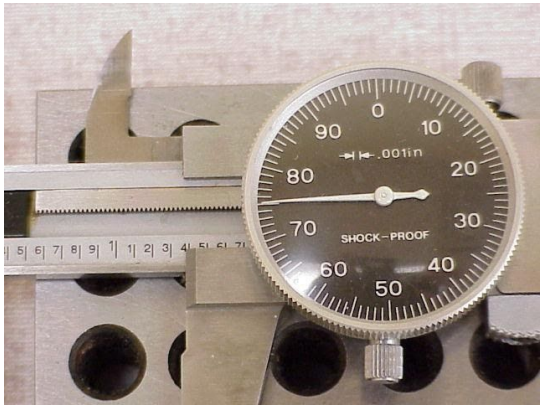
2.) The Bench Micrometer on the Left is reading:

A. .1702
B. .0172
C. .1720
D. 1.172



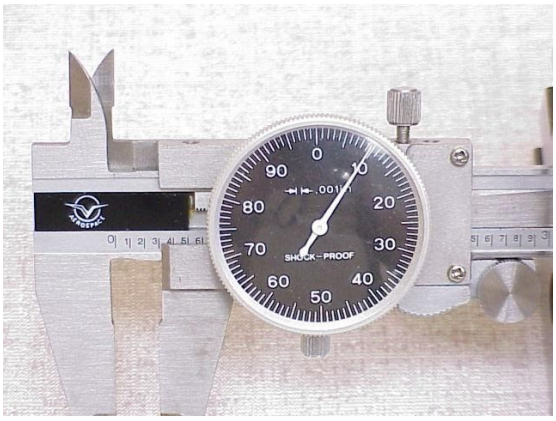
3.) The Bench Micrometer on the Left is reading:

A. .0987
B. .1237
C. .1050
D. .0997



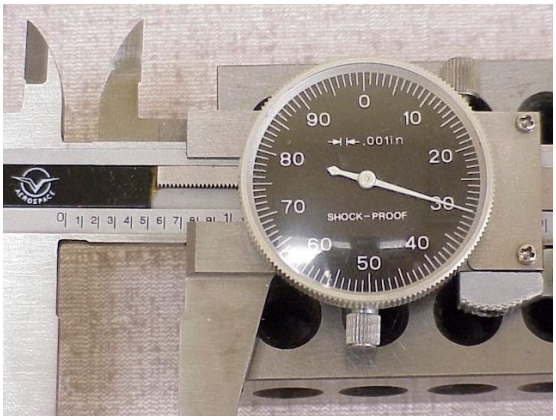
4.) The Calipers on the Left are reading:

A. .375
B. 1.415
C. 1.375
D. 1.315



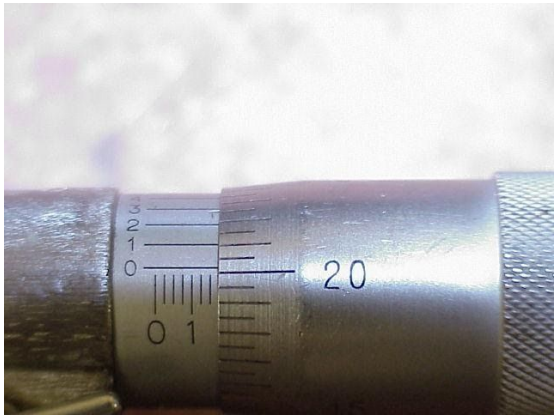
5.) The Calipers on the Left are reading:

A. 1.31
B. .310
C. .2100
D. .290



6.) The Calipers on the Left are reading:

A. 1.730
B. .730
C. .1730
D. .0770

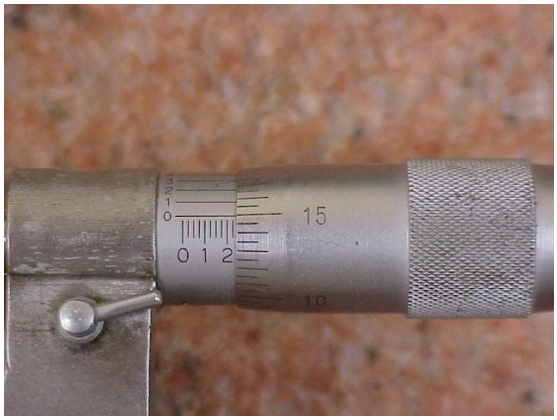


7.) The O.D. Micrometer on the Left is reading:

A. .1700
B. .1955
C. .1702
D. .0720

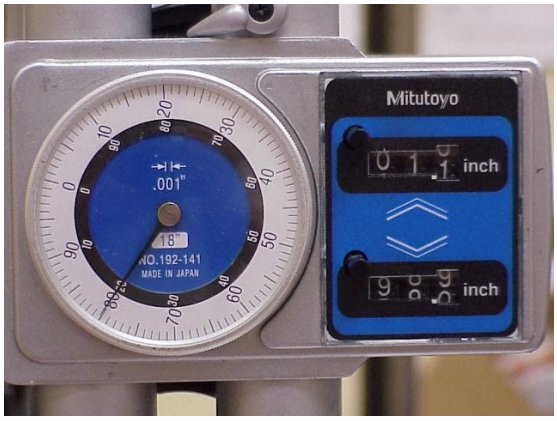
8.) The O.D. Micrometer on the Left is reading:

A. .115
B. .182
C. .109
D. .181



9.) The O.D. Micrometer on the Left is reading:

A. .240
B. .265
C. .245
D. .215

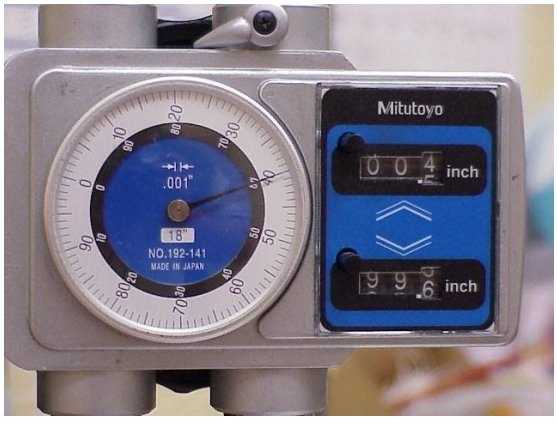


10.) The Height Gage on the Left is reading in the upward position:

A. 1.180
B. .180
C. 1.080
D. 1.008

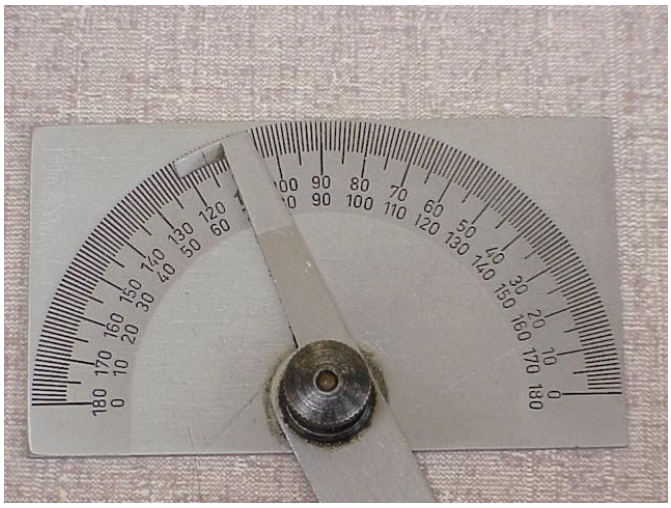
11.) The Height Gage on the Left is reading in the upward position:

A. .250
B. 2.150
C. .215
D. 2.500



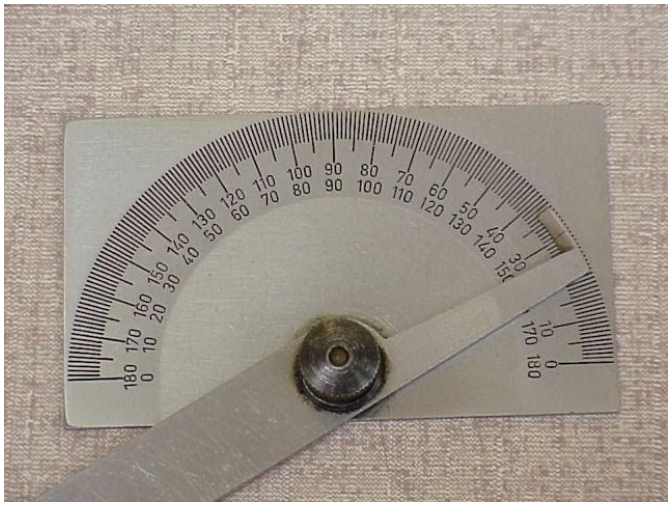
12.) The Height Gage on the Left is reading in the upward position:

A. .440
B. 4.400
C. .442
D. 2.440



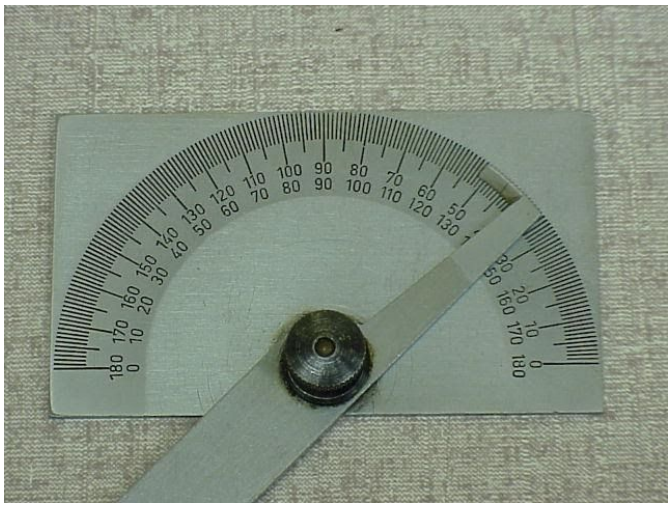
13.) The Protractor on the Left is set at which angle:

A. 115°
B. 125°
C. 70°
D. 122°



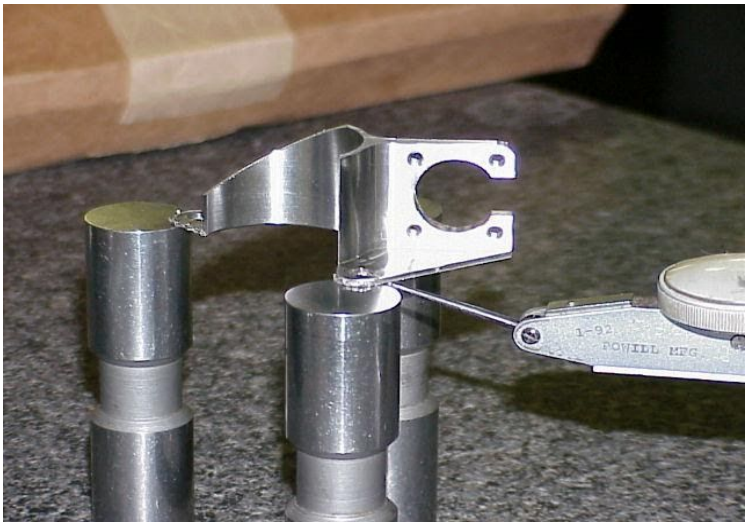
14.) The Protractor on the Left is set at which angle:

A. 115°
B. 90°
C. 30°
D. 35°



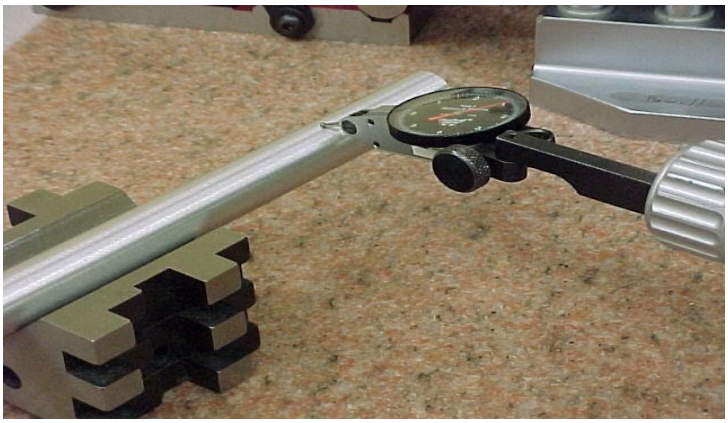
15.) The Protractor on the Left is set at which angle:

A. 90°
B. 50°
C. 45°
D. 160°



16). What is the set-up in the above operation checking for:

A. Perpendicularity
B. Run out
C. Flatness
D. Parallelism



17). What is the set-up in the above operation checking for:

A. Flatness
B. Parallel
C. Run-out
D. Surface Profile

Section # 3
Shop Math

Decimals

1). 1.2467 + .1 + 4.0837 + 5.6756

A. 10.6091
B. 11.106
C. 14.8
D. 111.1609

2). 7.3 - .5783

A. 7.6217
B. 6.7172
C. 6.7217
D. 7.6712

3). 8.9556 + .08777

A. 9.04337
B. 8.4037
C. 9.4037
D. 4.9037

4). 4.3811 - 1.4371

A. 2.944
B. 2.4999
C. 3.949
D. 3.944

5). .023 + 1.7163 + .3 + 7.777

A. 8.9163
B. 8.6193
C. 9.3168
D. 9.8163

6). 2.333 - 01.000

A. 01.111
B. 1.333
C. 3.333
D. 3.111

7). 1.7424 / .110

A. 18.54
B. 15.84
C. .15840
D. 1.58400

8). .110 / 1.10000

A. 11.000
B. .1
C. 1.100
D. 11.00000

9). 7.43 - .73 + 1.6

A. 8.3
B. 6.56
C. 5.65
D. 6.6500

10). 7.43 + 1.6 - .73

A. 5.65
B. 8.300
C. 6.6500
D. 6.56

Fraction & Decimal Conversion

Convert Problems 11 through 14 from fractions to their decimal equivalents and the decimals to their fraction equivalents using the chart provided.

11). 11/16

A. .6875 B. .0875 C. .5625 D. .0625

12). 39/64

A. .6093 B. .2344 C. .9219 D. .6039

13). .7343

A. 45/64 B. 3/4 C. 47/64 D. 23/32

14). .0156

A. 5/32 B. 15/64 C. 17/64 D. 1/64

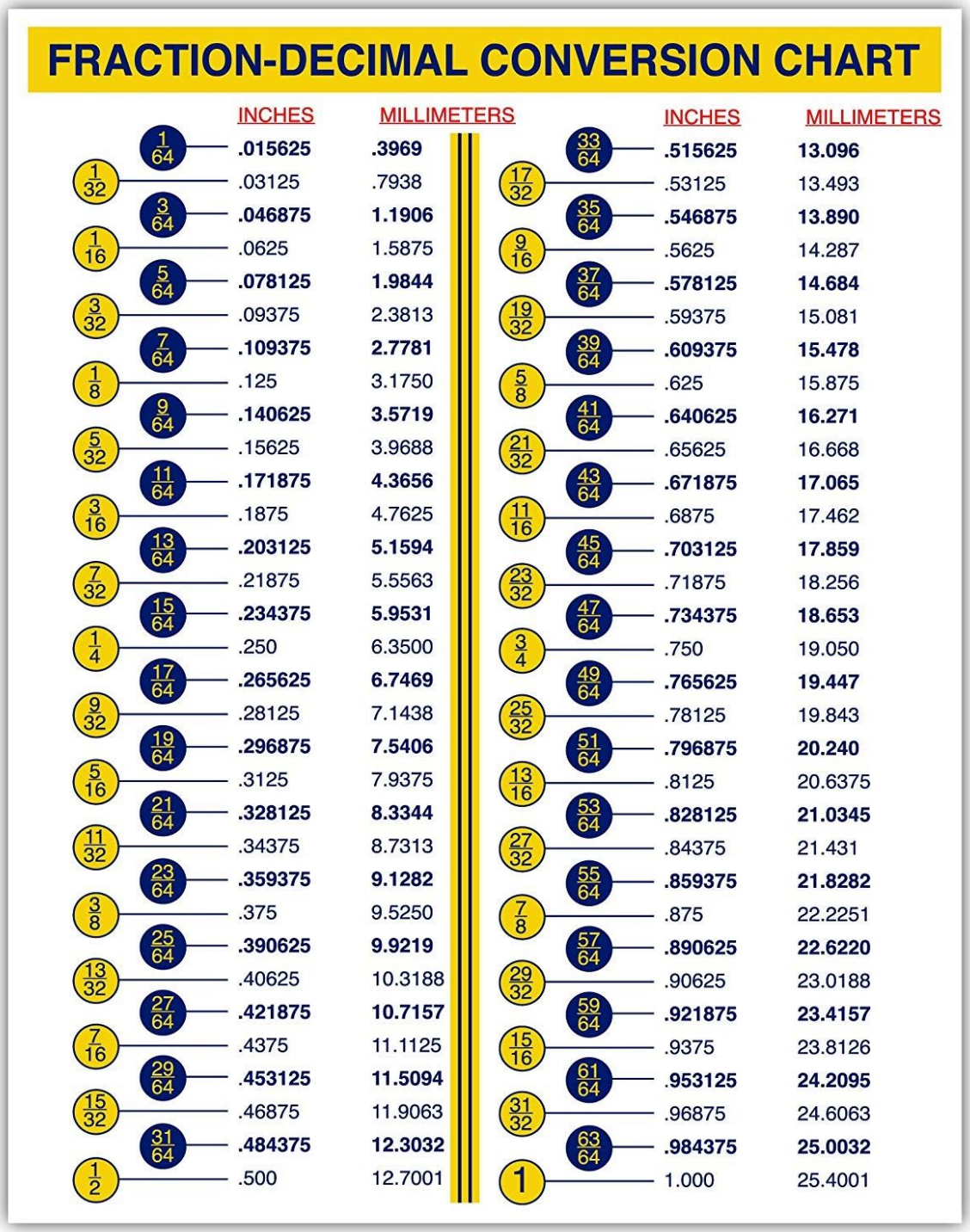
15). .250

A. 9/16 B. 1/2 C. 1/4 D. 22/32

16). 3/4

A. .750 B. .500 C. .5625 D. .700

Decimal Equivalent Chart

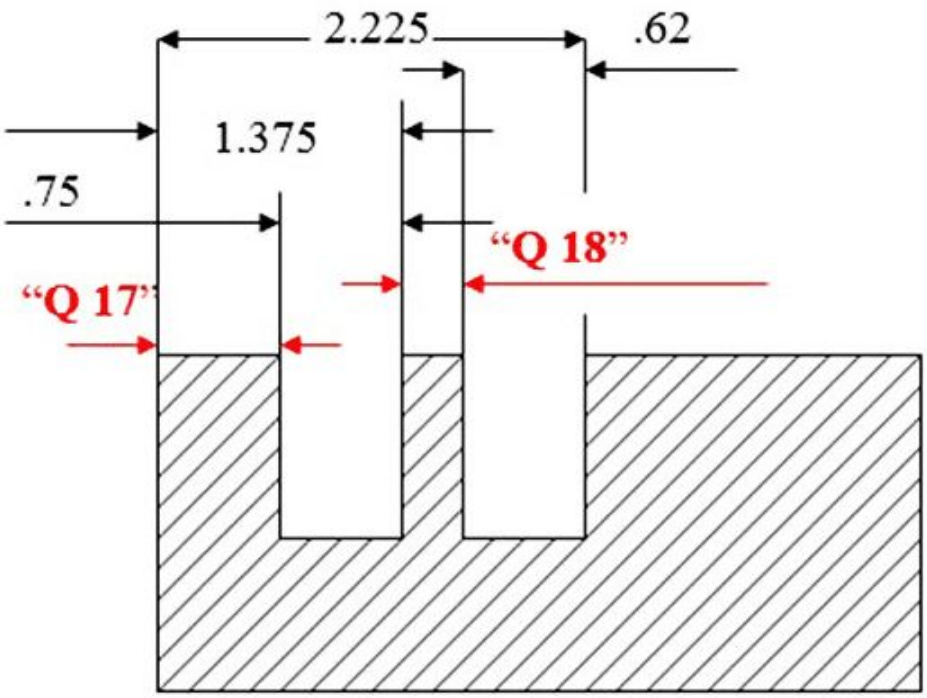


FRACTION-DECIMAL CONVERSION CHART

	INCHES	MILLIMETERS
1/64	.015625	.3969
1/32	.03125	.7938
3/64	.046875	1.1906
1/16	.0625	1.5875
5/64	.078125	1.9844
3/32	.09375	2.3813
7/64	.109375	2.7781
1/8	.125	3.1750
9/64	.140625	3.5719
5/32	.15625	3.9688
11/64	.171875	4.3656
3/16	.1875	4.7625
13/64	.203125	5.1594
7/32	.21875	5.5563
15/64	.234375	5.9531
1/4	.250	6.3500
17/64	.265625	6.7469
9/32	.28125	7.1438
19/64	.296875	7.5406
5/16	.3125	7.9375
21/64	.328125	8.3344
11/32	.34375	8.7313
23/64	.359375	9.1282
3/8	.375	9.5250
25/64	.390625	9.9219
13/32	.40625	10.3188
27/64	.421875	10.7157
7/16	.4375	11.1125
29/64	.453125	11.5094
15/32	.46875	11.9063
31/64	.484375	12.3032
1/2	.500	12.7001
33/64	.515625	13.096
17/32	.53125	13.493
35/64	.546875	13.890
9/16	.5625	14.287
37/64	.578125	14.684
19/32	.59375	15.081
39/64	.609375	15.478
5/8	.625	15.875
41/64	.640625	16.271
21/32	.65625	16.668
43/64	.671875	17.065
11/16	.6875	17.462
45/64	.703125	17.859
23/32	.71875	18.256
47/64	.734375	18.653
3/4	.750	19.050
49/64	.765625	19.447
25/32	.78125	19.843
51/64	.796875	20.240
13/16	.8125	20.6375
53/64	.828125	21.0345
27/32	.84375	21.431
55/64	.859375	21.8282
7/8	.875	22.2251
57/64	.890625	22.6220
29/32	.90625	23.0188
59/64	.921875	23.4157
15/16	.9375	23.8126
61/64	.953125	24.2095
31/32	.96875	24.6063
63/64	.984375	25.0032
1	1.000	25.4001

Dimension Calculation

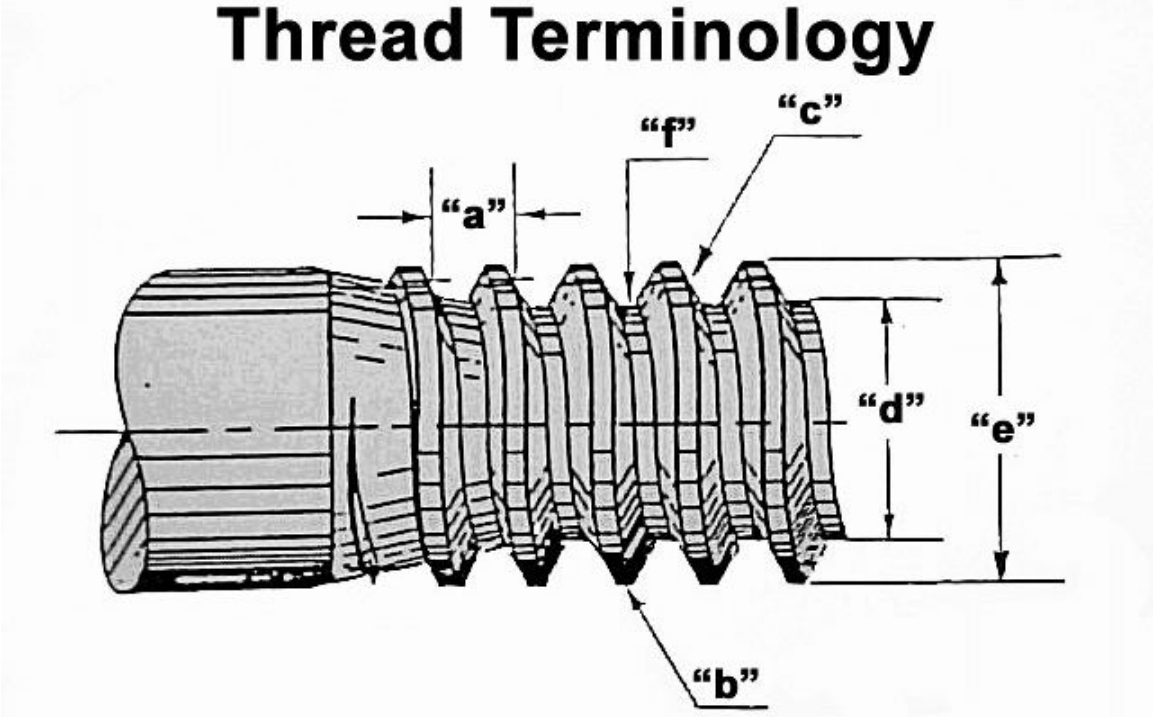
On the drawing below find the dimensions identified as “Q17” and “Q18”.



17). A. .625 B. 1.875 C. 1.630 D. .526

18). A. 1.630 B. .230 C. .625 D. .775

Section # 4
Thread Terminology



Reference the drawing above for questions 1 thru 6.
NOTE: "b", "c" and "f" need the name of the feature. (Hint: Not Diameter)

1). "a" is the:

A. Pitch
B. Pitch Diameter
C. Lead
D. Flank

2). "b" is the:

A. Major diameter
B. Outside Diameter
C. Crest
D. Lead

3). "c" is the:

A. Pitch Diameter
B. Flank
C. Pitch
D. Addendum

4). "d" is the:

A. Root
B. Minor Diameter
C. Pitch Diameter
D. Dedendum

Thread Terminology (cont)

5). "e" is the:

A. Outside Diameter
B. Pitch Diameter
C. Crest
D. Major Diameter

6). "f" is the:

A. Root
B. Root Diameter
C. Minor Diameter
D. Bottom

7). Threads are often measured with "Go" and "No-Go" thread gages. There is a more accurate method which is called:

A. Ring Gage
B. Plug Gage
C. Single Element
D. Composite

8). J Series threads, such as 10-32 UNJF-3B, differs from the ordinary unified thread, such as 10-32 UNF-3B, in that the J series:

A. Has an increased minor diameter and a controlled root radius
B. Only has added the letter "J"
C. Requires American National thread gages
D. Can be inspected using thread wires only

9). J series ring and snap thread gages must be used on all:

A. NF Threads
B. UNF Threads
C. "J" series internal threads
D. "J" series external threads

10). Single Element gaging means:

A. One single gage measures all elements at the same time.
B. Each element of the thread is measured separately.
C. "GO" and "No-Go" thread ring may be used.
D. Measurement over wires is the only measurement required.

Thread Terminology (cont)

11). A thread snap gage measures:

A. All elements of the thread
B. Minor Diameter
C. Pitch Diameter
D. Lead and Pitch

12). A "Go" Thread Ring is:

A. A single element gage
B. Composite gage and, if it fits, will only demonstrate the thread will assemble with its mating part.
C. The most accurate method for inspecting threads
D. Used for inspecting internal threads

13). A thread is acceptable to the "Go" thread member as long as the member will go:

A. Hand Tight
B. Wrench Tight
C. Using any amount of hand force
D. Using finger pressure only

14). Lead and Pitch are equal to each other only when the thread is a/an:

A. Single Start
B. External Thread
C. Internal Thread
D. Multiple Start

15). The definition of thread pitch is:

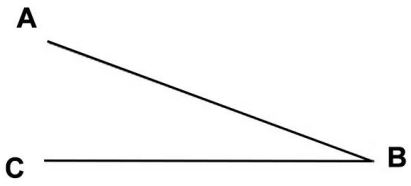
A. The distance between adjacent threads at corresponding points
B. The radial distance from the major diameter to the pitch diameter.
C. The amount of axial advance of a point on a thread in 360° of rotation.

16). The definition of thread lead is:

A. The radial distance from the pitch diameter to the minor diameter
B. The distance between adjacent threads at corresponding points
C. The radial distance from the major diameter to the pitch diameter
D. The amount of axial advance of a point on a thread in 360° of rotation.

Section # 5
Geometry & Related Subjects

1). The angle below is identified as:



A. CAB B. ABC C. BAC D. BCA

2). Sides of the above angle are identified as:

A. AB & BC B. AB & AC C. BA & AB D. CB & BC

3). If two lines are at an angle to each other, as shown below, the condition is known as:

A. Parallel
B. Oblique
C. Perpendicular
D. Obtuse

4). If two lines as shown below are exactly the same distance apart the condition is known as:

A. Out of parallel
B. Parallel
C. Parallelogram
D. Parallax

5). The unit of measurement of an angle is:

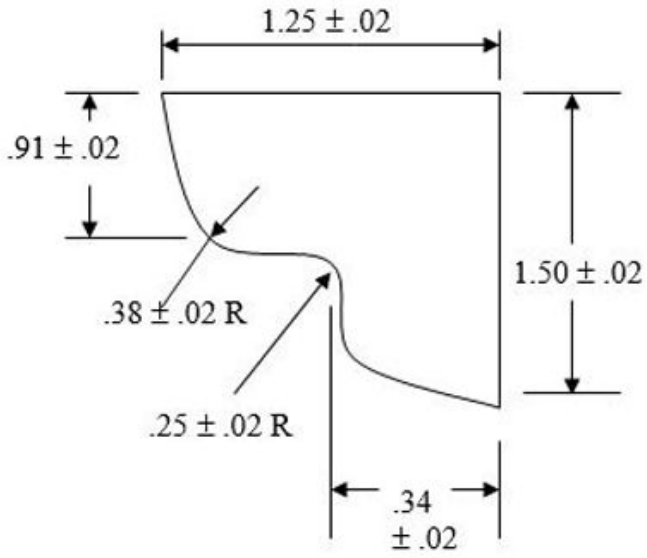
A. Dihedral B. Degree C. Tangent D. Sine

6). Each unit of measurement of the angle is divided into 60:

A. Minutes B. Degrees C. Seconds D. Hours

7). A complete circle has how many degrees?

A. 180 B. 270 C. 45 D. 360

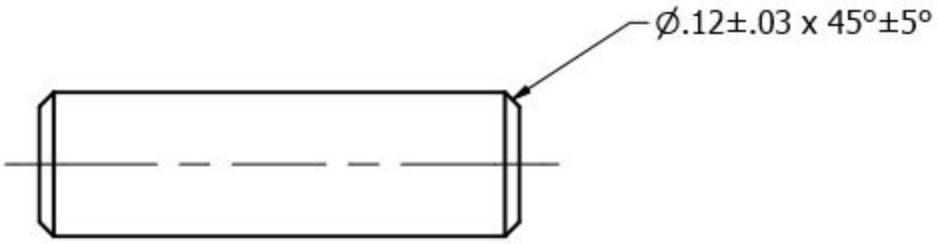


8). The .38 ± .02 Dimension is:

A. Fillets B. Corner Radius C. Angle D. Length

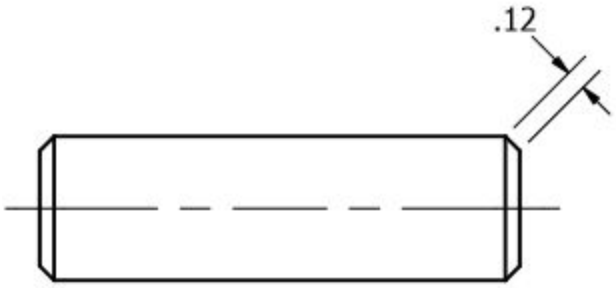
9). The .25 ± .02 Dimension is:

A. Length B. Fillet Radius C. Round D. Length

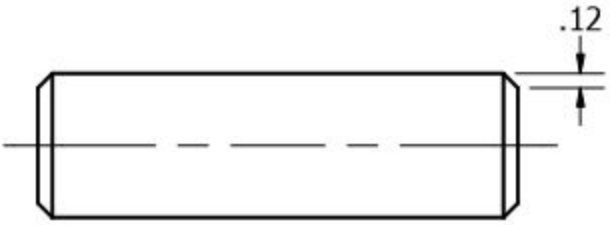


10. When a Chamfer is dimensioned as shown in the drawing above, the correct method of measuring the ⌀.12 ± .03 is:

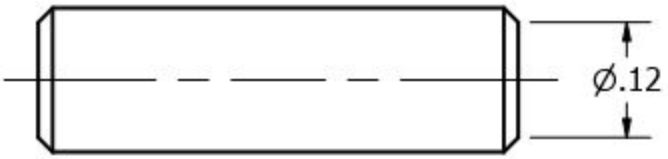
A.



B.



C.



D. Any of these three methods as long as one of the measurements is within the tolerance limits.

11). The Circumference of a circle is:

A. Distance from the center to the outer edge
B. Distance from the outer edge through the centerline to the opposite side
C. Distance around the outer edge
D. 180 degrees

12). The diameter of a round object is:

A. The distance from centerline to the outer edge
B. The distance from the outer edge through the center to the outer edge on the opposite side
C. The radius divided by two
D. √ 2 X R.

13). The radius of a circle is:

A. One half the diameter
B. The distance from the outer edge through the center to the outer edge on the opposite side
C. Two times the diameter
D. (R + 2) (D) - Ω

GEOMETRIC TOLERANCING

Identify the following geometric symbols

1). 

A. Straightness
B. Angularity
C. Flatness
D. Perpendicularity

2).

A. Flatness
B. Straightness
C. Parallelism
D. Angularity

3). 

A. Perpendicularity
B. Symmetry
C. Parallelism
D. Angularity

4). 

A. Concentricity
B. Cylindricity
C. Roundness
D. Runout

5). 

A. Datum Identification Symbol
B. Basic Dimension
C. Flatness
D. Maximum Material Condition

6). 

A. Angularity
B. Flatness
C. Profile of a Surface
D. Perpendicularity

7). 

A. Profile of a surface
B. Symmetry
C. Straightness
D. Angularity

8). 

A. Position
B. MMC
C. RFS
D. Roundness

9). 

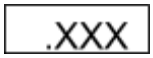
A. Roundness
B. Cylindricity
C. Concentricity
D. MMC

10). 

A. Straightness
B. Flatness
C. Run Out
D. Parallelism

11). 

A. Profile of a surface
B. Flatness
C. Profile of a line
D. Straightness

12). 

A. Maximum Material Condition
B. Datum Identification Symbol
C. Basic Dimension
D. Flatness

13). 

A. Circular Run out
B. Angularity
C. Profile of a Line
D. Total Runout

14). 

A. Profile of a Line
B. Straightness
C. Flatness
D. Profile of a surface

15). 

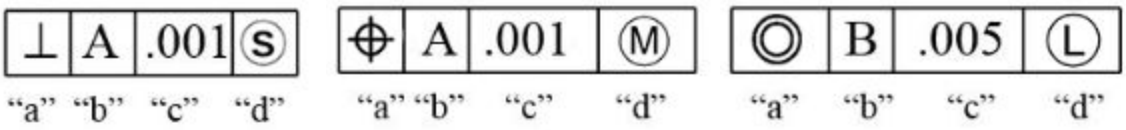
A. Circular Run out
B. Angularity
C. Symmetry
D. Total Run out

16). 

A. Roundness
B. Concentricity
C. True Position
D. Cylindricity

Below are three feature control symbols; identify the various symbols identified as a, b, c, & d.

Reference Questions 17 thru 20



17). Identify “a”

A. Modifier
B. Datum Reference
C. Geometric Symbol
C. Tolerance

18). Identify “b”

A. Datum Reference
B. Modifier
C. Tolerance
D. Geometric Symbol

19). Identify “c”:

A. Modifier
B. Geometric Symbol
C. Datum Reference
D. Tolerance

20). Identify “d”

A. Modifier
B. Geometric Symbol
C. Tolerance
D. Datum Reference

21). Concentricity is a type of location tolerance involving two or more features of size. Concentricity controls location of the features what?

A. Basic Dimension
B. Axis
C. Outside Diameter
D. Inside Diameter

22). Concentricity is always used on what kind of basis unless otherwise specified.

A. RFS
B. RMS
C. MMC
D. CLA

23). The shape of the tolerance zone for concentricity or true position is:

A. Square
B. Radial
C. Conical
D. Cylindrical

24). Unless otherwise specified all geometric tolerances must be met regardless of feature size. The only exception is:

A 

B. 

C. 

D.