

2015 Academic Challenge

ENGINEERING GRAPHICS TEST – REGIONAL

– This Test Consists of 40 Questions –

Engineering Graphics Test Production Team

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GENERAL DIRECTIONS

Please read the following instructions carefully. This is a timed test; any instructions from the test supervisor should be followed promptly.

The test supervisor will give instructions for filling in any necessary information on the answer sheet. Most Academic Challenge sites will ask you to indicate your answer to each question by marking an oval that corresponds to the correct answer for that question. One oval should be marked to answer each question. Multiple ovals will automatically be graded as an incorrect answer.

Be sure ovals are marked as  , not  ,  ,  , etc.

If you wish to change an answer, erase your first mark completely before marking your new choice.

You are advised to use your time effectively and to work as rapidly as you can without losing accuracy. Do not waste your time on questions that seem too difficult for you. Go on to the other questions, and then come back to the difficult ones later if time remains.

***** Time: 40 Minutes *****

DO NOT OPEN TEST BOOKLET UNTIL YOU ARE TOLD TO DO SO!

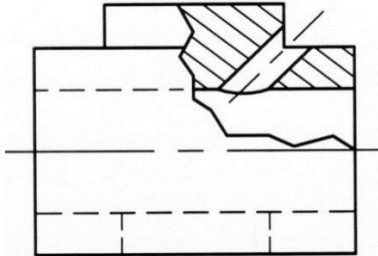
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WYSE – Academic Challenge
 Engineering Graphics Test (Regional) - 2015

1. How many different ASME standard line types are featured in the illustration below?



- A. 4
- B. 5
- C. 6
- D. 7
- E. 8

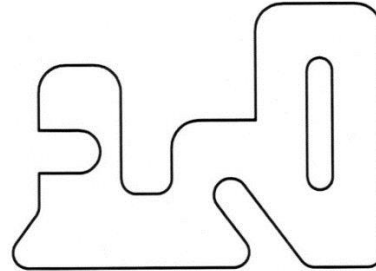
2. Model cars are commonly produced at $1/25^{\text{th}}$ scale. What would be the closest approximate length of a 2014 Mustang model, given the real-life bumper-to-bumper distance is 15'-9"?

- A. 6"
- B. 6.5"
- C. 7"
- D. 7.5"
- E. 8"

3. Which of the following architectural scales would be suitable for measuring at "quarter size"?

- A. $1/8" = 1'-0"$
- B. $1/4" = 1'-0"$
- C. $3/4" = 1'-0"$
- D. $1-1/2" = 1'-0"$
- E. $3" = 1'-0"$

4. How many 90° arcs are featured in the gasket shape illustrated below?



- A. 6
- B. 7
- C. 8
- D. 9
- E. 10

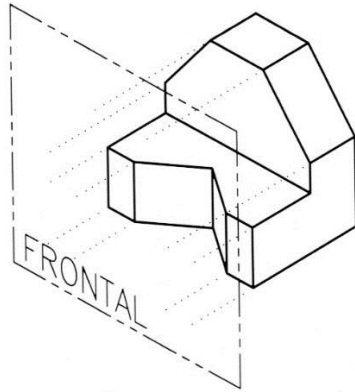
5. The point or sharp "tip" of a pyramid is known as the _____.

- A. apex
- B. peak
- C. conic
- D. convex
- E. star

6. What geometric form is directly incorporated into the manufacturing of all compression springs?

- A. spiral
- B. parabola
- C. helix
- D. knurl
- E. involute

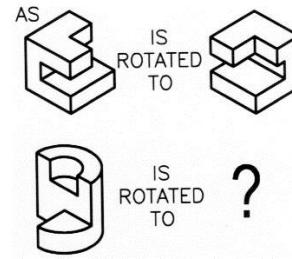
7. Considering ALL surfaces of the object illustrated below, how many of the surfaces will be represented as just a line (edge view) in the **front** view? [i.e. How many surfaces are perpendicular to the **frontal** plane?]



- A. 6
- B. 7
- C. 8
- D. 9
- E. 10

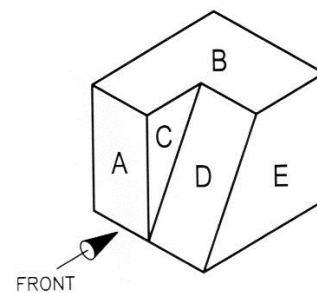
8. In engineering graphics education, **oblique** surfaces are defined as surfaces that are inclined to all three principal planes of projection. Therefore, how do **oblique** surfaces appear in the three regular views?
- A. Foreshortened in one view, and as a line in the other two
 - B. Foreshortened in two views, and as a line in the other one
 - C. True size and shape in one view, but as lines in the other two
 - D. As lines in all three views
 - E. As foreshortened shapes in all three views

9. The following is similar to a test item from the **Purdue Visualization of Rotations** test:



- A.
- B.
- C.
- D.
- E.

10. In the illustration below, which of the labeled surfaces will appear as a shape (versus a line) in two of the three regular views (front, top, and right side)?

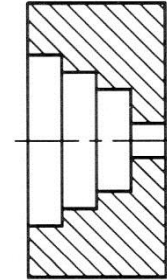


- A. A
- B. B
- C. C
- D. D
- E. E

11. Identify the TRUE statement about circles appearing as ellipses in pictorial drawings.

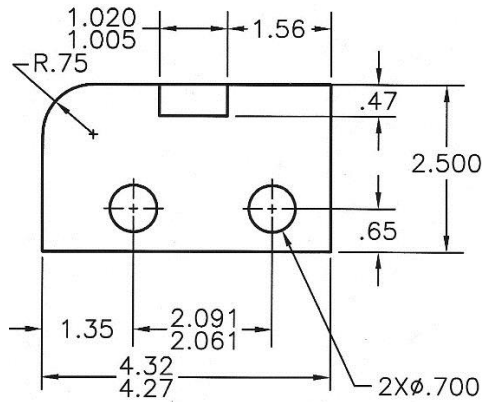
- A. Isometric ellipses can be created using a four-center/four-arc "approximate" method
- B. Isometric ellipse templates also create proper and exact ellipses for two-point perspective drawings
- C. Oblique drawings won't ever have ellipses because the front surface is parallel with the drawing plane
- D. One-point perspective pictorial drawings won't ever have ellipses because the front surface is parallel with the drawing plane
- E. Circular features cannot be projected as ellipses in trimetric pictorials.

13. The illustration below is a full section right side view of an object. If the front view features five circles, how many will be hidden?



- A. 4
- B. 3
- C. 2
- D. 1
- E. 0

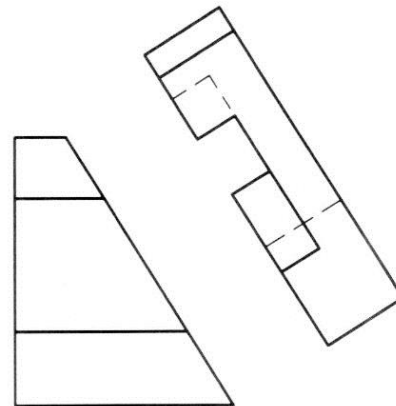
12. Read this "print" and determine how much difference is specified between the MMC of the holes and the LMC of the holes?



UNLESS OTHERWISE SPECIFIED:
 .XX = ±.01
 .XXX = ±.005

- A. .005"
- B. .010"
- C. .020"
- D. .030"
- E. .050"

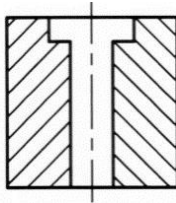
14. In engineering graphics, it is common to number the vertices of an object in order to help solve a problem. How many unique vertices does this object have?



- A. 14
- B. 16
- C. 18
- D. 20
- E. 22

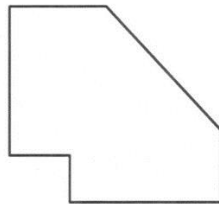
15. Some solid modeling programs require you to constrain a _____ fully before the creation of a solid feature can be created.
- A. primitive
 - B. thread
 - C. axis
 - D. fillet
 - E. profile

16. This section view of a 2" cube with a 1/2" diameter hole and a 1" diameter counterbore features ___ error(s).



- A. 0
- B. 1
- C. 2
- D. 3
- E. 4

17. How many dimensions are needed to fully describe (constrain) this geometry?



- A. 6
- B. 7
- C. 8
- D. 9
- E. 10

18. Within a 3D solid modeling program, some features may be called **cosmetic features**. By definition, these are features that appear somewhat realistic in the model, but are NOT geometrically constructed. Which of the following would be a likely example?

- A. Boss
- B. Keyway
- C. Slot
- D. Knurl
- E. Spotface

19. The tool shown below is used to cut a semi-circular groove within the body of a shaft for the purpose of housing a _____ key.

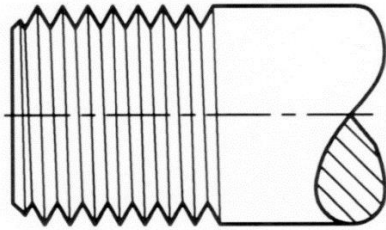


- A. moon
- B. Pratt
- C. square
- D. slipper
- E. Woodruff

20. Compare thread A with a thread note of 3/8-16UNC-2A with thread B with a thread note of 3/8-24UNF-2B, and then identify the FALSE statement.

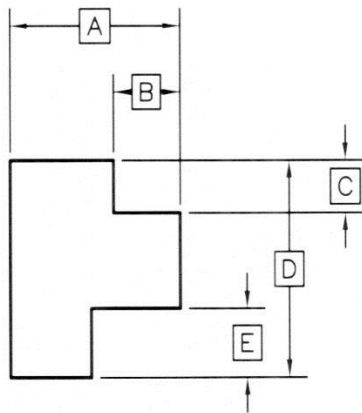
- A. A has a larger thread depth
- B. B has a larger pitch
- C. A is an external thread
- D. A & B have the same major diameter
- E. A & B both have the same thread form

21. In the illustration below, what is the most obvious sign that the screw threads are **NOT** drawn as **true projection**?



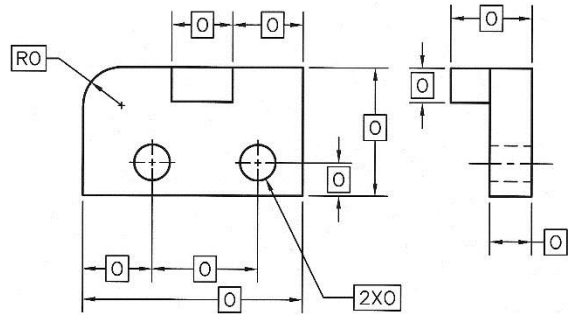
- A. The crest and root lines are straight line segments
- B. The crests are not chamfered
- C. The V-grooves are not the correct angle
- D. The end is not chamfered
- E. The crest and root lines slope the wrong direction

22. Which of the dimensions below is **poorly** placed?



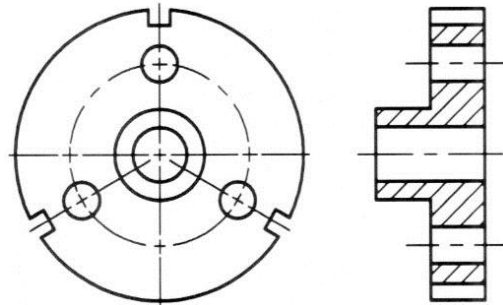
- A. A
- B. B
- C. C
- D. D
- E. E

23. In the drawing below, the dimensional values have been replaced with boxes. Of the twelve dimensions shown, how many are **size** dimensions?



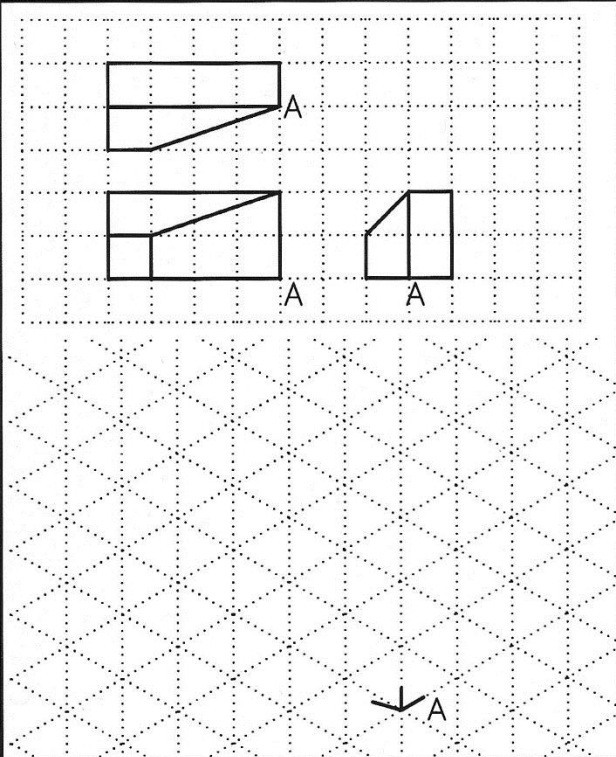
- A. 5
- B. 6
- C. 7
- D. 8
- E. 9

24. What type of section view is illustrated in the illustration below (Cutting plane line not shown)?

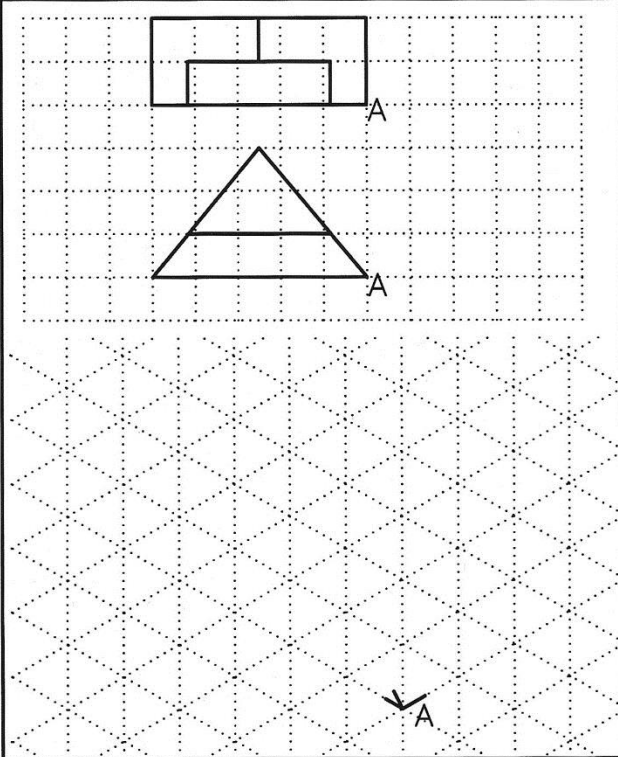


- A. Aligned
- B. Rotated
- C. Revolved
- D. Removed
- E. Offset

**PROBLEMS 25 & 26: CREATE ISOMETRIC SKETCHES
SELECT AN ANSWER THAT REPRESENTS THE NUMBER OF SEGMENTS REQUIRED**

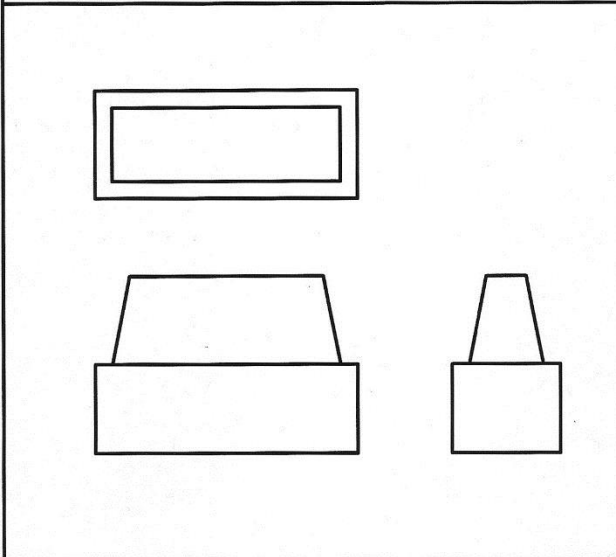


25. NUMBER OF LINE SEGMENTS:
A. 14 B. 15 C. 16 D. 17 E. 18

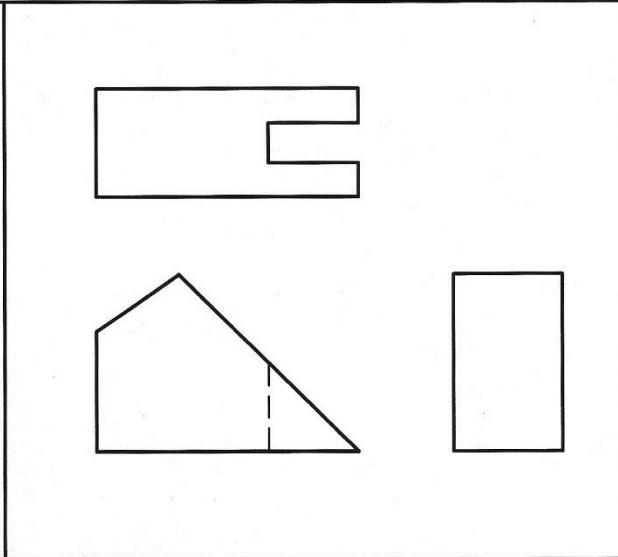


26. NUMBER OF LINE SEGMENTS:
A. 10 B. 11 C. 12 D. 13 E. 14

**PROBLEMS 27 & 28: MISSING LINE PROBLEMS: SELECT AN ANSWER THAT
CORRESPONDS WITH THE LEAST NUMBER OF LINE SEGMENTS (VISIBLE AND/OR
HIDDEN) STILL NEEDED TO COMPLETE A CORRECT AND VALID MULTIVIEW DRAWING**

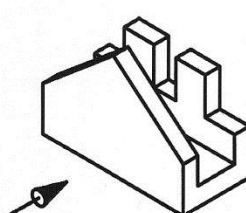
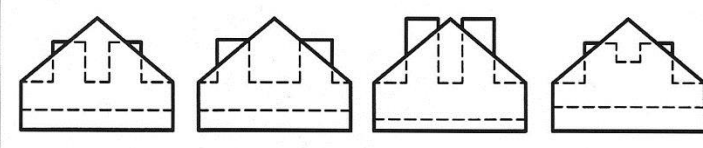
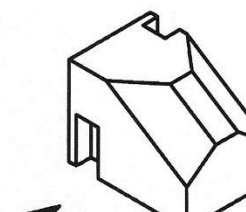
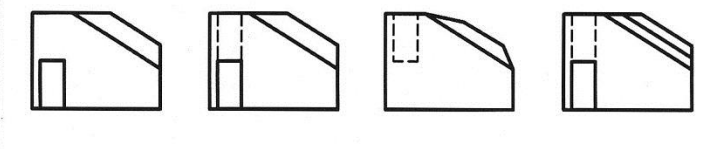
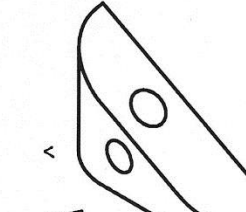
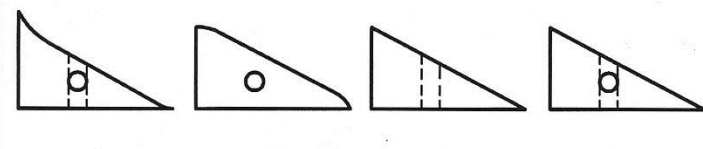
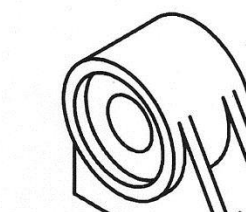
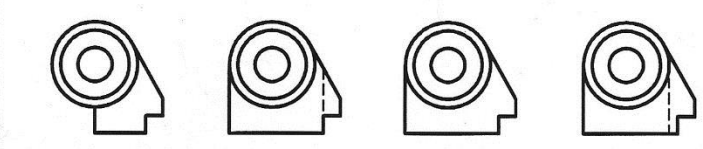


27. MINIMUM NUMBER OF LINES:
A. 2 B. 4 C. 6 D. 8 E. 10

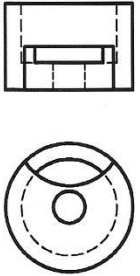
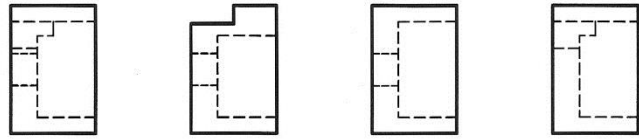
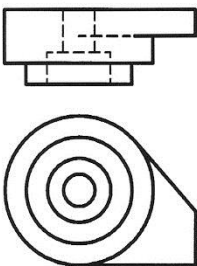
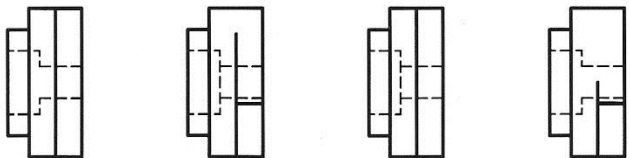
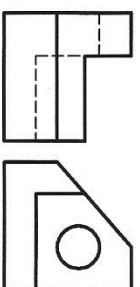
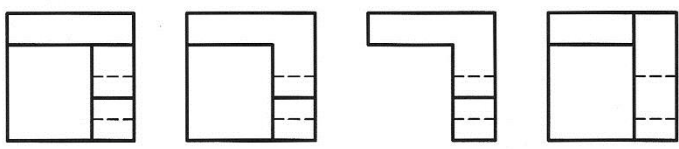
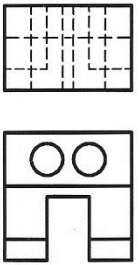
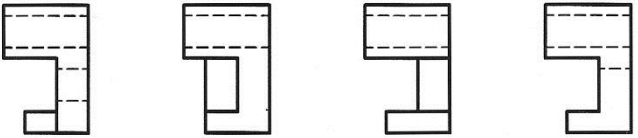


28. MINIMUM NUMBER OF LINES:
A. 2 B. 3 C. 4 D. 5 E. 6

FOR EACH PROBLEM ON THIS PAGE, SELECT A FRONT VIEW
 NOTE: CENTER LINES OMITTED ON THIS TEST

<p>29.</p> 	 <p>A. B. C. D. E.</p>
<p>30.</p> 	 <p>A. B. C. D. E.</p>
<p>31.</p> 	 <p>A. B. C. D. E.</p>
<p>32.</p> 	 <p>A. B. C. D. E.</p>

FOR EACH PROBLEM ON THIS PAGE, SELECT A SIDE VIEW
 NOTE: CENTER LINES OMITTED ON THIS TEST

<p>33.</p>  <p>?</p>	 <p>A. B. C. D.</p> <p>NONE OF THESE</p> <p>E.</p>
<p>34.</p>  <p>?</p>	 <p>A. B. C. D.</p> <p>NONE OF THESE</p> <p>E.</p>
<p>35.</p>  <p>?</p>	 <p>A. B. C. D.</p> <p>NONE OF THESE</p> <p>E.</p>
<p>36.</p>  <p>?</p>	 <p>A. B. C. D.</p> <p>NONE OF THESE</p> <p>E.</p>

FOR EACH PROBLEM ON THIS PAGE, SELECT A FRONT SECTIONAL VIEW
 NOTE: CENTER LINES OMITTED ON THIS TEST

