

## CHAPTER 2-COMMUNICATING WITH A SKETCH

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### TRUE/FALSE

1. The paper should be taped down to the table when sketching so it does not move around.  
ANS: F                      PTS: 1
2. Using graph paper is a good way to establish coordinates for drawing components when sketching.  
ANS: T                      PTS: 1
3. When sketching, it is never necessary to have an eraser available.  
ANS: F                      PTS: 1
4. It is best to have sketching paper that is as smooth as possible.  
ANS: F                      PTS: 1
5. When sketching, it is preferable to be able to move the paper around.  
ANS: T                      PTS: 1
6. It is important to sketch very long lines with one continuous stroke.  
ANS: F                      PTS: 1
7. An isometric drawing is a three dimensional pictorial representation of an object.  
ANS: T                      PTS: 1
8. Isometric sketches of an object represent the object exactly as it appears to the naked eye.  
ANS: F                      PTS: 1
9. Isometric circles appear round.  
ANS: F                      PTS: 1
10. A sketch can be used to manufacture a part.  
ANS: T                      PTS: 1
11. A grid frame of reference is helpful when sketching an irregular object.  
ANS: T                      PTS: 1
12. Orthographic projection is also called "proportional projection."  
ANS: F                      PTS: 1

13. To set up an isometric axis, you need three beginning lines.  
ANS: F                   PTS: 1
14. When making a three dimensional isometric view of an object, the most critical part of the construction is making sure the surrounding rectangular box has the proper proportions.  
ANS: T                   PTS: 1
15. It is important to sketch features of an object lightly by estimating distances within the rectangular box, which has already been drawn.  
ANS: T                   PTS: 1
16. Isometric lines are parallel to the isometric axes lines.  
ANS: T                   PTS: 1
17. Isometric lines are true length lines.  
ANS: T                   PTS: 1
18. Lettering on sketches does not need to be readable.  
ANS: F                   PTS: 1
19. In an isometric sketch, an isometric cube shows four sides.  
ANS: F                   PTS: 1
20. It is okay to sketch on a napkin at the coffee table while communication with a colleague.  
ANS: T                   PTS: 1
21. When sketching circles using the hand compass method, it is important to keep the pencil as independent from your hand as possible.  
ANS: F                   PTS: 1
22. There is no need for proportion when sketching an object.  
ANS: F                   PTS: 1
23. It is important to remember the relationships of the lines in terms of length and direction to one another.  
ANS: T                   PTS: 1
24. The common form of multiview alignment is one in which the front view is the most important view to select first.  
ANS: T                   PTS: 1
25. A multiview projection shows an object in a 3D picture.

ANS: F                   PTS: 1

26. Keeping views aligned in a multiview sketch makes the sketching and understanding easier.

ANS: T                   PTS: 1

27. Sketching and aligning the proportional rectangles for a multiview sketch is an important first step.

ANS: T                   PTS: 1

28. Sketching a 45° line is helpful when transferring width dimensions between the front view and the top view.

ANS: F                   PTS: 1

29. Object lines are always shown in an isometric sketch.

ANS: T                   PTS: 1

30. Hidden lines are always shown in an isometric sketch.

ANS: F                   PTS: 1

31. Some non-isometric lines can be true length lines.

ANS: F                   PTS: 1

32. A small circle is easy to sketch when you sketch it like a letter "O."

ANS: T                   PTS: 1

33. The box method to sketch a circle is not a very fast method.

ANS: F                   PTS: 1

34. A very lightly sketched square box that is equal in size to the diameter of the proposed circle is the box method of sketching a circle.

ANS: T                   PTS: 1

35. The centerline method for sketching a circle is different from the box method.

ANS: T                   PTS: 1

36. The centerline method for creating a circle is when you sketch very light horizontal, vertical, and 45° lines that meet at the center of the proposed circle.

ANS: T                   PTS: 1

37. One way to create an arc at a corner is to create a box equal in size to the radius of the arc.

ANS: T                   PTS: 1

38. An ellipse uses a consistent radius to be created.

ANS: F                    PTS: 1

39. Major and minor diameters represent the width and length of an ellipse.

ANS: T                    PTS: 1

40. The pencil you use for sketching should have a hard lead that is sharp.

ANS: F                    PTS: 1

41. A standard number 2 pencil works well for sketching with a slightly rounded point.

ANS: T                    PTS: 1

42. Sketch different line thicknesses by varying the pressure you apply to the pencil.

ANS: T                    PTS: 1

43. An automatic pencil is a poor choice to use when sketching.

ANS: F                    PTS: 1

#### **MULTIPLE CHOICE**

1. Which of the following is not necessary to have on hand when sketching?

- a. paper
- b. pencil
- c. eraser
- d. none of the above

ANS: D                    PTS: 1

2. What is a trammel when related to sketching?

- a. a circle with a 6" diameter
- b. a ruler made of paper that establishes the circle radius
- c. a compass for sketching circles
- d. none of the above

ANS: B                    PTS: 1

3. When sketching circular lines, one can use the \_\_\_\_ and the \_\_\_\_ method.

- a. protractor; trammel
- b. compass; block
- c. trammel; hand compass
- d. none of the above

ANS: C                    PTS: 1

4. What are some of the things you can ask yourself when sketching that will help keep the sketch in proportion?

- a. Is this next line longer than the previous line I drew?
- b. Is this next line perpendicular to my previous line?

- c. Should this line be darker than the previous line?
- d. all of the above
- e. both a and b

ANS: E                      PTS: 1

5. A good sketch can assist the drafter by allowing which of the following?
- a. the determination of how big to make the drawing
  - b. the determination of how the drawing should appear when finished
  - c. the determination of sheet size or screen limit for the drawing
  - d. all of the above
  - e. none of the above

ANS: D                      PTS: 1

6. Multiviews are views of an object in which the line of sight is \_\_\_\_ the surface of the object.
- a. parallel to
  - b. perpendicular to
  - c. near
  - d. none of the above

ANS: B                      PTS: 1

7. The block technique is used:
- a. only with rectangular (block type) objects.
  - b. with small objects to be sketched.
  - c. when the object can be surrounded with a rectangular measurement line.
  - d. none of the above

ANS: C                      PTS: 1

8. When establishing an isometric axis, you need:
- a. a vertical line, two 30° angular lines, and a horizontal line.
  - b. a ground level line, a horizontal line, and two 30° angular lines.
  - c. a vertical line, a horizontal lines, and a 30° angular line.
  - d. a measurement line, a vertical line, and two 30° angular lines.
  - e. none of the above

ANS: A                      PTS: 1

9. Which of the following is not a procedure in sketching?
- a. Cut out sections as measured by eye, using light lines.
  - b. Darken in the desired outlines.
  - c. Visualize the object surrounded with a rectangle.
  - d. none of the above

ANS: D                      PTS: 1

10. What kind of lines can be found in a multiview sketch?
- a. hidden lines
  - b. Non-isometric lines
  - c. trammel lines
  - d. block lines
  - e. none of the above

ANS: A                      PTS: 1

11. Which of the following steps is not necessary when sketching an object along isometric axes?
- Locate starting and end points for the non-isometric lines.
  - Darken all outlines.
  - Develop a proportional box.
  - Sketch in all isometric lines.
  - none of the above

ANS: E                      PTS: 1

12. The four center method of sketching an isometric ellipse includes:
- drawing construction line segments on the surface of the isometric cube.
  - sketching the non-isometric lines.
  - locating non-isometric line end points.
  - all of the above
  - none of the above

ANS: A                      PTS: 1

13. What are the light lines used to construct a circle in the box method called?
- sketch lines
  - phantom lines
  - construction lines
  - none of the above

ANS: C                      PTS: 1

14. A common use for an arc is one of the following:
- part of a circle
  - end of a slot
  - shape of a leader line
  - all of the above

ANS: B                      PTS: 1

15. What is the term for when the arc touches the line at only one point and does not cross over the line? What is the term for when the arc touches the line at only one point and does not cross over the line?
- radii
  - intersection
  - tangent
  - none of the above

ANS: C                      PTS: 1

## COMPLETION

1. Sketching is \_\_\_\_\_ drawing without the use of \_\_\_\_\_.

ANS: freehand, drafting equipment

PTS: 1

2. Sketching equipment is not elaborate. All you need are these three items  
\_\_\_\_\_.

ANS:

paper, pencil and an eraser  
paper, an eraser and a pencil  
pencil, paper and an eraser  
pencil, an eraser and paper  
An eraser, pencil and paper  
An eraser, paper and a pencil

PTS: 1

3. Whatever line you decide to sketch first determines the \_\_\_\_\_ of the drawing. The first line sketched is called the \_\_\_\_\_.

ANS: scale, measurement line

PTS: 1

4. The sketch should be large enough to be clear, but the \_\_\_\_\_ of the features are more important than the size of the sketch.

ANS: proportions

PTS: 1

5. Multiview projection is also known as \_\_\_\_\_.

ANS: orthographic projection

PTS: 1

6. The 45° line sketched above the right side view and to the right of the top view is called the \_\_\_\_\_.

ANS: mitre line

PTS: 1

7. In setting up an isometric view, you need four beginning lines: a horizontal reference line, two \_\_\_\_\_ lines and one vertical line.

ANS: 30° angle lines

PTS: 1

8. Circles and arcs appear as \_\_\_\_\_ in isometric views.

ANS: ellipses

PTS: 1

9. Lines that are not parallel to one of the three isometric axes lines are called \_\_\_\_\_.

ANS: non-isometric

PTS: 1

10. The quality of a sketch depends on \_\_\_\_\_.

ANS: the intended purpose

PTS: 1

## MATCHING

*Match the following word or phrase with its correct meaning.*

- |                       |                            |
|-----------------------|----------------------------|
| a. sketching          | e. measurement line        |
| b. isometric line     | f. proportion              |
| c. Non-isometric line | g. multiview projection    |
| d. mitre line         | h. orthographic projection |

1. Another name for multiview projection.
2. Lines that are parallel the one of the three isometric axes lines.
3. The first line sketched that determines the scale of the drawing.
4. Lines that are not parallel the one of the three isometric axes lines.
5. Two-dimensional views of an object that are established by a line of sight that is perpendicular ( $90^\circ$ ) to the surface of the object.
6. A freehand drawing or a drawing made without the use of drafting equipment.
7. The length of each line in relation to another line.
8. The  $45^\circ$  line sketched above the right side view and to the right of the top view.

- |           |        |
|-----------|--------|
| 1. ANS: H | PTS: 1 |
| 2. ANS: B | PTS: 1 |
| 3. ANS: E | PTS: 1 |
| 4. ANS: C | PTS: 1 |
| 5. ANS: G | PTS: 1 |
| 6. ANS: A | PTS: 1 |
| 7. ANS: F | PTS: 1 |
| 8. ANS: D | PTS: 1 |

## SHORT ANSWER

1. There are a number of uses and advantages for freehand sketching. List six of these uses and advantages as discussed in the text.

ANS:

Any six of the following:

Sketching is a fast form of visual communication.

Organize thoughts and minimize errors on final drawing.

Help establish coordinates for CADD drawing.

Record stages of progress of a design.

Illustration in technical reports.

Used as production drawing in job shop.

Used to gather shape and size descriptions for existing parts or products.



PTS: 1

2. Multiview projection is also known as orthographic projection. Explain the basics of creating orthographic projections.

ANS:

Multiview projections are two-dimensional views of an object that are established by a line of sight that is perpendicular ( $90^\circ$ ) to the surface of the object. The orthographic sketch is an execution of this projection. The common drawing form is three views the front, top, and right side. The main view is the front view, and the top and right side views must be positioned above and to the right of the front view, respectively. Additionally, the three views are aligned horizontally and vertically with construction lines. In addition, a  $45^\circ$  mitre line is used to transfer width dimensions between the right side and top views. More than three views can be used if necessary.

PTS: 1

3. Briefly describe how sketching is a form of communication.

ANS:

Sketching is fast visual communication. The ability to make an accurate sketch quickly can often be an asset when communicating with people at work or at home. Especially when technical concepts are the topic of discussion, a sketch can be the best form of communication.

PTS: 1

4. Why do drafters prepare a sketch before starting a formal drawing?

ANS:

Most drafters prepare a preliminary sketch to help organize thoughts and minimize errors on the final drawing.

PTS: 1

5. Why is it best to keep the sketching paper free to move?

ANS:

The best sketches are made when you are able to move the paper to the most comfortable drawing position.

PTS: 1

6. Describe the characteristics of a good pencil and leads to use for sketching.

ANS:

The pencil should have a soft lead. A common number 2 pencil works fine or an automatic 0.7- or 0.9-mm pencil with F or HB lead is also good. The pencil lead should not be sharp. A dull, slightly rounded pencil point is best.

PTS: 1

7. How do you sketch different line thicknesses?

ANS:

When necessary, different thicknesses of line can be drawn by changing the amount of pressure you apply to the pencil.

PTS: 1

8. Describe the paper you should use for sketching.

ANS:

The quality of the paper is also not critical. A good sketching paper is newsprint, although almost any kind of paper works. Paper with a surface that is not too smooth is best. Many engineering designs have been created on a napkin around a lunch table.

PTS: 1