Mechanical Drawing

Unit 2 Study Guide for Chapters 6-10

Chapter 6 Multiview Drawing

Section 6.1 Understanding Orthographic Projection

A. Technical Drawing: How can a technical drawing give more accurate information than a photograph?
- 1. Multiview Drawing
  - a. Normal Views

B. Orthographic Projection: How does the angle of vision affect the way you see an object?
- 1. Angles of Projection
  - a. First-Angle Projection
  - b. Third-Angle Projection
- 2. The Glass Box

C. Drawing the Views: How do you decide which views to use when making a technical drawing?
- 1. Choosing the Number of Views
  - a. Curved Surfaces

D. Placing Views: How does view placement affect the way a drawing is interpreted?
- 1. Locating the Views
  - a. Vertical Placement
  - b. Horizontal Placement
- 2. Second Position of the Side View

E. Beginning to Draw: How can you ensure your drawing gives all the necessary information?
- 1. Laying Out the Views
- 2. Adding Details

Section 6.2 Creating a Multiview Drawing Using CAD

A. Creating Views Independently in CAD: How does CAD add efficiency to creating views?
- 1. Laying Out the Views
- 2. Adding Details

B. Creating Views from a 3D Model: How can a 3D model help to create 2D views?
- 1. Solid Models
- 2. Wireframe Models
- 3. Extraction of the 2D Profiles

Chapter 7 Dimensioning

Section 7.1 Basic Dimensioning Principles

A. Lines and Symbols for Dimensioning: What information does a complete set of working drawings include?
- 1. Dimension Line
- 2. Extension Line
- 3. Arrowhead
- 4. The Finish Mark
- 5. Leaders

B. Dimensioning Systems and Types: What are the two basic types of dimensions?
- 1. Units
- 2. Types of Dimensioning
- 3. Placing Dimensions
- 4. Identifying the Drawing Scale
- 5. Size Dimensions of Basic Shapes

6. Location Dimensions
7. Datum Dimensioning

C. Standard Details: When can dimensioning be omitted from a drawing?
1. Chamfers
2. Tapers
3. Curves

D. Dimensioning a Detail Drawing: Why are the dimensions added in the final step?

E. Dimensioning an Assembly Drawing: How is dimensioning different for detail and assembly drawings?

Section 7.2 Dimensioning Techniques

A. Board-Drafting Techniques: Why do some drafters prefer to freehand sketch dimensions and notes before doing the final drawing?

B. CAD Techniques: What are two ways that CAD streamlines the dimensioning process?
1. Creating the Drawing
2. Setting the Dimension Style
3. Dimensioning the Drawing
4. Editing Dimensions

C. Accurate Measurement and Position Dimensioning: How do accuracy and precision affect the production process?
1. Limit Dimensioning
    a. Accuracy and Precision
    b. Expressing Size
    c. Expressing Position
    d. Locating Round Holes

D. Tolerance: Name and explain the two tolerance systems.
1. Unilateral Tolerance System
2. Bilateral Tolerance System
3. Tolerance Placement
4. Limit System

E. Dimensioning for Fits: What is the basic shaft system, and how to you determine the limits for its fit?
1. Basic Hole System
2. Basic Shaft System

F. Geometric Dimensioning and Tolerancing: What information does geometric dimensioning and tolerancing convey?
1. Datums
    a. Datum Reference Frame
    b. Specifying Datum Features
    c. Specifying Datum Targets
2. Geometric Dimensioning Sentence Structure
3. Tolerance Zones
    a. Parallel Lines
    b. Parallel Planes
    c. Cylinders
    d. Tolerance Zone Combinations

G. Surface Texture: To what characteristics does *surface texture* refer?
1. Definitions of Terms
2. Designation of Surface Characteristics

H. Using GD&T in AutoCAD: What GD&T step is required in AutoCAD but not in board drafting?

Chapter 8 Sectional Views

Section 8.1 Types of Sectional Views

A. Understanding Sectional Views: How can a drafter show interior features of an object?
    1. The Cutting-Plane Line
    2. Sections Through Assembled Pieces
B. Types of Sectional Views: How does a drafter know where to place the cutting plane?
    1. Full Sections
    2. Offset Sections
    3. Half Sections
    4. Broken-Out Sections
    5. Revolved Sections
    6. Removed Sections
    7. Auxiliary Sections
    8. Phantom Sections
C. Special Cases: What parts of an object are usually not sectioned?
    1. Ribs and Webs in Section
    2. Hidden and Visible Lines
    3. Alternate Section Lining
    4. Other Parts Usually Not Sectioned
    5. Rotated Features in Section
    6. Conventional Breaks, Symbols, and Intersections
    7. Intersections in Section

Section 8.2 Techniques for Sectioning

A. Board-Drafting Techniques: What board-drafting techniques can be used to efficiently draw sectional views?
    1. Section Line Spacing
    2. Outline Sectioning
    3. Drawing Practice
B. CAD Techniques: What advantage does CAD give for creating sectional views?
    1. Hatching
        a. Hatch Angle
        b. Line Spacing
        c. Defining Hatch Boundaries
        d. Associativity
    2. Preparation for Drawing
        a. Planning
        b. Setting Up the Drawing
        c. Drawing the Views
        d. Creating the Hatch

Chapter 9 Auxiliary Views

Section 9.1 Developing Auxiliary Views

A. Primary Auxiliary Views: Why do technical drafters need to use auxiliary views?
    1. Primary Auxiliary Views
    2. Partial Auxiliary Views
    3. Auxiliary Sections
B. Construction of a Primary Auxiliary View: How is the reference plane helpful in constructing primary and secondary auxiliary views?
    1. Drawing a View of a Symmetrical Object
        a. Using a Vertical Reference Plane
        b. Using a Horizontal Reference Plane
        c. Drawing Curves on Auxiliary Views
C. Developing a Primary Auxiliary View in CAD: How does the CAD technique apply principles discussed earlier for developing a primary auxiliary view?

Section 9.2 Drawing Secondary Auxiliary Views

A. Secondary Auxiliary Views: Why must you understand the development of a primary auxiliary view before you can draw a secondary auxiliary view?

1. Constructing a Secondary Auxiliary View
2. Revolving Solid Models

Chapter 10 Descriptive Geometry

Section 10.1 Descriptive Geometry

A. Elements of Descriptive Geometry: What are the basic elements of descriptive geometry?

B. Points: How do points help solve problems regarding drawing lines?

C. Lines: How is a point different from a line?

1. The Basic Lines
    a. Normal Lines
    b. Inclined Lines
    c. Oblique Lines
    d. True Length of Oblique Lines
2. Parallel Lines
3. Intersecting Lines
4. Perpendicular Lines
5. Industrial Applications of Lines
    a. Slope
    b. Azimuth and Bearing
    c. Grade

D. Planes: What are the important characteristics of planes?

1. The Basic Planes
    a. Normal Planes
    b. Inclined Planes
    c. Oblique Planes

E. Board-Drafting Techniques: What must you know to solve problems in descriptive geometry?

1. Point on a Line
2. Line in a Plane
3. Point in a Plane
4. Point View of a Line
5. Distance Between Parallel Lines
6. Distance Between a Point and Two Lines
7. Shortest Distance Between Skew Lines
8. True Size of an Inclined Plane
9. True Size of an Oblique Plane
10. True Angle Between Lines

Section 10.2 Solving Descriptive Geometry Problems with CAD

A. Using 3D Coordinate Systems with CAD: What advantage does CAD have over board drafting in solving descriptive geometry problems?

1. The World Coordinate System
2. User Coordinate System
3. UCS Icon

B. Drawing in Three Dimensions: Why is drawing object in 3D space helpful for solving descriptive geometry problems in CAD?

1. Specifying Thickness
2. Setting the Viewpoint
3. Extruding a 2D Object
4. Specifying Individual Coordinates

C. Solving Descriptive Geometry Problems: How do CAD commands help to solve descriptive geometry problems?

1. Locating Points
2. Determining the True Length of a Line
3. Determining Distances
4. Finding the Shortest Distance Between Skew Lines
5. Identifying Piercing Points
6. Locating the Angle Between Intersecting Planes
7. Viewing the True Shape and Size of a Plane