Printreading for Residential Construction

Chapter 1

1. What are the five types of working drawings? Plot plans, floor plans, elevations, sections, and details

2. What information is typically available on a plot plan? Size and shape of building lot, location, shape, and overall size of the house on a lot, and the finish floor elevation

3. What scale is typically used for a plot plan? Smaller scale (1/8” – 1’ or 1/16” – 1’)

4. Which drawings show the shape, size, and relationship of rooms? Floor plan

5. Which drawings are typically drawn first? Floor

6. What are the types of elevation drawings? Exterior and Interior

7. How many elevation drawings are required to show the outside walls of a house? Four (N, S, E, W) Minimum

8. What types of information may be found on interior elevation drawings? Shape, size, and finish of interior walls and partitions

9. Which drawing is a cutting plane through a portion of a house? Section

10. How is the scale determined for a detail drawing? Complexity of the detail

11. What type of information is typically found in the title block of a drawing? Number of the sheet, total number of sheets, design firm name, architect seal, project or building number, date, revisions, drafter initials, checker initials, owner or client name, building site address, scale of drawings

12. Where did the name “Blueprint” originate? Original reproductions produced white lines on a blue background

13. What is the main advantage of electrostatic prints? More legible with dark lines and a white background

14. What happened to the original blueprints when they were exposed to light? Chemical reaction

15. What color background and lines are typically found on diazo prints? Blue or black lines and a white background
16. What are the two methods of developing diazo prints? Wet method and dry method.

17. How are electrostatic prints made? Electrostatic charge paper and a negatively charged drum and light.

18. What is the main disadvantage of electrostatic prints? May be distorted by projection through a lens.

19. What are some of the tools of old fashioned drafting? T-squares, triangles, scales, and pencils.

20. What are the two most commonly used drafting tools (Instruments)? Compass and dividers.

21. What are the two types of dividers? Center-wheel and friction.

22. What is an “architect’s scale”? Triangular shaped ruler with increments marked using different scales.

23. What are hard pencil leads used for when drawing sketches? Fine, precise lines.

24. What are the main advantages of Computer-Aided Design for drawings? Speed, accuracy, consistency, changeability, duplication, and storage.

25. What are CAD input systems? (List some) Software such as AutoCAD and hardware like a keyboard, computer, monitor, mouse or track ball.

26. What are CAD output systems? (List some) Devices that can display drawings on a monitor, print drawings on a printer, or plot drawings.

Chapter 2

1. What is sketching? Drawing without instruments.

2. What type of lead is typically used for sketching? Softer.

3. How are portions of a sketch protected from erasing? Erasing shields.

4. How is the length of a horizontal line indicated? Dots.

5. What is a geometric shape with a flat surface called? Plane figure.

6. What is a “sector” when referring to drawing a circle? Pie shaped segment of a circle.
7. What is an isosceles triangle? Contains two equal sides and angles.

8. What is an equilateral triangle? Contains three equal sides and angles (60 degrees).

9. What is the term for a three-dimensional representation of an object? Pictorial drawing.

10. What is the term for a pictorial drawing with all receding lines converging to vanishing points? Perspective drawing.

11. What is the angle for horizontal lines when constructing an isometric drawing? 30°.


13. What are the most common objects shown on oblique drawings? Cabinets.

14. Which type of drawing shows each face of an object projected on a flat plane at 90 degrees to each other? Orthographic projection.

15. How many plane views are typically required to show all the details of most objects? Three.

16. What is the most important single drawing in a set of plans? Floor.

17. How are hidden lines shown on orthographic projections? Dashed lines.

18. What are the two rules for deciding what scale to use for a set of prints? Must be small enough to be handled easily but large enough to show necessary detail.

19. What scale is typically used for floor plans? ¼”=1’.

20. What scale is typically used for detail plans? 1 ½” =1’.

21. What is the length of a wall measuring 2 7/8” if the scale is ¼”=1’? 11’6”.

22. What is the length of a wall measuring 2 1/8” if the scale is 1/8”=1’? 17’.

23. What is the length of a wall measuring 1 3/16” if the scale is ¼”=1’? 5’ 6”.

24. What is the length of a cabinet measuring 1 7/8” if the scale is 1/2”=1’? 3’ 9”.

25. What is the height of a window measuring 2 7/8” if the scale is 1 1/2”=1’? 1’ 11”.

26. What is the length of a house measuring 5 5/8” if the scale is 1/8”=1’? 45’.
27. Is a tape measure as good as an architect’s scale ruler for getting dimensions from drawings? Why? No it may not be as accurate without the smaller markings available on the scale ruler.


29. What are three methods of terminating dimensioning lines? Arrowheads, slashes, or dots.

30. Where is the dimensioning measurement taken from for outside walls of a dwelling? (Inside of stud, outside of stud, outside of sheathing, or outside of finished wall) Outside of stud.

31. Where are the dimensioning measurements taken for interior walls? (Stud face, center of stud, finish wall face) Center of stud.

32. Where are the dimensioning measurements taken for locating windows and doors on a drawing? (Near edge and far edge, center, etc.) What is preferred? Center.

Chapter 3

1. What is a prime number? Number that can only be divided evenly by 1 and itself.

2. What are a minuend and a subtrahend? Minuend - Total number of units before subtraction. Subtrahend – Number of units to be removed.

3. What is one method of checking a multiplication question for accuracy? Reverse the numbers and recalculate. 245 x 15 then 15 x 245.

4. What is the term for the process of determining the number of times one number is contained in another? Division.

5. What are the terms used to describe the resultant answer in a multiplication and division question? Product and Quotient.

6. What are two methods of stating smaller segments of whole numbers? Fractions and decimals.

7. What must be done with fractions before they can be added or subtracted? Change to common denominator.

8. What is the proper procedure for multiplying two fractions? Multiply the numerator by the numerator and the denominator by the denominator then reduce to lowest term.
9. What must be done with a mixed number before it can be multiplied by a fraction? Change to an improper fraction

10. What is the value of $\frac{1}{2}$ multiplied by $\frac{1}{8}$? $\frac{1}{16}$

11. What is the value of $1 \frac{2}{3}$ multiplied by $\frac{3}{4}$? $1 \frac{1}{4}$

12. What is the value of $3 \frac{1}{8}$ multiplied by $1 \frac{3}{8}$? $3 \frac{29}{32}$

13. What is the rule for dividing fractions? Invert the divisor then multiply numerators and denominators

14. What is the value of $1 \frac{2}{3}$ divided by $\frac{2}{5}$? $4 \frac{1}{6}$

15. What is the value of $\frac{3}{4}$ divided by $1 \frac{1}{2}$? $\frac{1}{2}$

16. What does the symbol “*” represent when it separates two numbers? Multiplied by

17. What does the symbol “/” represent when it separates two numbers? Divided by

18. How is a fraction converted to a decimal number? Divide numerator by the denominator

19. How are inches converted to a decimal number? Divide inch measurement by 12

20. What is the decimal equivalent of $\frac{2}{3}$? $.667$

21. What is the accepted (rounded off) decimal foot value of $\frac{1}{8}$? $.0104$

22. How many feet are in 1 meter? 3.28

23. How many pounds are in 1 kg? 2.2

24. What is the area of a room measuring 10’x12’? $120 \text{ ft}^2$

25. What is the volume of a room measuring 10’x 12’x 8’? $960 \text{ ft}^3$

Chapter 4

1. What is the main advantage of symbols and abbreviations used on working drawings? Save time and conserve space (OK that is two)

2. What is the purpose of the letters added to electrical symbols? Indicate the specific task
3. What does the symbol S₂ indicate on a working drawing? Double-pole switch

4. What is an acronym? Abbreviation using the first letter of each word (GFCI)

5. When an abbreviated letter denotes several different meanings on symbols, how do you determine which one is indicated? Location typically gives indication which one is represented

6. What are three abbreviations for a closet on a working drawing? C, CL, and CLOS

Chapter 5

1. What is the appropriate time to purchase a building permit? After the plans are completed and before any work begins

2. When is it permitted to occupy a newly constructed residence? Passes final inspection and occupancy permit is issued

3. Where is basic information typically found to draw a plot plan? Information from survey plats

4. What is the term used to describe the divided portions of a township? Sections and quarter sections

5. Which drawing typically shows the utilities and size of the house on a lot? Plot plan

6. What drawing would include a point of beginning? Plot plan

7. How is natural grade distinguished from finish grade on an elevation drawing? Dashed lines represent natural grade while solid lines represent finished grade

8. What is indicated by closely spaced contour lines on a plot plan? Steeply sloped lots

Chapter 6

1. What scale is typically used for floor plans? ¼” = 1’

2. Portions of a floor plan may be drawn to a different scale to allow for more detail. True or false?
3. Which plan is the result of an imaginary cutting plane taken through the house 5’ above each finish floor? **Floor plan**

4. Where is the front of the house located on most floor plans? **Bottom of sheet**

5. What is a riser on a drawing of a set of stairs? **Vertical portion of a stair step**

6. What is the term used to describe the process in CAD that allows architects to easily copy a floor plan for additional floors or trades? **Layering**

7. Which drawings have no detailed information or dimensions but show overall construction concepts? **Simplified Floor Plans**

8. How are base cabinets and wall cabinets shown on a floor plan? **Base – solid lines, Wall – dashed lines**

9. How many floor plans are required for a two-story house with a basement? **Three**

10. What is a footing? **Wider (16” – 20”) support base for a foundation wall**

11. What are three types of dormers? **Gable, Hip, and Shed**

12. What are two materials used to reinforce concrete? **Steel and plastic**

13. What does “WWR” on a concrete floor indicate? **Welded wire reinforcement**

14. What is a panned ceiling? **Two ceiling levels connected by sloped surfaces**

15. What is indicated by a symbol on the outside of a residence with the letters “FP HB” nearby? **Frost-proof hose bib**

**Chapter 7**

1. What are three general bits of information shown on exterior elevation drawings? **House design, locations of openings, and materials to be used**

2. What scale is typically used for exterior elevation drawings? **¼”- 1’**

3. What are the four exterior elevation drawings for most houses? **North, South, East, West**

4. Elevation drawings typically show all dimensions. True or false? **False**

5. A scale of ¼”=1’ is what percentage of the actual building? **1/48**

6. Are upper or lower case letters typically used for abbreviations? **Upper**
7. What are some characteristics of a contemporary house design? More complex roof lines, geometric window and curved or angled walls

8. What are the six basic roof designs for construction? Flat, shed, gable, hip, gambrel, and mansard

9. How is the “fractional pitch” of a roof determined? Angle of the slope

10. Detailed information on windows and doors is found on elevation drawings. True or false?

11. What is the purpose of dashed lines on a window in an elevation drawing? Show the window swing

12. What is the minimum thickness for solid-core exterior wooden doors? 1 ¾”

13. What two elements typically make up the exterior finish information? Exterior finish and decorative features

14. Vertical dimensions between floors on elevation drawings are taken from what point to what point? Finished floors and ceilings

15. What measurement is typically shown on drawings for doors and windows? Rough opening

Chapter 8

1. Which drawing is made by passing a cutting plane vertically through a portion of a building? Sections

2. What is the difference between sectional and detail drawings? Details are drawn to a larger scale showing more detail (Hence the name)

3. What type of drawing would typically show individual components in a wall or foundation? Detail

4. What is the term used to describe a drawing that is made by passing a cutting plane through the shorter dimension of a house? Transverse

5. What are the three common types of residential construction? Frame, brick, solid masonry

6. What type of framing is assembled with a bottom plate, studs and two top plates one story at a time? Platform
7. What is a “sill plate”? Lowest member of platform framing

8. What is the purpose of cross bridging between floor joists? Strengthens and stiffens the floor and keeps the joists from twisting

9. What type of framing is used when the studs extend from the sill plate to the double top plate? Platform

10. What size planks are typically used for floors and roofs with post and beam construction? 2”

11. What are “structural insulated panels”? Thick layer of rigid foam insulation pressed between two OSB or plywood panels

12. What is the purpose of weep holes in brick veneer construction? Allow moisture to escape (Duh!)

13. How is the brick veneer secured to the wood frame construction in a typical building? Metal ties nailed to wood and worked into the mortar joints

14. What is a wythe? Single continuous masonry wall one unit thick

Chapter 9

1. What drawing is an elevation, section, or plan view drawn to a larger scale? Detail

2. What are the three preferred scales for detail drawings? ¾”=1’, 1 ½”= 1’, and 3”= 1’

3. What are the two basic types of dimensions? Location and size

4. What is the purpose of references? Indicate that more information is available

5. What is the term used to describe an imaginary slice passing through an object? Cutting plane

6. How are different section details identified? Section notation and alphabetic identifier

7. What room in a dwelling is most likely to need interior wall elevations? (Think about it.) Kitchen

8. Which drawing typically shows more detail, floor plan or interior elevation? Interior elevations

9. What is a keyway in a footing? Grove in the top to improve shear strength
10. When are detail drawings required for roof framing? Complex layout

11. Typically, what is the only required information for the contractor when preparing a wall for the installation of windows? Rough opening

12. How much is the rise in the panned ceiling on sheet 6? 1’

13. What type of brick is typically used for the fire box in a fireplace? Firebrick

14. What is the size of the wire reinforcement in the concrete floor of the basement? 6 x 6

15. How far does the ceramic tile hearth extend from the firebox opening? 1’-6”

16. What is the “R” rating of brick veneer walls? R-21

Chapter 10

1. Which trade is likely to use more of the drawings than others? Carpentry

2. What are the first points that must be established when doing concrete foundation work? Corners in relation to the point of beginning

3. What is the most common thickness for residential foundation walls? 8”

4. What is the purpose of double-head nails? Easier to disassemble

5. What must be added when slab-at-grade foundations are installed in cold climates? Additional edge insulation

6. How are butted joists fastened together? Wood or metal ties

7. How are lapped joists fastened together? Face nailing

8. When are lower ends of bridging to be fastened? After all building loads are in place

9. What finish items are typically detailed in specifications? Door and window hardware, bathroom fixtures, electrical fixtures, appliances, wall and floor materials and finishes, etc.

10. What is the maximum slope for a ramp for people with physical disabilities? 1” in 12”
11. What is the maximum height above the floor for a counter containing a sink to be ADA compliant? 34” above finished floor

12. What is a pattern of brick called? Brick bond


14. How often is the NEC updated? 3 Years

15. What is indicated on a plot plan by a line consisting of long and short dashes? Power line

16. According to the NEC, how many amps are to be calculated for general purpose receptacles? 1.5A

17. Where is EMT not recommended as a wiring method? Severe physical damage

18. How often must ENT be supported? (According to the NEC) 3’

19. What are the maximum degrees for all bends in PVC conduit? (According to the NEC) 360°

20. What is the minimum bending radius for armored cable? (According to the NEC) 5 x diameter of cable (inside edge)

21. What is the minimum distance between supports for NM or NMC cable? (According to the NEC) 4”-6”

22. What does the U stand for in USE cable? Underground (moisture resistant)

23. How far must holes for wires be from the edge when drilled in wooden members? 1 ¼”

24. Kitchen counter tops require a receptacle if they are over what length? (According to the NEC) (According to the CEC) They may be different. NEC-12” CEC-300mm(12”)

25. What is the height range for installing receptacles and switches according to ANSI/ICC? 9” – 48”

26. What structural consideration is very important to plumbers? Direction of joist and location of fixtures

27. When is the rough-in plumbing done? When rough framing is complete
28. What are the main components of a plumbing system? Water supply piping, sanitary drain and vent piping, and storm drain piping

29. What is “potable” water? Water free from impurities sufficient to cause disease or harmful effects

30. What is the purpose of a “trap” in a plumbing system? Prevent sewer gas from entering the house

31. Where is information about the manufacturer and model for plumbing fixtures found? Specifications

32. Everything needed for the plumbing installation is found on the plumbing floor plan. True or false?

33. Which drawings would show connections to local water and sewer lines? Plot plan

34. How are distinctions made between different types of piping on piping drawings? Different line types

35. Where are supply air registers typically placed in a room? Outside walls

36. Where are return air registers typically placed in a room? Center (Inside walls)

37. Which dimension is always given first when referring to rectangular ducts? Width

38. What style house would benefit from an extended plenum duct system? Long (ranch style)

39. What is the purpose of safety controls on a heating system? Prevent injury to personnel or damage to equipment when equipment malfunctions

40. What is the advantage of a two pipe system for in-slab hot water heating? More consistent temperature to all terminal devices

41. What are the two main types of electric radiant heating? Panel and baseboard units

42. What is a geothermal heating system? Taking heat from the temperature of the earth below the frost line

43. What three liquids are used for a geothermal system? Water, refrigerant, or antifreeze
44. What are the three basic parts of an air conditioner? Cooling fan or evaporator, compressor, and a condenser.

45. What factor must be considered when installing a split HVAC system? Additional flow resistance caused by the evaporator.

46. Which type of screws is typically used for sheet metal work? Self-tapping.