

EXAM HIGHLIGHTS

These materials are intended to serve as a comprehensive study guide for applicants preparing for the entrance exam. By reviewing these key points, candidates will have a clearer understanding of what to expect and how to focus their study efforts.

This material is not endorsed by U.A. Local 343's Apprenticeship Program. We cannot verify its accuracy or similarity to the actual exam because we do not have access to the exam itself.

EXAM HIGHLIGHTS

MATH SKILLS

1. Linear Equations

Students should be able to:

- Addition
- Subtraction
- Multiplication
- Division
- Solve one-step equations (addition/subtraction)
- Solve two-step equations (addition/subtraction + division)
- Rearrange equations to isolate the variable
- Check solutions by substitution

2. Fraction Operations

Students should be able to:

- Add fractions with unlike denominators
- Subtract fractions with unlike denominators
- Multiply fractions
- Convert improper fractions \leftrightarrow mixed numbers
- Simplify fractions to lowest terms

3. Decimal–Fraction Conversions

Students should be able to:

- Convert decimals to fractions
- Convert fractions to decimals
- Recognize place value (tenths, hundredths, thousandths)

4. Word Problems (Rates & Proportions)

Students should be able to:

- Solve rate problems (gallons/hour, ounces/minute)
- Use proportions to solve pay, time, and work problems
- Interpret real-world scenarios and translate them into equations

5. Percent Skills

Students should be able to:

- Find a percent of a number
- Convert percent to decimal
- Solve reverse-percent problems (e.g., “10 is 6% of what?”)
- Understand percent increase (e.g., 250% of a value)

6. Measurement & Construction Math

Students should be able to:

- Convert inches \leftrightarrow feet
- Add and subtract mixed units (yards, feet, inches)
- Calculate pipe wall thickness from inside/outside diameters
- Add elevation values using feet and inches

7. Mixed Number & Fraction Applications

Students should be able to:

- Work with fractional measurements
- Interpret fractional quantities in real-world contexts
- Combine whole numbers with fractional parts

8. Multi-Step Problem Solving

Students should be able to:

- Identify the required operations
- Break down multi-step problems
- Maintain accuracy with units and conversions
- Check answers for reasonableness

MECHANICAL REASONING

9. Levers

Students should be able to:

- Identify fulcrum, load, and effort
- Distinguish between 1st, 2nd, and 3rd class levers
- Determine mechanical advantage based on arm lengths
- Predict how changing the fulcrum position affects force

10. Pulleys

Students should be able to:

- Identify fixed, movable, and block-and-tackle systems
- Count supporting rope segments to find the mechanical advantage
- Determine whether a pulley changes direction, force, or both
- Interpret pulley diagrams accurately

11. Gears

Students should be able to:

- Determine direction of rotation
- Understand gear ratios (speed vs. torque trade-off)
- Identify driver vs. driven gears
- Use tooth counts to calculate gear ratio

12. Inclined Planes

Students should be able to:

- Understand how ramp length affects required force
- Calculate mechanical advantage using length \div height
- Recognize real-world applications (ramps, loading, lifting)

13. Tape Measure & Measurement Reading

Students should be able to:

- Read fractional inch markings ($1/2$, $1/4$, $1/8$, $1/16$)
- Identify the nearest correct fraction
- Interpret real-world measurement diagrams
- Break down complex diagrams
- Track orientation changes step-by-step
- Eliminate impossible shapes
- Check for symmetry and consistent features