

Sheet Metal Worker Level 1

Sheet Metal Worker

Unit: A1 Orientation I: Structure and Scope of Sheet Metal Trade

Level: One

Duration: 7 hours

Theory: 7 hours

Practical: 0 hours

Overview:

This unit profiles the trade's historical and modern significance, core tasks and skill requirements, as well as its job-ladders and long-term career options. It includes information about learning styles/strategies, stressing their application to apprenticeship and journey-level trade education. The unit also introduces the concept of skills stewardship, stressing the obligation that apprentices incur to help convey what their own journeypersons teach them to those who in turn follow them into the trade. A sound grasp of the roles, workplace relationships, and possibilities introduced in this unit is part of 'learning to learn' in Manitoba's apprenticeship system. Senior apprentices are later offered information about learning to teach in this system – a central and time-honoured foundation of Sheet Metal Worker journeywork.

Objectives and Content:

**Percent of
Unit Mark (%)**

- | | |
|--|----------------|
| 1. Describe structure and scope of the modern Sheet Metal Worker trade. | 60% |
| a. Historical background, including apprentice experience | |
| b. Structure/scope of the trade | |
| • International and national characteristics | |
| • Characteristics and practice of the trade in Manitoba | |
| • Trade organizations | |
| c. Opportunities and career ladders | |
| • Generalists and specialists | |
| • 'lead' hands and other immediate supervisors | |
| • Geographic mobility | |
| • Job hierarchies and innovations | |
|
2. Describe the Manitoba Sheet Metal Worker Apprenticeship Program. |
20% |
| a. Concept and significance of skills stewardship | |
| • To the trade | |
| • To apprentices | |
| • To journeypersons | |
| • To employers | |
| • To the community | |
| b. Practical Training (on-the-job) | |
| • Roles/responsibilities of employer and journeyperson(s) | |
| • Roles/responsibilities of Apprenticeship Training Coordinator (ATC) | |
| • Roles/responsibilities of apprentice(s) | |
| • Roles/responsibilities of instructors | |

- c. Technical Training (offsite)
- d. Attendance requirements
- e. Progression requirements
- f. Reporting of Grades
- g. Trade Regulation and its significance
- h. Policies (e.g. re: personal conduct, 'missed' units, fees, harassment, etc.)
 - Apprenticeship Manitoba
 - Training provider(s)

3. Describe special challenges and opportunities re: apprenticeship training. 20%

- a. Adapting personal learning goals to program contexts
 - Characteristics and 'domains' (types) of adult learning
 - Description/recognition of learning and teaching styles
 - Work culture (incl. work-crew hierarchy), interpersonal skills, and trade-learning
 - Integrating Technical Training and Practical Training content
 - Possibilities and perils of peer-learning
 - Budgeting and other necessary personal arrangements
 - Handling common varieties of stress at work and in school
- b. On-the-job challenges/opportunities
 - Description/recognition of jobsite teaching styles/roles
 - Communicating with journeypersons and employers
 - Coverage/documentation of formally prescribed tasks and subtasks
 - Personal record of achievements/needs: the Trade Learning Journal option
 - Getting help and fixing mistakes
- c. In-school opportunities/challenges
 - Personal arrangements that support in-school progress
 - 'baggage-handling' – self-assessing potential impacts of previous school experience on current learning (favourable/unfavourable); resources
 - Techniques for note-taking, record-keeping, and review
 - Relations with instructors
 - College resources (library, support services, etc.)
 - 'missed units' – policies re: supplementals, re-tests, make-up assignments, etc.

Sheet Metal Worker

Unit: A3 Trade Safety Awareness

Level: One

Duration: 7 hours

Theory: 7 hours

Practical: 0 hours

Overview:

Safe working procedures and conditions, injury prevention, and the preservation of health are of primary importance to industry in Canada. These responsibilities are shared and require the joint efforts of government, employers, and employees. It is imperative that all parties become aware of circumstances that may lead to injury or harm. Safe learning experiences and environments can be created by controlling the variables and behaviours that may contribute to incidents or injury. It is generally recognized that safety-conscious attitudes and work practices contribute to a healthy, safe, and accident-free working environment. It is imperative to apply and be familiar with the Workplace Safety and Health Act and Regulations. As well, it's essential to determine workplace hazards and take measures to protect oneself, co-workers, the public, and the environment. Safety education is an integral part of Insulator apprenticeship training both in school and on-the-job. Unit content is supplemented throughout Technical Training by trade-specific information about Insulator safety hazards and precautions presented in the appropriate contexts of discussion and study. **Note: No percentage-weightings for test purposes are prescribed for this unit's objectives. Instead, a 'Pass/Fail' grade will be recorded for the unit in its entirety.**

Objectives and Content:

**Percent of
Unit Mark (%)**

1. Identify safety and health requirements.

- a. Overview of *The Workplace Safety and Health Act*
 - Rights and responsibilities of employees under the Act
 - Rights and responsibilities of employers under the Act
 - Rights and responsibilities of supervisors under the Act
- b. Fourteen (14) regulations
- c. Codes of practice
- d. Guidelines
- e. Right to refuse
 - Explanation of right to refuse process
 - Rights and responsibilities of employees
 - Rights and responsibilities of employers
 - Rights and responsibilities of supervisors under the Act

2. Identify personal protective equipment (PPE) and procedures.

- a. Employer and employee responsibilities as related to personal protective equipment.
- b. Standards: ANSI (U.S.A. standards), etc.
- c. Work protective clothing and danger if it fits poorly.
- d. Gloves – Importance of proper glove selection (when handling chemicals, cold items, slivers, etc.)

- e. Headwear – appropriate protective headwear when required and the approved type of headwear.
- f. Eye protection – comparison and distinction of everyday eyeglasses, industrial safety glasses and safety goggles
- g. Foot protection – when required according to safety standards
- h. Hearing protection
 - Hazards of various noise levels (hearing protection must be worn)
 - Laws
 - Types of hearing protection
- i. Respiratory protection – types, overview of proper selection
- j. Fall protection – Manitoba requirements standards guidelines
 - ANSI (U.S.A. standards), etc.
- k. Ladders and scaffolding
- l. Safety principles for working with or around industrial trucks site-specific (forklifts, pallet trucks, etc.)

3. Identify regulations pertinent to care and cleanliness in the working area.

4. Identify the regulations relevant to the safe use of chemicals.

5. Identify regulations governing the use of scaffolding.

6. Identify regulations governing the use of ladders and related equipment.

7. Identify ergonomics.

- a. Definition of ergonomics and conditions that may affect the body
 - Working postures
 - Repetition
 - Force
 - Lifting
 - Tools
 - Identify tool and safety equipment
 - Causes of hand tool accidents
 - equipment

8. Hazard recognition and control.

- a. Safe work practices
- b. Basic risk assessment
- c. Injury prevention and control measures
- d. Identification of hazards involved in pneumatic tool use and explanation of how to guard against them
- e. Refrigerants
- f. Toxic chemical (non-refrigerant)
- g. High pressure fluids

9. Hazard of confined space entry.

- a. Identification of a confined space
- b. Hazards of a confined space
 - physical
 - biological
- c. Working in a confined space
- d. Emergency response plan
- e. Self-contained breathing apparatus (SCBA)

- 10. Identify first aid/CPR.**
- a. Overview of first aid regulation
 - b. Obligations of employers regarding first aid
 - Who is certified to provide first aid?
 - What to do while waiting for help?
 - Where is first aid kit?
 - c. Describe basic first aid requirements and techniques
 - Scope and limits of first aid intervention
 - Specific interventions (cuts, burns, abrasions, fractures, suffocation, shock, electrical shock, etc.)
 - What is it?
 - Interface with other services and agencies (eg. Workers Compensation claims)
 - d. Describe basic CPR requirements and techniques
 - How do you get certified?
 - Scope and limits of CPR intervention (include varieties of CPR certification)
- 11. Identify the safety requirements as they apply to WHMIS with emphasis on:**
- a. WHMIS is a system
 - b. Provincial regulation under the *Safety and Health Act*
 - Each province has a WHMIS regulation
 - c. *Federal Hazardous Products Act*
 - d. WHMIS generic training:
 - WHMIS defined and the format used to convey information about hazardous materials in the workplace
 - Information found on supplier and workplace labeling using WHMIS
 - Hazardous materials in accordance with WHMIS
 - Compliance with government safety standards and regulations
 - e. Description of WHMIS (include varieties of WHMIS Certification)
 - Typology of WHMIS labels, symbols, and classifications
 - Scope and use of Materials Safety Data Sheets (MSDS)
- 12. Identifying and controlling hazards.**
- a. Basic control measures (injury prevention)
 - b. Safe work procedures
 - c. Explanation on the importance of industrial housekeeping
 - d. Employer responsibilities
 - e. How and where to store materials
 - f. Safety measures related to walkways, stairs and floor openings
 - g. Explanation of how to protect the worker and others when working in traffic paths
- 13. Describe the safe storage of stock equipment in service vehicles.**
- 14. Discuss transportation of dangerous goods.**

Sheet Metal Worker

Unit: A4 Communication

Level: One

Duration: 16 hours

Theory: 14 hours

Practical: 2 hours

Overview:

Upon completion of this unit of instruction the apprentice will demonstrate knowledge of effective practices and communication equipment and their applications.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Identify effective communication practices. a. Respected b. Organized	20%
2. Describe the importance of effective communication practices. a. Customers b. Co-workers c. Related industry people	20%
3. Describe the importance of the coaching and mentoring relationship between journey person and apprentice. a. Effective communication b. Respect	20%
4. Identify the types of communication methods and equipment and describe their applications.	20%
5. Demonstrate 'request for information' (RFI) on specific sheet metal worker-related problems.	20%

Sheet Metal Worker

Unit: A5 Tools and Equipment

Level: One

Duration: 21 hours

Theory: 13 hours

Practical: 8 hours

Overview:

Upon completion of this unit of instruction the apprentice will demonstrate knowledge of tools and equipment, their applications, maintenance and procedures for use.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Identify types of hand tools and describe their applications and procedures for use.	10%
2. Identify types of portable power tools and describe their applications and procedures for use.	10%
3. Identify types of powder actuated tools and describe their applications.	5%
4. Identify types of shop tools and equipment and describe their applications and procedures for use.	10%
5. Identify types of shop tools and layout tools and equipment and describe their applications and procedures for use.	10%
6. Identify types of welding and cutting equipment and describe their applications. a. Welding • Metal • Non-metal/plastic b. Cutting • Oxy-fuel • Plasma	10%
7. Describe the procedures used to clean, maintain and store tools and equipment.	5%
8. Demonstrate the use of tools and equipment through various projects.	40%

Sheet Metal Worker

Unit: A6 Elevating Devices

Level: One

Duration: 4 hours

Theory: 4 hours

Practical: 0 hours

Overview:

Upon completion of this unit of instruction the apprentice will demonstrate knowledge of ladders, scaffolds and hydraulic lifts, their applications and procedures for use.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Identify safety considerations pertaining to ladders, scaffolding and hydraulic lifts.	25%
a. Occupational health and safety regulations	
b. Safe work practices	
2. Identify types of ladders, scaffolding and hydraulic lifts and describe their applications.	25%
3. Describe the procedures for erecting and dismantling ladders and scaffolding.	25%
a. Limitations	
4. Describe the procedures used to assess and maintain ladders, scaffolding and hydraulic lifts.	25%

Sheet Metal Worker

Unit: A7 Metallurgy

Level: One

Duration: 7 hours

Theory: 6 hours

Practical: 1 hours

Overview:

Upon completion of this unit of instruction the apprentice will demonstrate knowledge of metals and their characteristics, and metallurgic principles.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define and explain terminology associated with metallurgy.	15%
2. Describe the properties of metals. a. Composition b. Physical	15%
3. Describe identification systems for metals. a. Numbering b. Colour coding c. Gauging	15%
4. Identify methods used to work with metals. a. Forming b. Cutting/shearing c. Punching d. Drilling e. Joining	15%
5. Describe the effects metal working has on metallurgic properties. a. Stress b. Contraction c. Expansion d. Distortion e. Work hardening f. Annealing g. Galvanic action	15%
6. Describe the procedures to prevent or correct problems that occur when working metals.	15%
7. Demonstrate knowledge of various methods and metals.	10%

Sheet Metal Worker

Unit: A8 Introduction to Gas Metal Arc Welding (GMAW)

Level: One

Duration: 20 hours

Theory: 9 hours

Practical: 11 hours

Overview:

Upon completion of this unit of instruction the apprentice will demonstrate knowledge of GMAW equipment, its applications and maintenance, and of the procedures used to weld mild steel using the GMAW process.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define and explain terminology associated with GMAW.	5%
2. Describe metal inert gas (MIG) welding and its applications. a. GMAW (gas) b. FCAW (flux-core)	5%
3. Identify safety precautions when using GMAW equipment. a. Personal b. Shop/facility c. Equipment d. Ventilation	5%
4. Identify and describe GMAW equipment, consumables and accessories.	5%
5. Describe the procedures to set-up, adjust and shut-down GMAW equipment for welding mild steel.	5%
6. Describe the procedures used to maintain and troubleshoot GMAW equipment.	5%
7. Identify the types of welds performed using the GMAW process. a. Plug b. Fillet (continuous) c. Stitch d. Tack e. Edge f. Corner	5%
8. Describe the procedures used to weld mild steel using the GMAW process.	5%

- 9. Describe the weld defects, their causes and the procedures to prevent and correct them. 5%
- 10. Demonstrate welding using the GMAW process. 55%

Sheet Metal Worker

Unit: A10 Plasma Arc Cutting

Level: One

Duration: 4 hours

Theory: 2 hours

Practical: 2 hours

Overview:

Upon completion of this unit of instruction the apprentice will demonstrate knowledge of plasma arc cutting equipment, its maintenance and procedures for use.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Identify plasma arc cutting equipment and accessories and describe their applications.	10%
2. Identify safety precautions when using plasma arc cutting equipment. a. Personal b. Shop/facility c. Equipment d. Ventilation	5%
3. Describe the procedure to set-up, adjust and shut-down plasma arc cutting equipment.	10%
4. Describe the procedures used to maintain and troubleshoot plasma arc cutting equipment.	15%
5. Describe the procedures used to cut using plasma arc cutting equipment.	10%
6. Demonstrate the use of a plasma arc cutter.	50%

Sheet Metal Worker

Unit: A11 Soldering

Level: One

Duration: 7 hours

Theory: 5 hours

Practical: 2 hours

Overview:

Upon completion of this unit of instruction the apprentice will demonstrate knowledge of materials and equipment used for soldering and the procedures used to solder various materials.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define and explain terminology associated with soldering.	10%
2. Describe soldering and its applications.	10%
3. Identify safety precautions when using soldering equipment. a. Personal b. Shop/facility c. Equipment d. Ventilation	10%
4. Identify and describe soldering equipment and accessories.	10%
5. Describe the procedures used to set-up, adjust and shut-down soldering equipment.	10%
6. Describe the procedures used to maintain and troubleshoot soldering equipment.	10%
7. Identify materials used for soldering and describe their applications. a. Fluxes b. Solders	10%
8. Describe the procedures used to solder various materials.	10%
9. Demonstrate soldering procedures.	20%

Sheet Metal Worker

Unit: A12 Pattern Development and Layout

Level: One

Duration: 35 hours

Theory: 35 hours

Practical: 0 hours

Overview:

Upon completion of this unit of instruction the apprentice will demonstrate knowledge of basic pattern development and layout, and basic geometric shapes.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define and explain terminology associated with pattern development and layout.	20%
2. Identify layout tools and describe their applications and procedures for use.	20%
3. Identify basic geometric shapes and describe their characteristics.	20%
4. Identify different views used when sketching and describe their applications. a. Elevation b. Plan c. Section d. Auxiliary	20%
5. Identify layout methods and describe their applications. a. Simple/straight line b. Parallel line c. Radial line d. Triangulation e. Computerized f. Combination	20%

Sheet Metal Worker

Unit: A13 Basic Hoisting, Lifting and Rigging

Level: One

Duration: 4 hours

Theory: 3 hours

Practical: 1 hours

Overview:

Upon completion of this unit of instruction the apprentice will demonstrate knowledge of hoisting, lifting and rigging equipment, their applications and procedures for use.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Identify safety considerations pertaining to hoisting, lifting and rigging.	10%
a. Occupational health and safety regulations	
b. Safe work practices	
2. Identify types of rigging equipment and accessories and describe their applications and procedures for use.	10%
3. Identify types of hoisting and lifting equipment and accessories and describe their applications and procedures for use.	10%
4. Describe the procedures used to assess, store and maintain rigging, hoisting and lifting equipment.	10%
5. Identify types of basic knots, describe the procedures used to tie them, and practice them.	10%
a. Bowline	
b. Running bowline	
c. Square/reef	
d. Half-hitch	
6. Describe the procedures used to rig material for lifting.	10%
7. Identify and describe procedures used to communicate during hoisting, lifting and rigging operations.	15%
a. Hand signals	
b. Electronic communications	
8. Practice knot-tying.	15%
8. Demonstrate knowledge of hand signals.	10%

Sheet Metal Worker

Unit: B1 Trade Mathematics I

Level: One

Duration: 24 hours

Theory: 24 hours

Practical: 0 hours

Overview:

This unit is designed to provide the apprentice with the knowledge and ability to use mathematics with precision, resourcefulness and confidence. The unit begins with an overview of the importance of math to the trade, including a review of general mathematical concepts, the use of calculators, and trade-related mathematics.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Describe the practical importance of math disciplines to the Sheet Metal Worker trade.	5%
a. Definition and scope of relevant math disciplines	
b. Time-sheets, wages, and personal budgeting	
c. Manufacture and packaging of sheet metal materials and products	
d. Trade documents, including manufacturers' specifications	
e. Computer technology/applications	
f. Design/technical drawing	
g. Work order preparation	
h. Machinery and equipment set-up	
i. Measurement and related test readings	
• Temperatures	
• Pressures	
• Other measured quantities	
j. Customer relations/perceptions (e.g. schedules, timetables, etc.)	
2. Review general math concepts.	70%
a. Basic operations	
• Linear measure	
• Area and volume	
• Perimeter	
• Addition	
• Subtraction	
• Multiplication	
• Division	
• Order of operations	
• Fractions and decimals	

- b. Units of measure
 - Imperial
 - Metric (SI)
 - Conversion factors
- c. Calculator use
 - Basic operation keys/functions
 - Percentage keys/functions
 - Trig keys/functions
 - Keys/functions re: memory and constants

3. Demonstrate trade-related calculations as specified by instructor.

25%

- a. Basic operations
 - Linear measure
 - Area and volume
 - Perimeter
 - Addition
 - Subtraction
 - Multiplication
 - Division
 - Order of operations
 - Fractions and decimals
- b. Units of measure
 - Imperial
 - Metric (SI)
 - Conversion factors
- c. Calculator use
 - Basic operation keys/functions
 - Percentage keys/functions
 - Trig keys/functions
 - Keys/functions re: memory and constants

Sheet Metal Worker

Unit: C1 Drafting

Level: One

Duration: 20 hours

Theory: 7 hours

Practical: 13 hours

Overview:

Upon completion of this unit of instruction the apprentice will demonstrate knowledge of basic drafting, basic drafting tools and equipment and their procedures for use, and basic knowledge of Computer Aided Drafting (CAD).

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define and explain terminology associated with drafting. a. Basic b. Computerized (CAD)	10%
2. Identify basic drafting tools and equipment and describe their applications and procedures for use.	10%
3. Describe the procedures used to develop basic drawings and sketches. a. Pictorial b. Orthographic	10%
4. Identify types of computer technology used for pattern development and describe their applications. a. CAD	5%
5. Demonstrate basic drafting skills	65%

Sheet Metal Worker

Unit: C2 Simple Layout

Level: One

Duration: 14 hours

Theory: 4 hours

Practical: 10 hours

Overview:

Upon completion of this unit of instruction the apprentice will demonstrate knowledge of simple layout, its applications and associated calculations and pattern development using simple layout.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define and explain terminology associated with simple layout.	5%
2. Describe the types of basic patterns and fittings that require simple layout.	5%
3. Identify calculations used in simple layout and the procedures used to perform them.	10%
4. Describe the procedures used to develop basic patterns and fabricate fittings using simple layout. a. Determine views b. Label lines and points c. Prepare pattern d. Determine types of seams, joints and edges e. Calculate allowances f. Determine stretchouts g. Confirm pattern accuracy h. Cut pattern i. Label pieces	10%
5. Develop patterns using simple layout.	70%

Sheet Metal Worker

Unit: C4 Fabrication Fundamentals

Level: One

Duration: 48 hours

Theory: 8 hours

Practical: 40 hours

Overview:

Upon completion of this unit of instruction the apprentice will demonstrate knowledge of the procedures used in fabricating basic ductwork and fittings.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define and explain terminology associated with fabrication.	5%
2. Identify tools and equipment used to fabricate basic sheet metal components.	5%
3. Identify types of fastening methods used when fabricating ductwork and fittings and describe the procedures and connectors used to produce them.	5%
4. Identify types of seams for fabrication of ductwork and fittings and describe the procedures and connectors used to produce them. a. Longitudinal b. Transverse	5%
5. Identify types of edges for fabrication of ductwork and fittings and describe the procedures used to produce them.	5%
6. Identify types of duct reinforcement.	5%
7. Demonstrate cutting, forming and insulating ductwork, fittings and components.	70%

Sheet Metal Worker

Unit: C7 Parallel Line Development I

Level: One

Duration: 14 hours

Theory: 6 hours

Practical: 8 hours

Overview:

Upon completion of this unit of instruction the apprentice will demonstrate knowledge of parallel line development, its applications and associated calculations and the procedures used to develop and fabricate basic fittings using parallel line development.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define and explain terminology associated with parallel line development.	10%
2. Describe the types of basic fittings that require parallel line development. a. Tee b. Round elbow	10%
3. Identify calculations used in parallel line development and the procedures used to perform them.	10%
4. Describe the procedures used to develop and fabricate basic fittings using parallel line development. a. Determine views b. Label lines and points c. Prepare pattern d. Determine true length of lines e. Determine types of seams, joints and edges f. Calculate allowances g. Determine stretchouts h. Confirm pattern accuracy i. Cut pattern j. Label pieces	10%
5. Demonstrate parallel line development.	60%

Sheet Metal Worker

Unit: C10 Radial Line Development I

Level: One

Duration: 14 hours

Theory: 6 hours

Practical: 8 hours

Overview:

Upon completion of this unit of instruction the apprentice will demonstrate knowledge of radial line development, its applications and associated calculations and the procedures used to develop and fabricate basic fittings using radial line development.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define and explain terminology associated with radial line development.	10%
2. Describe the types of basic fittings that require radial line development. a. Right cone	10%
3. Identify calculations used in radial line development and the procedures used to perform them.	10%
4. Describe the procedures used to develop and fabricate basic fittings using radial line development. a. Determine views b. Label lines and points c. Prepare pattern d. Determine true length of lines e. Determine types of seams, joints and edges f. Calculate allowances g. Determine stretchouts h. Confirm pattern accuracy i. Cut pattern j. Label pieces	10%
5. Demonstrate radial line development.	60%

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Unit: C13 Triangulation I

Level: One

Duration: 14 hours

Theory: 6 hours

Practical: 8 hours

Overview:

Upon completion of this unit of instruction the apprentice will demonstrate knowledge of triangulation, its applications and associated calculations and the procedures used to develop and fabricate basic fittings using triangulation.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define and explain terminology associated with the triangulation method.	10%
2. Describe the types of basic fittings that require the triangulation method.	10%
a. Transitions	
b. On-center	
c. Square to round	
3. Identify calculations used in the triangulation method and the procedures used to perform them.	10%
4. Describe the procedures used to develop and fabricate basic fittings using the triangulation method.	10%
a. Determine views	
b. Label lines and points	
c. Prepare pattern	
d. Determine true length of lines	
e. Determine types of seams, joints and edges	
f. Calculate allowances	
g. Determine stretchouts	
h. Confirm pattern accuracy	
i. Cut pattern	
j. Label pieces	
5. Demonstrate triangulation.	60%
