

Miniature Train Model

Introduction

Have you ever ridden on a train or owned a train set? The parts that make up the engine car on a train can vary depending on the make and model; however, all train engine cars have parts that are similar.

Interpreting dimensioned drawings is an important engineering skill. Using drawings to create a computer model of a part is also important. You learned earlier in this course that a sketch is the documentation foundation for related technical work. Communicating this information effectively allows a group of people to function as a design team.

In this project you will further develop your modeling skills and your ability to use a computer as an efficient communication tool. The skills that you learned earlier in this course will be systematically applied to model the eight remaining parts needed for the Miniature Train Assembly. The parts with the dimensions are listed below.

Equipment

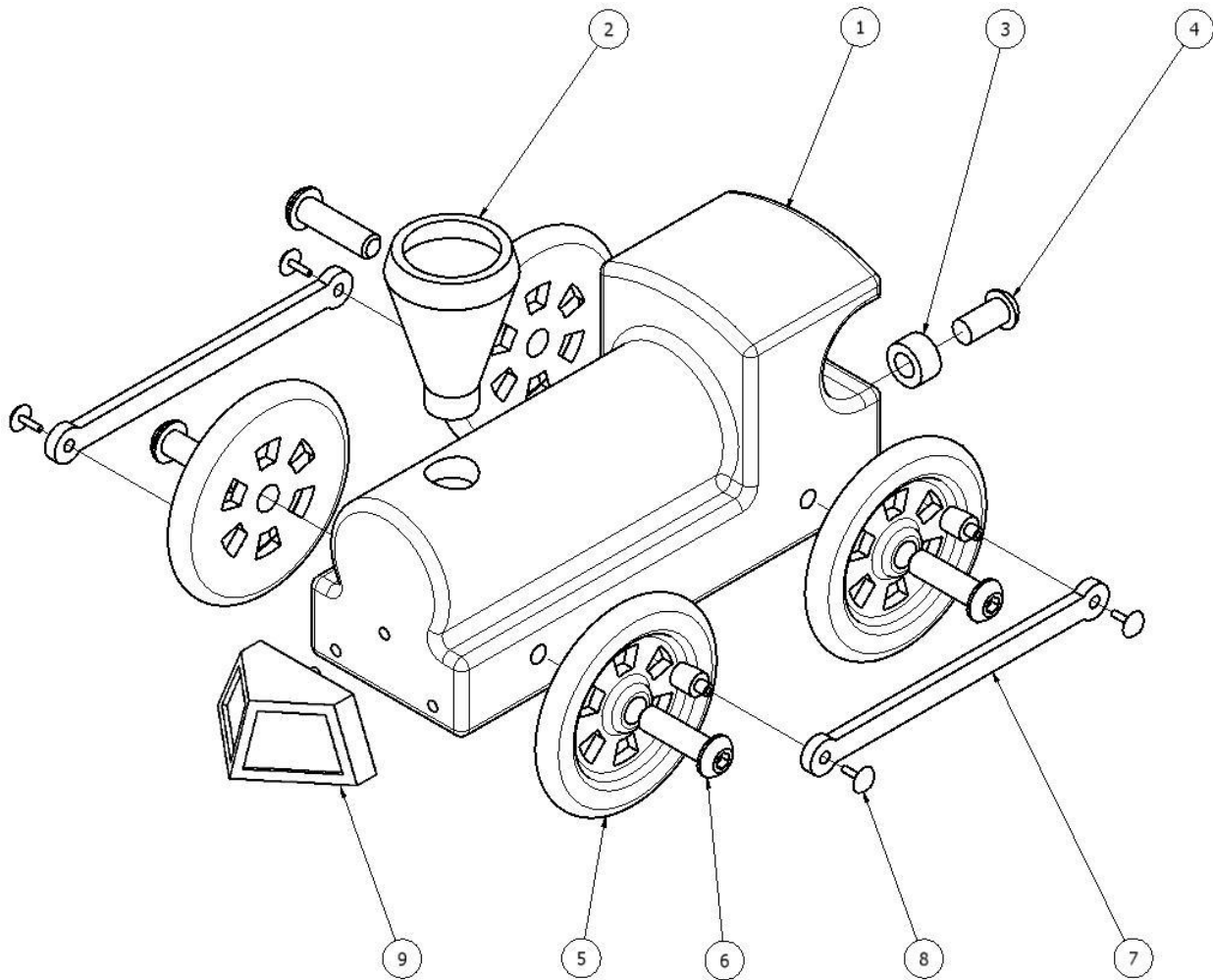
- Computer with 3D CAD solid modeling program
- Engineering notebook

Procedure

1. Model and assemble the parts shown using the drawings provided.
2. Create a set of working drawings to document the train parts and assembly.

Train Parts List

| Item | Quantity | Name | Description | Material |
|------|----------|--------------|-------------|-------------|
| 1 | 1 | Train Body | | ABS Plastic |
| 2 | 1 | Stack | | ABS Plastic |
| 3 | 1 | Hitch Magnet | | ABS Plastic |
| 4 | 1 | Hitch Peg | | ABS Plastic |
| 5 | 4 | Wheel | | ABS Plastic |
| 6 | 4 | Axle Peg | | ABS Plastic |
| 7 | 2 | Linkage Arm | | ABS Plastic |
| 8 | 4 | Linkage Peg | | ABS Plastic |
| 9 | 1 | Cow Catcher | | ABS Plastic |



Train Tolerances

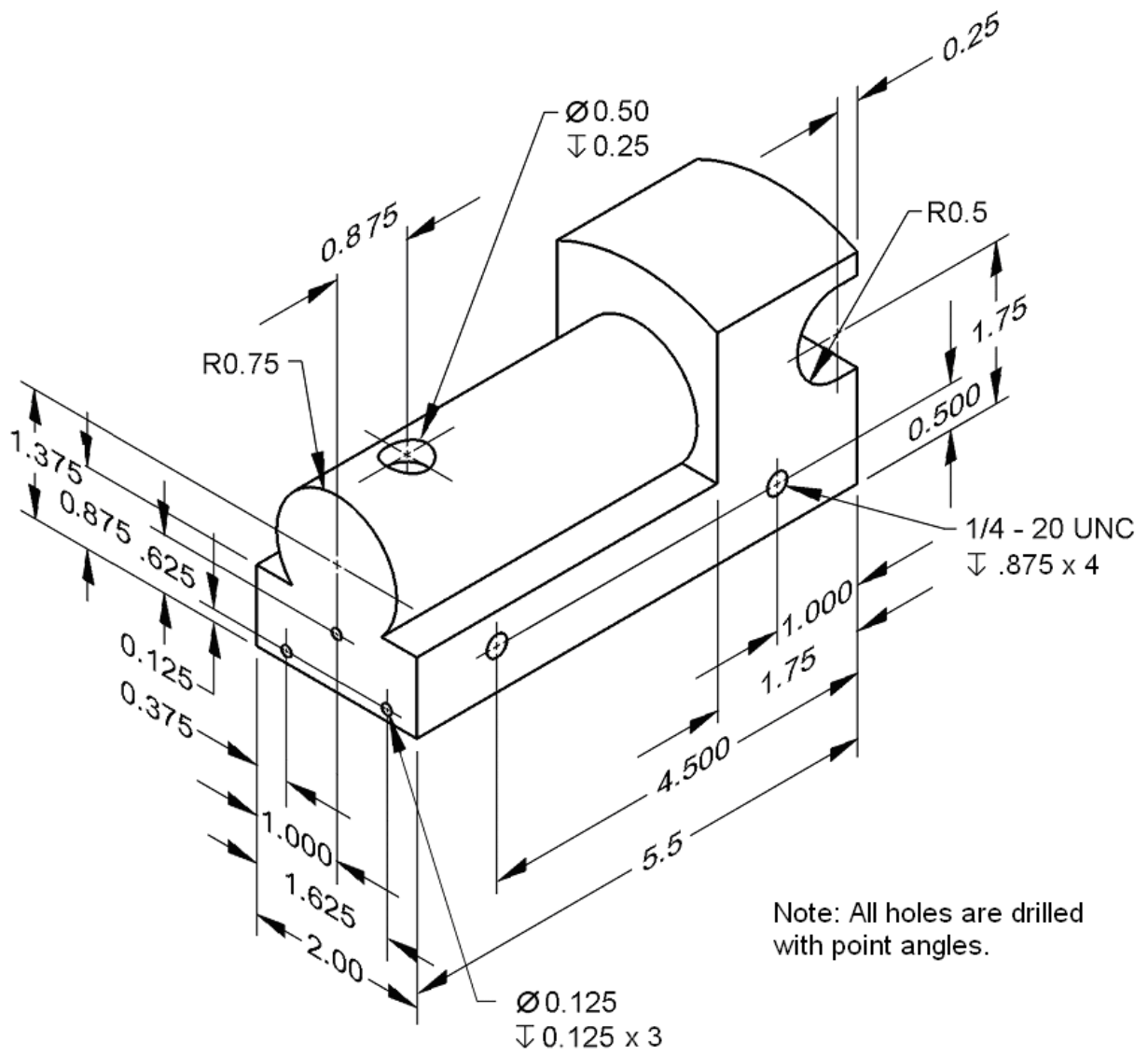
All parts have the following tolerances:

X.X = +/- .020

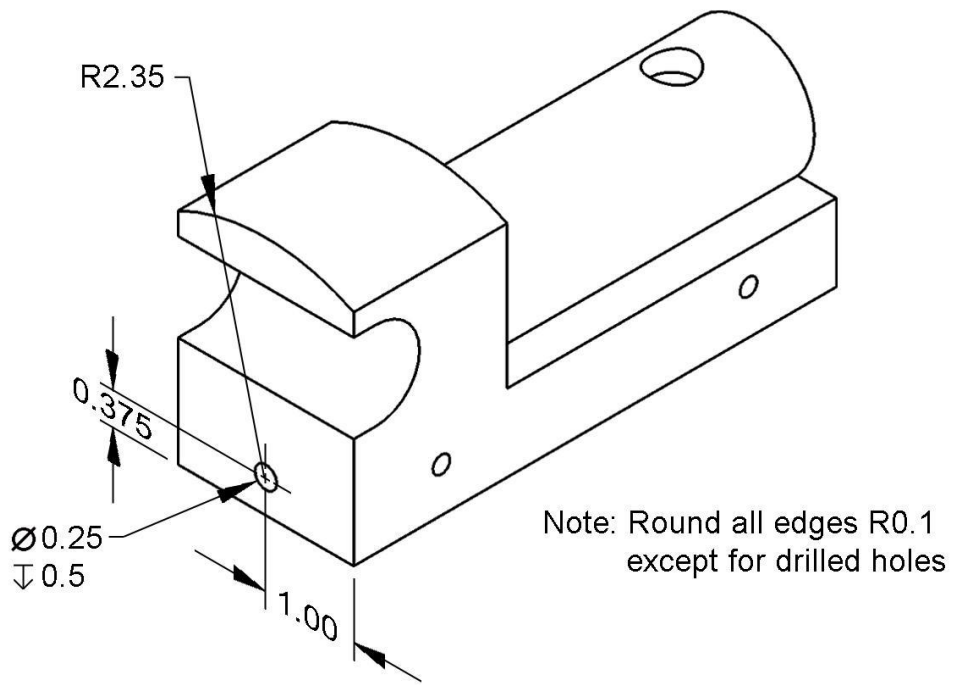
X.XX = +/- .010

X.XXX = +/- .005

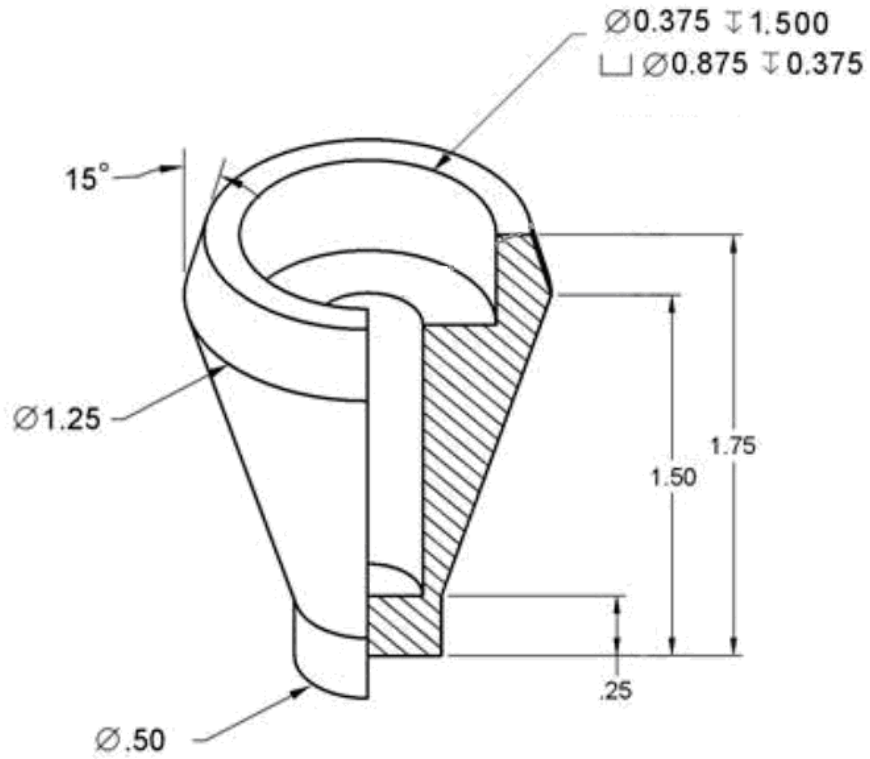
Part #1: Train Body



Note: All holes are drilled with point angles.

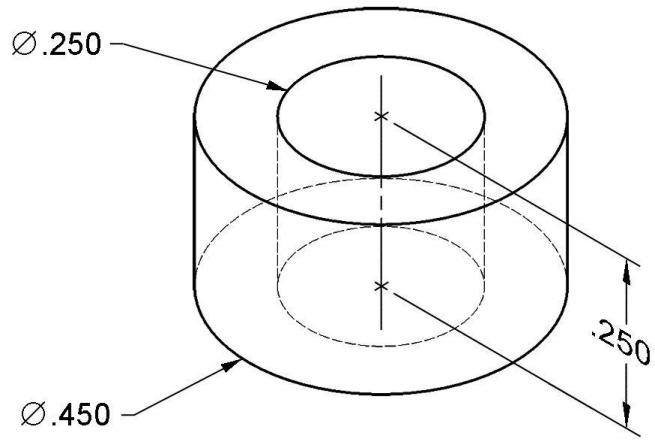


Part #2: Stack

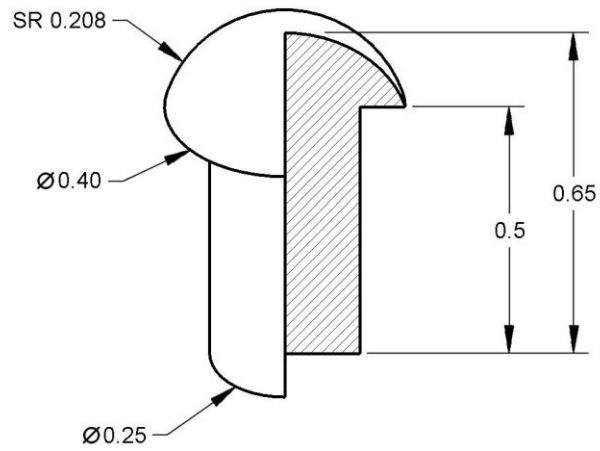


Note: Optional chamfer bottom edge .01 x 45 deg

Part #3: Hitch Magnet

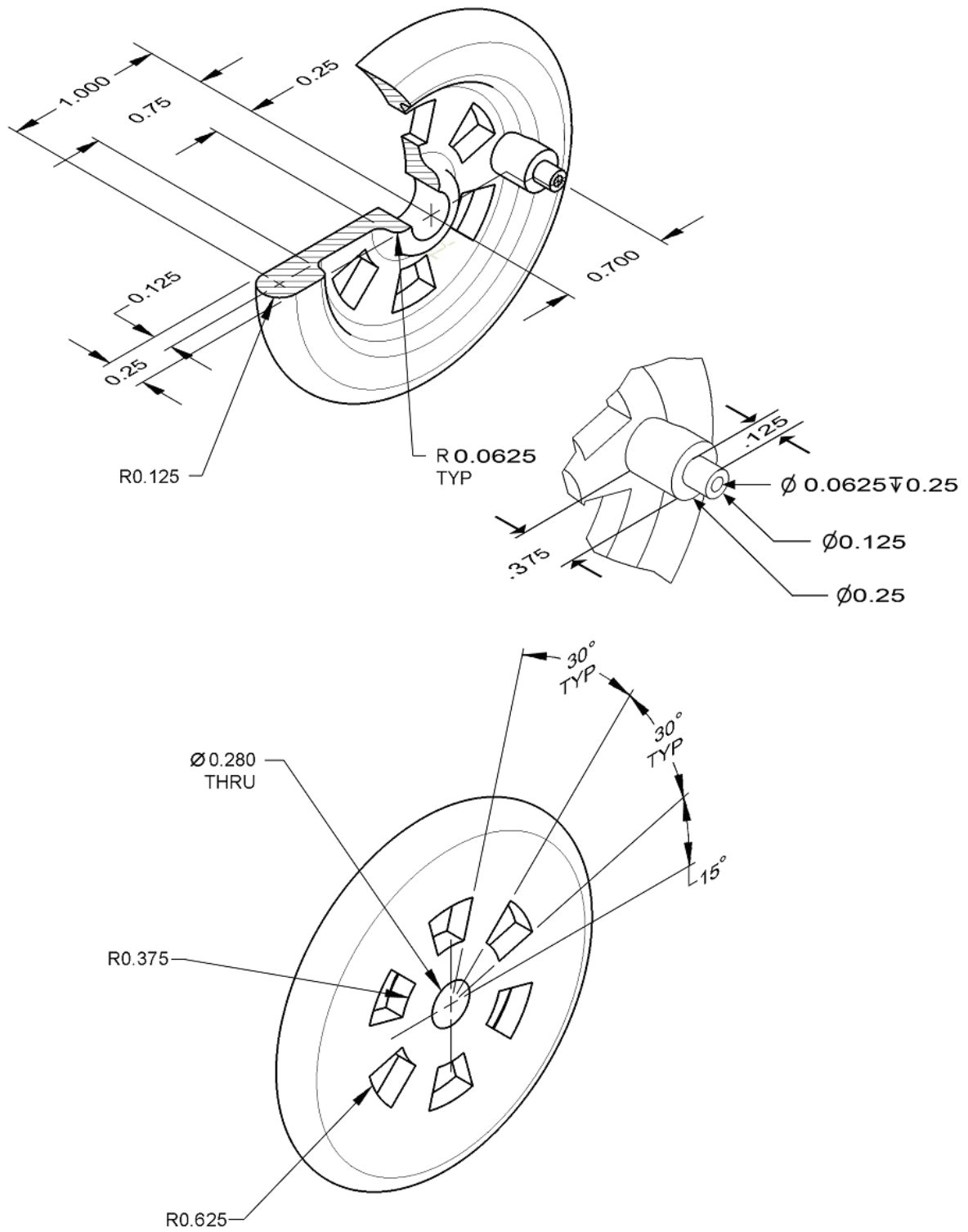


Part #4: Hitch Peg

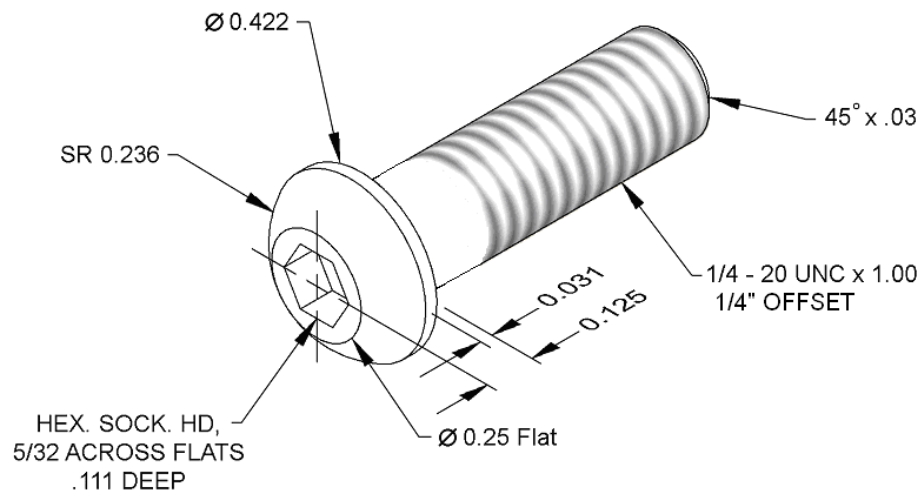


Note: Optional chamfer bottom edge .01 x 45 deg

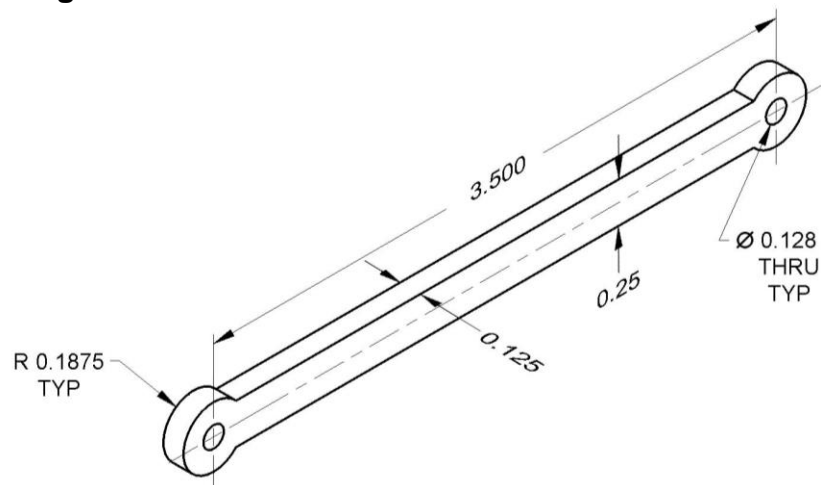
Part #5: Wheel



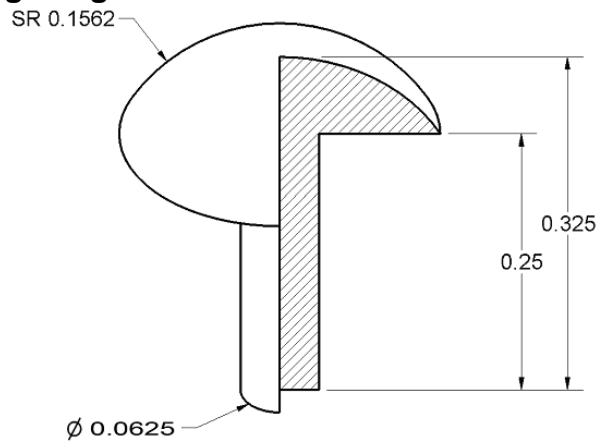
Part #6: Axle Peg



Part #7: Linkage Arm

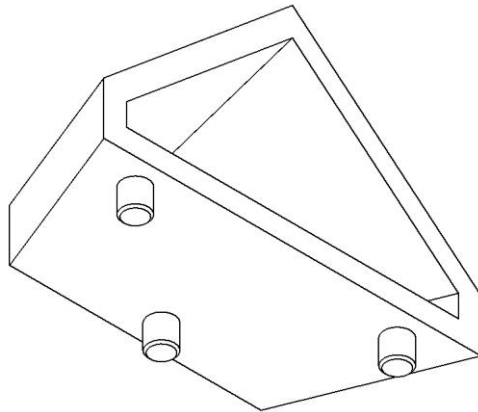
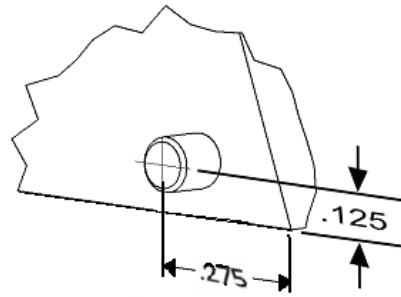
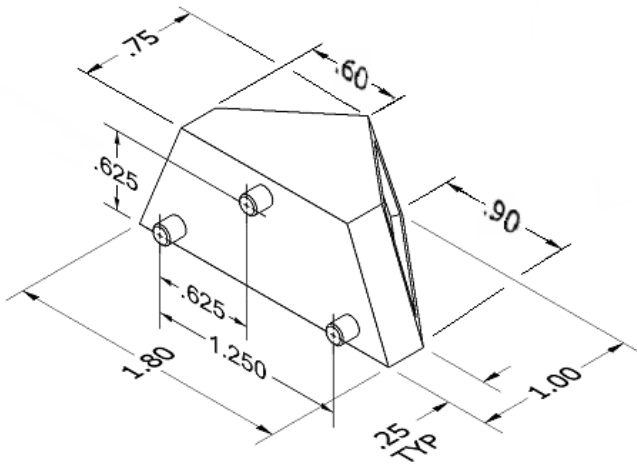
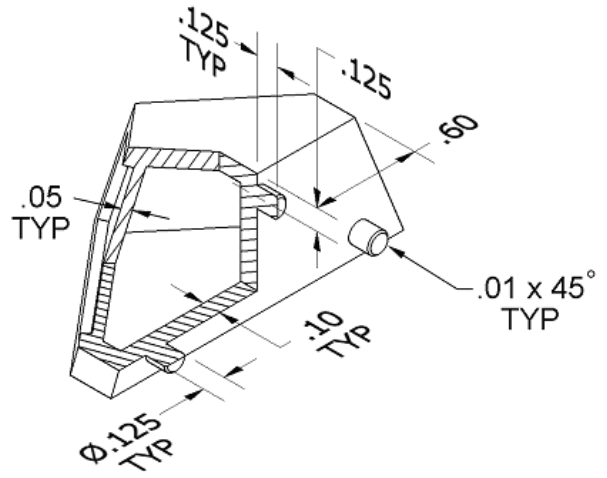
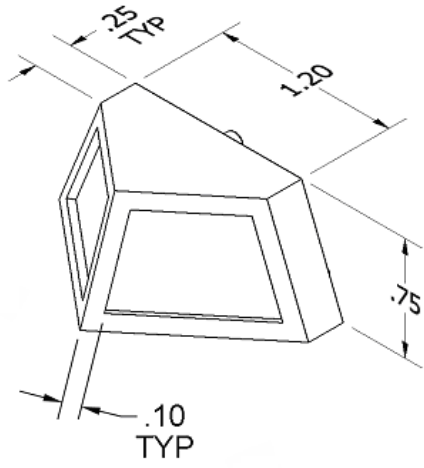


Part #8: Linkage Peg

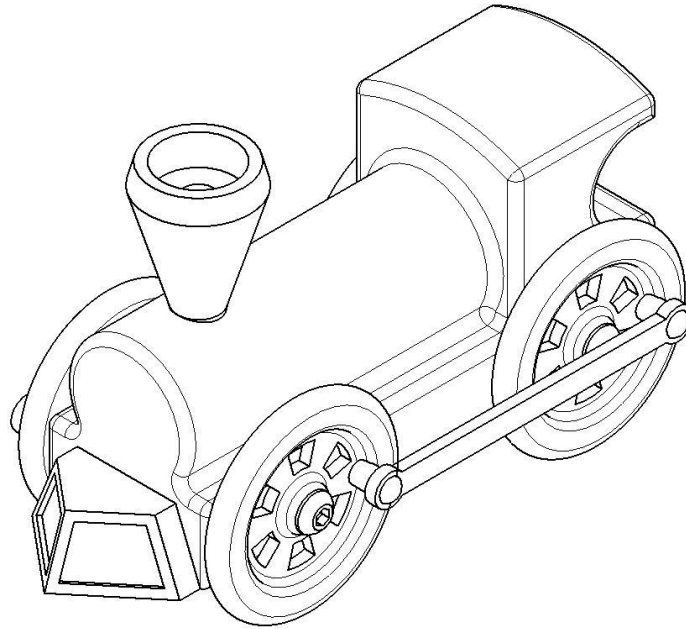


Note: Optional chamfer bottom edge .01 x 45 deg

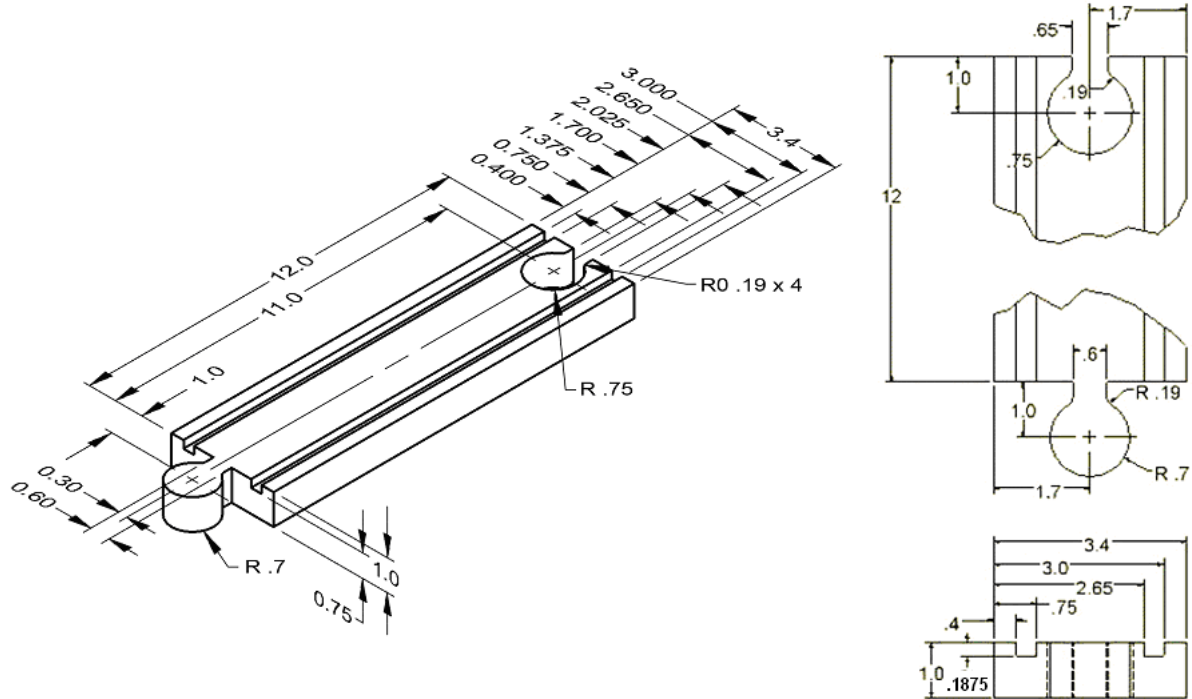
Part #9: Cow Catcher



Assembled Train



Straight Track



Conclusion

1. Why are drawings composed of different line conventions?
2. What is the purpose of a sectional view?
3. What is the purpose of an auxiliary view?
4. Why are symbols used instead of words to identify hole types?
5. What advantage is there to using algebraic equations instead of numerical values when defining the dimensions of a CAD model?
6. What three types of constraints can be applied to CAD sketches or models?
7. What advantages do CAD drawings have over paper sketches?