1 When a gusset plate is directly welded to the beam or column, it is recommended that the connection be designed for the larger of the peak stress and ______ times the average stress.
   a. 1.25  b. 1.4  c. 1.5  d. 2

2 The weld ductility factor referred to above is also sometimes referred to as ____________.
   a. The PWBTW Act  b. The Maxwell Dilemma  c. The Richard Factor  d. #WeldItBigger

3 True or False: A weld that is sized to develop the strength of the gusset plate does not need to be increased by the weld ductility factor.

4 True or False: The weld ductility factor does not apply to welds that are subjected to shear only.

5 Which point in Figure 1 would you expect to be the location of peak stress due to uneven stress distribution?

6 Using the information provided in Figure 2, calculate the average and peak stresses on the gusset plate, which will be used to size the fillet weld, w. The gusset plate thickness is 1¾ in. The resulting forces on the gusset to beam connection interface are:
   \( H_b = 643 \text{ kips (shear)} \)
   \( V_b = 237 \text{ kips (axial)} \)
   \( M_b = 5,090 \text{ kip-in. (moment)} \)

7 Use the controlling stress calculated in Question 6 to size the fillet weld, w, shown in Figure 2. Use LRFD.
1 a. 1.25. This is recommended in Part 13 of the 14th Edition Steel Construction Manual. The 25% increase is recommended to provide ductility to allow adequate force redistribution in the weld group.

2 c. Richard Factor. It comes from stress distributions Ralph Richard characterized in his research on bracing connections.

3 True. A weld that develops the strength of the plate can rely on the ductility of the plate for load redistribution capability.

4 True. AISC Design Guide 29 states, on page 155: “The weld ductility factor is not used for welds that resist shear forces only.” Shear forces can redistribute along the length of a gusset; it’s the tension forces that can produce concentrations that require special consideration.

5 Point B. Because of the proximity of the brace claw angle to the gusset to beam connection, a peak stress can be expected at point B.

6 \( f_v = \frac{643 \text{ kips}}{1.75 \text{ in.} \times 36.5 \text{ in.}} = 10.1 \text{ ksi} \)

7 Determine the directional strength increase value:

\[
F_{nw} = 0.6 \times 70 \text{ ksi} \times (1.0 + 0.5 \sin^{1.5} 50.9^\circ) = 56.4 \text{ ksi}
\]

For two fillet welds, the required fillet weld size, w, is calculated using the following relationship:

\[
2 \times 0.75 \times 56.4 \text{ ksi} \times 0.707 \times w = 17.1 \text{ ksi} \times 1.75 \text{ in.} \times 0.500 \text{ in.}
\]

Use a ½-in. fillet weld.