SLSI Errors: Measurement to Product - Assignment

Complete this assignment prior to the presentation.
Have fun.

True or False

T	F	1. Random errors can be completely eliminated from a measurement.
T	F	2. Standard deviation is a precision indicator.
T	F	3. It is possible to have a measurement set that is accurate but not precise.
T	F	4. You can measure an angle twice as accurately using a total station with a 2” manufacturer’s stated angle accuracy than using one with a 4” stated accuracy.
T	F	5. Determining a point elevation by differential leveling is an example of a direct measurement.
T	F	6. It’s not really possible to state a measurement-based result to a 100% confidence level.
T	F	7. A least squares adjustment is for adjusting random and systematic errors.
T	F	8. A discrepancy is the difference between the same quantity measured by two different field crews.

Choice For each of the following errors indicate the source and type

Source		***Type***	
E	Environment	M	Mistake
I	Instrumental	S	Systematic
P	Personal	R	Random

Source			***Type***			***Error***
E	I	P	M	S	R	Sticking compensator on automatic level.
E	I	P	M	S	R	Incorrect reflector offset in total station.
E	I	P	M	S	R	Manufacturer’s stated angle accuracy for a total station.
E	I	P	M	S	R	Heat waves when sighting across pavement.
E	I	P	M	S	R	GPS multipath.
E	I	P	M	S	R	The crosshairs in a total station are slightly rotated and off center.
E	I	P	M	S	R	Magnetic declination

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Question (1) What is a *degree of freedom*?

Question (2) What are *a priori* errors and what are they used for?

Question (3) Do Iowa statutes or administrative code specify minimum survey accuracy standards? If so, list the law/code and the standard(s)

Question (4) As a joke, the new rod person was given a level rod that had the bottom half-foot cut off. If it was used for all the backsights and foresights on a level loop, would it affect loop closure? Why or why not?

Question (5) What is a minimally constrained adjust and why is it used?

Extra credit
To re-establish the lost E1/4 corner of Section 20 a base receiver is set up over the existing NE corner and a roving unit on a 2 meter rod is used to measure a distance of 5283.44 ft to the existing SE corner. What is the expected distance error between the NE and E1/4 corner location after it is re-set with the rover? Assume the base receiver set up height is 5.58 ft, its centering error is 0.005 ft, and the NE corner elevation is 1455 (scaled). It is 75°F, 29.95" Hg barometric pressure, 70% relative humidity, with wind gusting to 20 mph. The rover antenna centering error is 0.10 ft at both the SE and E1/4 corners. Both receivers have a manufacturer's stated horizontal accuracy of 8mm + 1 ppm and vertical accuracy of 15 mm + 1.5 ppm.