

Name \_\_\_\_\_ School \_\_\_\_\_ Contestant Number \_\_\_\_\_

**2015 Cowboy Classic - Agricultural Technology and Mechanical Systems  
Energy Systems Skill**

You have just graduated from Natrona County High School where Mr. Burch has extensively trained you in small engine repair. With his reputation in this area, you quickly land a technician position at a small engine repair shop in Casper. One of the local ranchers in the community has brought in one of his Briggs and Stratton engines for you to overhaul. This engine has been used extensively to operate a sump pump he uses to clean out his manure pit under his small hog barn. His complaint is that runs really rough. You are to fix the problem. Before you can work on the engine, you need to check your tools to see what needs to be replaced or purchased for the job.

**Match the correct small engine tool from the word bank below**

1.   K        3.   E        5.   C        7.   A        9.   M    
 2.   J        4.   H        6.   B        8.   G        10.   N

A	RPM Meter	D	Torque Wrench ft. lbs.	G	Torque Wrench in. lbs.	J	Piston ring expander	M	Piston ring compressor
B	Engine tappet	E	Feeler gauge	H	Micrometer	K	Valve spring compressor	N	Spark tester
C	Flywheel puller	F	Starter clutch wrench	I	Blade balancer	L	Carburetor adjustment tool		

**Using the tools provided, determine the cylinder displacement (CD) for the exposed cylinders.** (The answer must be expressed in cubic inches) Use the back of this page for your calculations.

Engine #1 \_\_\_\_\_ 8.873 in.<sup>3</sup> \_\_\_\_\_ Engine #2 \_\_ 8.743 in.<sup>3</sup> \_\_\_\_\_

$$CD = \frac{\pi \times \text{Bore}^2 \times \text{Stroke}}{4}$$

Using the tools provided, check Piston Ring Land Wear for engine model # 91202.  
**Document the actual measurements and indicate if the piston needs to be replaced.**

Rings	Piston 1 Measurement	Reject Yes / No	Piston 2 Measurement	Reject Yes / No
Compression ring	<b>.004</b>	<b>No</b>	<b>.003</b>	<b>No</b>
Scraper ring	<b>.004</b>	<b>No</b>	<b>.004</b>	<b>No</b>
Oil ring	<b>.006</b>	<b>No</b>	<b>.003</b>	<b>No</b>

Criterion	Points Possible	Points Earned
Matching	10	
Cylinder Displacement	6	
Piston Ring Land Wear	12	
Safety	2	