Math Review

Scenarios and Problems

Instructor Guide

Module 2: Basic Operations

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Basic Operations with Whole Numbers and Decimals (Technician)
Basic Operations with Whole Numbers and Decimals (Lineworker)

Scenario

Jerry, a lineman apprentice, is working on the installation of an underground service with his crew leader, Jim.

“All right, Jerry. Do you have all your measurements before you cut the wire for your run?” Jim asks.

“I think so,” Jerry replies.

“Let's double-check just to be sure.”

“Okay, I have 4 feet from the pad mount transformer to the underground service, 30 feet to the home, 6 feet from the service to the meter, and an extra foot on either side for the connections.”

“That is what I have, too. Go ahead and cut your wire for the service run.”

How many feet of wire should Jerry cut for this underground service installation?

A. 38 ft
B. 40 ft
C. 42 ft – Correct Answer
D. 44 ft
Problems
Adding and Subtracting

Jim needs 300 yards of wire for today's job, but only has 125 yards left on the truck. How many additional yards of wire does Jim need for today's work?

A. 200 yd
B. 300 yd
C. 175 yd – Correct Answer
D. 125 yd

Kari, a line helper, is helping with the installation of a new pole that is 35 feet from the ground to the top. She will install a neutral wire 5 feet below the base of the transformer, and the transformer base is 5 feet below the top of the pole. How far up from the base of the pole must the neutral wire be installed?

A. 20 ft
B. 25 ft – Correct Answer
C. 30 ft
D. 35 ft

As part of his duties, Jerry has to measure a new length of wire for an underground service. The new underground service requires 4 feet of wire from the pad mount transformer to reach the underground service, 50 feet of wire to reach the customer’s home, 5 feet of wire from the underground service to the customer’s meter, and an extra foot of wire on both ends so the connections can be completed. How many feet of wire must Jerry measure to complete the underground service?

A. 54 ft
B. 59 ft
C. 60 ft
D. 61 ft – Correct Answer

Ernesto is installing a temporary electrical service for a house under construction. The temporary pole is 20 feet long and it must be buried 4 feet in the ground. A meter panel that needs to be installed has to be 5 feet off the ground. How far up the pole does Ernesto mark for the meter installation before the pole is placed in the ground?

A. 10 ft up the pole
B. 5 ft up the pole
C. 7 ft up the pole
D. 9 ft up the pole – Correct Answer
As part of her duties, Kari is asked to check the oxygen content of a confined space the line crew has to enter. Kari checks the air content and the meter alarms for low oxygen content at 18.7%. The normal content of oxygen in air is 21%. How many percent must the oxygen content change so the percentage comes up to 21% and the crew can enter the confined space?

A. 4.4%  
B. 2.3% – Correct Answer  
C. 3%  
D. 2.4%

Tom is asked to check the operating pressure of the hydraulic system. The pressure indicates that it is reading approximately 18.8 psi. The normal pressure of the system should be at least 50.5 psi. How many psi must Tom adjust the hydraulic pump output pressure so the system is operating at 50.5 psi?

A. 32.7 psi  
B. 50.5 psi  
C. 31.7 psi – Correct Answer  
D. 41.7 psi

Bill is taking a measurement of a meter constant transformer. The measurement indicates the constant transformer is reading at 0.977% of full load. The constant transformer should be reading at 1.10% of full load. How much of an increase does Bill need to adjust the constant transformer in order to make it read correctly?

A. 0.123% of full load – Correct Answer  
B. 0.0123% of full load  
C. 1.23% of full load  
D. 0.015% of full load
**Multiplying and Dividing**

Alice is working with a crew pulling an underground cable. The cable must be lubricated during the pull. Alice is expected to use 8 pounds of lubricant for every 100 feet of cable. The cable pull is 400 feet long. How many pounds of lubricant does Alice need to load into the truck?

A. 32 lbs – Correct Answer  
B. 38 lbs  
C. 12.5 lbs  
D. 24 lbs

Tom has to determine the correct amount of amps for the electrical system he is installing to a house. The house needs 1,400 watts of power and the system is a 240-volt system feeding the house. The amps are determined by dividing the watts needed for the house by the system voltage. How many amps of power will this house use? (Round up to the nearest whole number.)

A. 5.8 amps  
B. 5.0 amps  
C. 6.0 amps – Correct Answer  
D. 0.58 amps

Mary is working in a residential subdivision. The voltage in the subdivision is 13,600 volts. This voltage must be equally divided among the 5 subdivision branches. What would be the voltage for each branch?

A. 3,000 volts  
B. 2,720 volts – Correct Answer  
C. 2,700 volts  
D. 1,360 volts

Ernesto is pulling a new overhead cable. The cable truck has 1,000 feet of cable on the cable spool. The distance between each of the poles is 120 feet. How many complete poles can Ernesto pull the cable across before he has to get another spool of wire? (Round to the nearest whole number.)

A. 8.5 poles  
B. 8.0 poles – Correct Answer  
C. 7.0 poles  
D. 8.3 poles
The line crew is laying plastic pipe to pull a service into a house. The driveway to the house is 220 feet long and each piece of plastic pipe is 15 feet long. How many pieces of pipe does the crew need to complete the cable pull to the house? (Round up to the nearest whole number.)

A. 15.0 pieces – Correct Answer
B. 23.0 pieces
C. 16.0 pieces
D. 15.3 pieces

Camila has to calculate how many amps of current is required for a 10,000 kW load from a 220-volt ac system with a power factor of 0.8. To begin, Camila must multiply 220 volts by the power factor of 0.8. What would this number be?

A. 17.6
B. 176 – Correct Answer
C. 1760
D. 17,600

Pete has to rig a 1,300-pound transformer up to the top of a pole. If he uses a 3/8-inch polypropylene rope, he can pick up 1.4 times more weight than the 3/8-inch nylon rope he had planned on using. If the 3/8-inch nylon rope can pick up 1,300 pounds, how many additional pounds can Pete pick up using the 3/8-inch polypropylene rope?

A. 1,820 lbs – Correct Answer
B. 2,598 lbs
C. 520 lbs
D. 1,300 lbs

Ernesto and the line crew are troubleshooting a loss of power at a customer’s pizza business. The crew identified that the 25-amp fuse has failed. The crew needs to determine if the 25-amp fuse is the correct size by calculating the current needed to run the pizza ovens at the business. To begin, they must multiply the supply voltage of 110 volts by a power factor of 0.8. What would this result be?

A. 0.88
B. 8.8
C. 88 – Correct Answer
D. 880
Tom has to calculate the number of transformers for a residential neighborhood. The average demand for the 12 houses in the neighborhood is 3,500 watts each. The calculation requires multiplying the number of houses by the average demand divided by 1,000, which equals 42. Tom must now multiply by a factor of 0.067 to determine the need. How many transformers are required for this neighborhood? (Round up to the nearest whole number.)

A. 2 transformers  
B. 12 transformers  
C. 3 transformers – Correct Answer  
D. 4 transformers  

Jack was asked to calculate the amount of current (amps) needed to light 10, 60-watt bulbs. These bulbs use a 120-volt system with a power factor of 0.93. To get the current, he has to divide the total watts (600) by the product of the voltage times the power factor, or 600 divided by (120 * 0.93). Thus, the current is calculated by dividing 600 watts by 111.6 volts. How much current did Jack determine was needed to light the 10 bulbs?

A. 4.65 amps  
B. 5.38 amps – Correct Answer  
C. 0.54 amps  
D. 0.47 amps
Multiplying and Dividing by Powers of 10

Pete is ordering new materials for the warehouse. He has identified that the warehouse is very short on bolts used to attach equipment to utility poles. Each box of bolts contains 12 bolts. Pete has determined he needs 100 bolts for the warehouse. How many bolts is Pete ordering?

A. 120 bolts  
B. 100 bolts  
C. 1,200 bolts – Correct Answer  
D. 1,000 bolts

Camila is working on a power upgrade project for a downtown area of the city. The energy use of all the customers on the circuit is 1,000 watts/hour. Camila has to calculate the energy use of all the customers over a 5.5-hour period. How much power did the downtown area use over the 5.5-hour period?

A. 5,500 watts – Correct Answer  
B. 550.0 watts  
C. 55.0 watts  
D. 5,5000 watts

Val is using a handheld temperature sensing tool to detect abnormal temperature conditions in a boiler. After taking the reading, the temperature indicated 90.15°F when the boiler was shut down. If the temperature increases by a factor of 10 when it is operating, what would be the new reading?

A. 0.9015°F  
B. 9.015°F  
C. 901.5°F – Correct Answer  
D. 900.0°F

Camila is calculating the energy use of a large industrial customer over a 5.5-hour period. The customer uses 10,000 kW/hour, so how many kW of energy did the customer use in a 5.5-hour time period?

A. 55,000,000 kW  
B. 55,000 kW – Correct Answer  
C. 550.0 kW  
D. 55.0 kW
Tim, a power system control technician, received an alarm of an under-voltage condition on the electrical system. The normal voltage on the system is 13.6 kV. Tim’s reading indicates voltage dropped by 1/1000. What would be the system voltage?

A. 0.0136 kV – Correct Answer
B. 0.136 kV
C. 0.00136 kV
D. 1.36 kV

Alex is monitoring the transmission system during a winter storm. The system voltage is normally 345,000 V. During the storm, the system voltage shows a momentary drop by 1/1000 times smaller and immediately returns to normal system voltage. What were Alex’s instruments indicating the system voltage was during the momentary drop in power?

A. 345 volts – Correct Answer
B. 345,000 volts
C. 34.5 volts
D. 3.45 volts

Camila is working on determining the size of a transmission line to provide the energy needs of a town with 10,000 households. If each household uses 1,000 watts on average, what must the transmission line provide on average?

A. 100,000 watts
B. 10,000 watts
C. 1,000,000 watts
D. 10,000,000 watts – Correct Answer

Bill is determining the impedance in an a.c. circuit. The impedance is the voltage divided by the current. Bill measures 240 volts in the circuit with 0.009 amps, which equals 26,667 ohms of impedance. What would be the ohm of impedance reading if the amps were increased 10,000 times larger?

A. 26.667 ohms
B. 266.67 ohms
C. 2,666.7 ohms
D. 2.6667 ohms – Correct Answer
Craig is a system operator. A storm has hit the utility company service territory, causing major customer outages. On a normal day, there are about 32 customer outages at any one time. During this storm, the outages are 10,000 times greater. How many customers are without power during the storm?

A. 3,200 customers  
B. 3,200,000 customers  
C. 32,000 customers  
D. 320,000 customers – Correct Answer
Basic Operations with Whole Numbers and Decimals (Plant Operator)

Scenario

A new diesel fuel storage tank is being considered for the plant backup/peaking generators. Jeanne, a plant operator, will be involved in checking and maintaining this fuel storage, as well as the fuel contained therein. The old tank held 157 cubic feet of fuel and the new tank holds 314 cubic feet of fuel.

Jeanne has participated in a discussion of adding the new tank as well as keeping the old tank. What would be their combined capacity in cubic feet?

A. 451 ft$^3$
B. 461 ft$^3$
C. 481 ft$^3$
D. 471 ft$^3$ – Correct Answer
Problems
Adding and Subtracting

Jeanne is overseeing the installation of a new diesel fuel storage tank. The old tank held 157 cubic feet of fuel and the new tank holds 314 cubic feet of fuel. How much additional volume in cubic feet of fuel does the new storage tank hold when compared to the old storage tank?

A. 147 ft$^3$
B. 157 ft$^3$ – Correct Answer
C. 167 ft$^3$
D. 177 ft$^3$

As part of her duties, Jeanne records the reading on the cumulative engine hours indicator on each of the diesels monthly. She notes that the diesels ran 249.7 hours in March and 367.2 hours in April. How many additional hours did it run in April when compared to March?

A. 107.5 hours
B. 127.5 hours
C. 117.5 hours – Correct Answer
D. 118.5 hours

As part of her duties, Jeanne records, computes, and logs the engine hours on each of the diesels monthly. If one engine logged 125.7 hours and the other engine logged 124.9 hours, what was the total running time for both engines for the month?

A. 249.5 hours
B. 248.6 hours
C. 249.6 hours
D. 250.6 hours – Correct Answer

The engine running time indicator resembles an automotive odometer that records total vehicle miles. The running time indicator rolls over every 1,000 hours from 999.9 to 000.0. If Jeanne records a reading of 897.6 in April and 132.4 in May, what was the total running time between the two readings?

A. 234.8 hours – Correct Answer
B. 248.6 hours
C. 765.2 hours
D. 1,030 hours
**Multiplying and Dividing**

Jeanne knows the new diesel fuel tank is holding 342 cubic feet of fuel and, at the current temperature, the fuel weighs 60 pounds per cubic foot. How many pounds of fuel are in the tank?

A. 20,420 lbs  
B. 20,520 lbs – Correct Answer  
C. 19,520 lbs  
D. 19,420 lbs  

Jack, a plant operator, has been asked to estimate the amount of lubricant remaining in a 40-gallon drum. He weighed the drum and subtracted the weight of an identical empty drum to determine that the remaining lubricant weighed 176 pounds. He also found that a 1-gallon sample weighed 8 pounds. How many gallons of lubricant remain in the drum?

A. 24 gallons  
B. 23 gallons  
C. 22 gallons – Correct Answer  
D. 21 gallons  

Because diesel fuel is delivered to the plant in gallons, Jeanne needs to calculate the number of gallons the new 342 cubic foot tank holds. If one cubic foot has a volume of 7.48 gallons, how many gallons, to the nearest gallon, can the new tank hold?

A. 2,558 gallons – Correct Answer  
B. 2,568 gallons  
C. 2,158 gallons  
D. 3,268 gallons
Multiplying and Dividing by Powers of 10

Jeanne needs 2,850 feet of #10 AWG wire for a plant upgrade. She locates a pallet containing 10 reels of #10 AWG wire and each reel contains 250 feet. How many feet of #10 AWG wire has she found?

A. 200 ft
B. 2,250 ft
C. 2,500 ft – Correct Answer
D. 2,8500 ft

Jack is asked to log the energy in Megawatt-hours (MW-h) on one of the larger generators in the plant. Its energy instrument currently reads 3,141,592.2 kilowatt-hours (kW-h). Since 1 MW-h is equivalent to 1,000 kW-h, how many MW-h should he report?

A. 3,141.4 MW-h
B. 3,141 MW-h
C. 3,141.5 MW-h
D. 3,141.6 MW-h – Correct Answer

To prevent the formation of boiler scale, an additive is added to the water at a rate of 100 parts per million (ppm) by weight. How many pounds of water should Jessica, a plant operator, use to dilute 1 pound of additive to the correct concentration?

A. 100 lbs
B. 1,000 lbs
C. 10,000 lbs – Correct Answer
D. 100,000 lbs
Basic Operations with Whole Numbers and Decimals (Pipefitter/Pipelayer/Welder)

Scenario

“Hey, Harvey,” Jeff, a gas distribution mechanic, says as he gets ready to start his day. “Are we getting a shipment in today?”

“Yep, looks like we are getting a valve, some bolts and flanges, and about 134 pounds of other supplies.”

“I think the forklift could handle lifting all of those off the truck at the same time, right?”

“The valve is large and weighs 1,573 pounds, and the box of bolts and flanges is 210 pounds. Add those to the 134 pounds of other supplies, and you have your answer.”

How many pounds of material will Jeff unload with the forklift if he unloads all the items at once?

A. 1,603 lbs  
B. 1,707 lbs  
C. 1,783 lbs  
D. 1,917 lbs – Correct Answer
Problems
Adding and Subtracting

Mariana is going out on a gas installation job on a busy highway. She has to make sure the crew has sufficient cones to put the entire traffic pattern in place to protect the crew. Mariana needs 20 cones leading up to the trucks, 15 cones alongside the trucks and 22 cones after the trucks. How many cones should Mariana load on to the truck to cover the entire traffic pattern?

A. 42 cones
B. 37 cones
C. 35 cones
D. 57 cones – Correct Answer

Harry is resupplying a gas truck with bolts. He has several different sizes to put in the truck bins. Harry has 20 3/8x5-inch bolts, 32 1x5-inch bolts, 18 3/4x5-in bolts, and 24 3/8x6-inch bolts. How many bolts is Harry loading into the truck bins?

A. 94 bolts – Correct Answer
B. 70 bolts
C. 76 bolts
D. 74 bolts

Jill is doing a pipe fusion on plastic pipe being installed in a new gas system. The pipe specifications require that before the pipe is fused, the fusion machine must be heated to 480° F. The machine is currently reading 233° F. How many more degrees does the machine have to heat up to get to the required temperature of 480° F?

A. 250° F
B. 257° F
C. 247° F – Correct Answer
D. 253° F
Mary and the gas crew are performing valve maintenance at a gate station. The valve body bolts are 1-inch bolts that need to be torqued to 1,392 foot-pounds. The crew has torqued the bolts to 1,199 foot-pounds. How many more foot-pounds does the crew have to torque the bolts to reach the torqueing requirements?

A. 193 ft-lbs – Correct Answer
B. 93 ft-lbs
C. 190 ft-lbs
D. 1,392 ft-lbs

Jim is preparing to complete a welding job using an E-80 welding rod. The rod is always kept in a warming oven set at 200 to 250° F. Unfortunately the welding rod was damp and needed to be reconditioned in an oven set at 600 to 750° F. What is the heat range that Jim needs to increase the oven temperature in order to recondition the welding rod?

A. 200 to 250° F
B. 300 to 400° F
C. 400 to 500° F – Correct Answer
D. 500° F

Tyrone has to weld 2 pieces of plate together to cover a gas trench in the main road. He has one piece of plate that is 0.969 inches thick and a second plate that is 0.156 inches thick. When Tyrone is finished welding the plates together, what will be the total thickness of the plate?

A. 1.125 in – Correct Answer
B. 1.11 in
C. 0.1125 in
D. 1.119 in

Gail is doing a butt joint weld between two plates of steel. Her supervisor reviewed the weld, and he determined that the weld had an insufficient amount of weld bead. The weld bead should have been 5/16 of an inch, or 0.3125 inches, but was only 3/16 of an inch, or 0.1875 inches. How big a weld bead does Gail have to add to get the butt joint to the correct size?

A. 0.13-in bead
B. 0.125-in bead – Correct Answer
C. 0.1350-in bead
D. 0.15-in bead
Multiplying and Dividing

Joe and the gas crew are replacing old cast iron piping with plastic piping. They must replace 7 lengths of 16 feet cast iron pipe. How many feet of plastic pipe does the crew need to complete the job?

A. 112 ft – Correct Answer
B. 56 ft
C. 72 ft
D. 23 ft

Tom has to rig some pipe on a truck. He only has a sling made of 5/8-inch nylon rope. Tom calculates the rope’s safety limit in the following way: $25 \times 60 = \text{safe weight of lift}$. Based on Tom’s calculation, what is the safety limit of the nylon rope?

A. 300 lbs
B. 600 lbs
C. 1,500 lbs – Correct Answer
D. 750 lbs

Craig is working with the gas crew installing a new plastic piping system in a residential neighborhood. The system is 1,800 feet long and there is a tap for the houses every 75 feet. How many taps does Craig have to install to complete a connection for every house?

A. 20 taps
B. 25 taps
C. 24 taps – Correct Answer
D. 22 taps

Ken is installing a new piping system, which requires a valve for every 300 feet of pipe. If there are 15,000 feet of pipe in the system, how many valves does Ken need to be install?

A. 50 valves – Correct Answer
B. 5 valves
C. 500 valves
D. 60 valves
Alex is doing a welding job on a 1/2-inch piece of plate steel. In order to determine how many pounds of welding rod he will need, Alex will need to multiply the thickness of the plate by the weld angle by how many feet of weld bead is required. In this case, Alex is welding a 1/2-inch plate with a 0.45 weld angle and needs 10 feet of weld bead. How many pounds of welding rod will Alex use to complete the job?

A. 2.0 lbs
B. 2.25 lbs – Correct Answer
C. 22.5 lbs
D. 0.225 lbs

Ned’s crew is calculating the design pressure of a 12-inch steel pipe. The calculation for the design pressure = (2 * Operating Pressure * Wall Thickness) / Outside Pipe Diameter. Ned’s crew has the following numbers: 35,000 psi operating pressure, 0.281-inch wall thickness, and 12.75-inch outside diameter. After multiplying the first three numbers together, this calculation reduces to: 19,670 / 12.75 = design pressure. What number would Ned’s crew report as the design pressure?

A. 1543 psig – Correct Answer
B. 15,427 psig
C. 154.3 psig
D. 15.427 psig

Regina is fitting a new high-pressure gas distribution piping system today, which is 80 times as much pressure as the 0.4 psi-rated residential pipes she usually works with. What is the new piping’s psi rating?

A. 30 psi
B. 32 psi – Correct Answer
C. 3.2 psi
D. 300 psi
Multiplying and Dividing by Powers of 10

Kelly is a gas system operator responsible for monitoring the flow rate of natural gas through the transmission system pipeline. The normal flow into the region is 4,300,000 cubic feet/day. Kelly knows that during the summer time, the rate decreases by 1/100 based on warmer temperatures. What flow rate would Kelly expect to report during the summer months?

A. 4,300 ft³/day
B. 43,000 ft³/day – Correct Answer
C. 430,000 ft³/day
D. 430,000,000 ft³/day

Pete is monitoring gas customers who don’t have gas, called an outage, related to a valve failure in the system. The current number of outages is 428 customers. In order for the valve to be repaired, the gas system has to be shut down for a couple of hours. The resulting shut down is going to increase the number of outages to 100 times more customers. How many customer outages is Pete expected to report?

A. 42 outages
B. 428 outages
C. 4280 outages
D. 42,800 outages – Correct Answer

Kathy is making a bulk order to restock the warehouse with plastic pipe fittings. Each box of fittings has 18 taps. She needs 10,000 boxes. How many taps is Kathy ordering?

A. 18,000 taps
B. 1800 taps
C. 180 taps
D. 180,000 taps – Correct Answer

A gas transmission line transports 53,000,000 cubic feet/year of natural gas. The gas is evenly distributed to 100 major customers. How many cubic feet/year does each customer use on average?

A. 53,000 ft³/year
B. 50,000 ft³/year
C. 530,000 ft³/year – Correct Answer
D. 5,300 ft³/year
Harry and the gas crew are doing a system upgrade to replace old class 150 carbon steel pipe with new class 900 carbon steel pipe. The working pressure of the class 150 carbon steel pipe was 150 psig. The new pipe increases the psig by 10 times. What would be the new operating pressure of the system based on this piping upgrade?

A. 9,000 psig
B. 3,000 psig
C. 1,500 psig – Correct Answer
D. 15,000 psig

Tom and the gas crew are monitoring corrosion on steel gas pipelines. A month ago the metal loss calculated for the pipe was 0.043 pounds. The crew has noticed an increase in the corrosion rate based on an increase in stray voltage on the system. The new rate is 10 times faster than measured a month ago. What new metal loss would the crew report?

A. 0.0430 lbs
B. 0.0043 lbs
C. 43 lbs
D. 0.43 lbs – Correct Answer

Kathy is calculating the gas use of a large industrial customer. The customer used 55,000 cubic feet in a 5.5-hour period. If the customer shuts down all of their large furnaces, the consumption is reduced by 1/1000. What would be the amount of consumption reduction?

A. 5,500 ft$^3$
B. 55,000 ft$^3$
C. 550.0 ft$^3$
D. 55.0 ft$^3$ – Correct Answer

Alex is monitoring the volume in the liquefied natural gas tank. The normal volume of the tank is 190,000 gallons. Alex received an alarm that indicates the volume decreased by 1/1000. How many gallons did the volume decrease?

A. 190 gallons – Correct Answer
B. 1,900 gallons
C. 19,000 gallons
D. 19 gallons
Kathy is working on a gas system upgrade to support the installation of a new transmission line in her area. The flow of natural gas in the current piping system is 5,300 cubic feet/year of natural gas. The transmission pipe is expected to increase to 10,000 times more flow of natural gas. What would be the new gas flow rate through the system?

A. 53,000,000 ft³/year – Correct Answer
B. 5,300,000 ft³/year
C. 530,000 ft³/year
D. 53,000 ft³/year

Craig is a gas system operator. A leak in the system has forced the operators to shut off the gas to a city in the company’s territory. On a normal day there are about 3 customer outages at any one time. During this system shutdown, the gas outages have increased to 10,000 times more customers. How many customers are without gas during this system shutdown?

A. 3,000 customers
B. 3,000,000 customers
C. 30,000 customers – Correct Answer
D. 300,000 customers
Basic Operations with Whole Numbers and Decimals
(Technician)

Scenario

“Hey Melissa, ready to finish up the Motor Control Unit checks?” Gabriel, an electrician, asks Melissa, another electrician, after coming back from lunch.

“Yep, I am ready to go,” responds Melissa. “How many MCUs did we check this morning?”

“Let’s see, I show we inspected 39 units.”

“Okay, we had to check a total of 63 MCUs, so we should be able to finish up this afternoon.”

How many MCUs do Gabriel and Melissa have left to check?

A. 14 MCUs
B. 24 MCUs – Correct Answer
C. 34 MCUs
D. 44 MCUs
Problems
Adding and Subtracting

Melissa and Gabriel are electricians in a power plant. They have been given the task of checking the Motor Control Units (MCUs) in three motor control centers (MCCs). The first MCC has 24 MCUs, the second MCC has 18 MCUs, and the third MCC has 12 MCUs. How many total MCUs will they need to check?

A. 42 MCUs
B. 36 MCUs
C. 54 MCUs – Correct Answer
D. 72 MCUs

Demetra and Henry, two power plant electricians, are inspecting electrolyte fluid levels in battery cells. They noted several low levels in the battery cell banks and are using fluid to refill them. They use 5 pints to fill one bank of cells, 8.5 pints in the next bank of cells, and 4.5 pints in the last bank of cells. If they had 50 pints of electrolyte fluid to start with, how much electrolyte fluid do they have left?

A. 18 pints
B. 21 pints
C. 32 pints – Correct Answer
D. 37 pints
Multiplying and Dividing

Brian is an electrician in a power plant. He has been given the task of replacing filters in air handling units for 5 battery rooms. Each air handling unit needs 16 filters to clean the incoming air. How many filters will Brian need?

A. 21 filters
B. 40 filters
C. 65 filters
D. 80 filters – Correct Answer

Dominique, an electrician, has been assigned an assistant named Henry. Together they can change 32 filters in an 8-hour period. How many total filters can they change in 1 hour?

A. 24 filters
B. 16 filters
C. 4 filters – Correct Answer
D. 2 filters

Mia is planning for an upcoming job and knows that two electricians working together can inspect, clean, and test a Motor Control Unit (MCU) in 2 hours. How many MCUs could the two electricians inspect over the course of a 40-hour workweek?

A. 10 MCUs
B. 20 MCUs – Correct Answer
C. 40 MCUs
D. 80 MCUs

Electricians Jimmy and Scott are assigned the task of inspecting all the spare electric motors stored in the warehouse. Together the two electricians can inspect 12 motors per hour. If they have 5.5 hours left in the day to work on the task, how many motors can they complete in the remaining time?

A. 58 motors
B. 60 motors
C. 66 motors – Correct Answer
D. 72 motors
Val, a boiler maker, is using a handheld temperature sensing tool to detect abnormal temperature conditions in a boiler. After taking the reading, she noted the temperature was 90.15° F above ambient when the boiler was shut down. If the temperature increases by a factor of 10 above ambient when it is operating, what would the operating temperature be?

A. 1,101.5° F
B. 100.15° F
C. 1,001.5° F
D. 901.5° F – Correct Answer

Jack, a technician, is asked to log the energy in megawatt-hours on one of the larger generators in the plant. Its energy instrument currently reads 3,141,000 kW-h. Since 1 Megawatt-hour (MW-h) is equivalent to 1,000 kilowatt hours (kW-h), how many MW-h should he report?

A. 3,141,000 MW-h
B. 3,141 MW-h – Correct Answer
C. 3.141 MW-h
D. 31,410 MW-h

Brian, an electronics technician, has been asked to check out a voltage amplifier that is supposed to have a gain of 10,000. He measures the amplifier input and records a reading of 100 microvolts (0.000100 volt). If the amplifier is operating properly, what voltage would Brian expect to find at its output?

A. 1 volt – Correct Answer
B. 10 volts
C. 0.1 volt
D. 0.01 volts