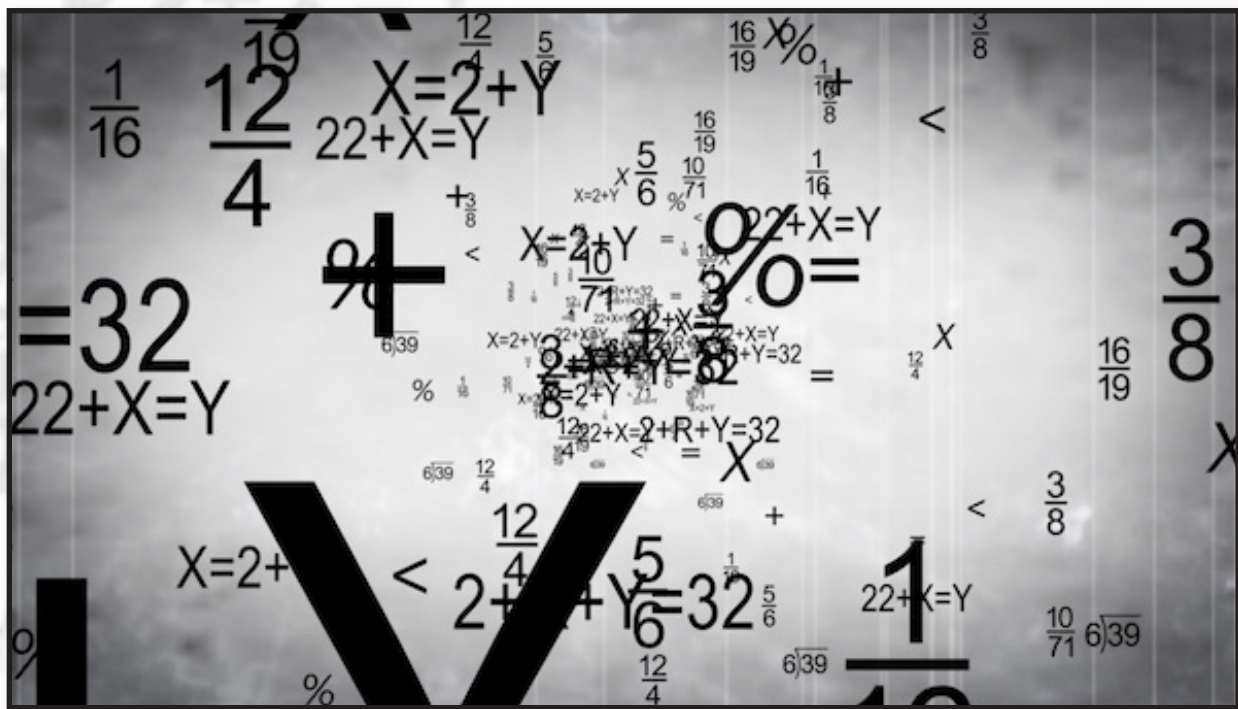


Math Review

Scenarios and Problems *Student Guide*



Module 3: Forms of Fractions

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Forms of Fractions (Lineworker)

Scenario

“Hi, Leala,” Stan says as he sees Leala, an electrician, returning from the field. “How much oil did you use on those transformers?”

“I only had to add oil to the transformers at the Perry St. substation. Let’s see, looks like one needed a whole gallon, the second only took about $\frac{1}{3}$ of a gallon, and the last used about $\frac{1}{2}$ of a gallon.”

Leala could report that she used $1\frac{1}{6}$ gallons of oil. Instead of $1\frac{1}{6}$ gallons of oil, which of the following could Leala say?

- A. $1\frac{1}{3}$ gallons of oil
- B. $1\frac{1}{6}$ gallons of oil
- C. $1\frac{5}{6}$ gallons of oil
- D. $1\frac{2}{3}$ gallons of oil



Leala was adding oil to substation transformers
Courtesy OSHA, image is in the public domain

Problems

Identifying and Writing Fractions

Tom has 4 pole inspections to do and has completed 3 inspections. What fraction of the pole inspections has Tom completed?

- A. 75% of the inspections
- B. $\frac{3}{4}$ of the inspections
- C. $\frac{4}{3}$ of the inspections
- D. 13% of the inspections

Kemen is pulling wire for an upgrade project. Kemen and the crew have pulled 400 feet of the 500 feet required to complete the job. What fraction of the wire pulling has the crew completed?

- A. 75% of the wire
- B. $\frac{500}{400}$ of the wire
- C. $\frac{4}{5}$ of the wire
- D. 25% of the wire

Laura's crew is settling poles for a power upgrade project. The crew has set 5 of the 8 poles for the project. What fraction of the total project has the crew completed?

- A. 63% of the project
- B. $\frac{5}{8}$ of the project
- C. $\frac{8}{5}$ of the project
- D. 16% of the project

Changing Improper Fractions to Mixed Numbers

Gail is an electrician assigned to monitor oil levels in the network transformers. Gail notes that the transformers had $\frac{2}{5}$ of a gallon added last month and she is adding $\frac{4}{5}$ of a gallon during her current inspections. Instead of logging $\frac{6}{5}$ of a gallon being added over the last 2 months, which of the following could Gail use to accurately report as the amount of oil added in the last 2 months?

- A. 1 gallon
- B. $1\frac{1}{5}$ gallon
- C. $1\frac{2}{5}$ gallon
- D. $\frac{2}{5}$ of a gallon

Ned is adding SF₆ gas to gas-cooled transformers in a transmission substation. Ned notes that the last three additions were $\frac{1}{3}$ of a bottle, $\frac{4}{5}$ of a bottle, and $\frac{4}{5}$ of a bottle. Besides reporting $\frac{29}{15}$ of a bottle of SF₆ gas was added in the last three months, which of the following could Ned also use to accurately report the amount of SF₆ gas used?

- A. 2 bottles
- B. 1 bottle
- C. $1\frac{14}{15}$ bottles
- D. $1\frac{1}{15}$ bottles

The line crew is using wedge fittings to tie in transformers for a new overhead line system. The crew has 18 wedge connectors total, nine on each of the two line trucks. One crew has used $\frac{4}{9}$ of the wedge connectors and the other crew has used $\frac{6}{9}$ of the wedge connectors. Instead of saying $\frac{10}{9}$ of the connectors were used, which of the fractions below could be used to report the connectors that were used?

- A. $1\frac{1}{3}$ of the connectors used
- B. $1\frac{1}{9}$ of the connectors used
- C. 33% of the connectors used
- D. $\frac{8}{9}$ of the connectors used

Changing Mixed Numbers to Improper Fractions

Alex is doing a splice for an underground service. He used a $1\frac{3}{4}$ -inch splice on one end and due to cable damage, had to use a $3\frac{2}{3}$ -inch splice on the other end. Instead of reporting $5\frac{5}{12}$ inches of splice being used, Alex could use which of the following to report the amount of splice used in inches?

- A. $\frac{37}{12}$ in of splicing material
- B. $\frac{65}{12}$ in of splicing material
- C. $\frac{22}{12}$ in of splicing material
- D. $5\frac{5}{12}$ in of splicing material

Leala is an electrician required to add oil to the transformers in a substation. Leala added the following amount of oil to three transformers: one transformer needed 1 gallon of oil, another needed $\frac{1}{6}$ of a gallon, and the last transformer needed $\frac{2}{3}$ of a gallon. Leala could report that she used $1\frac{5}{6}$ of a gallon. Instead of $1\frac{5}{6}$ of a gallon, which of the following could Leala also say?

- A. $\frac{35}{6}$ of a gallon
- B. $\frac{11}{6}$ of a gallon
- C. $\frac{6}{11}$ of a gallon
- D. 1.75 gallons

Ken is required to inspect the hot sticks of three line trucks. On the first truck, Ken finds $\frac{3}{5}$ hot sticks pass inspection. On the second line truck, $\frac{3}{4}$ of the hot sticks pass inspection. On the third truck, Ken finds $\frac{1}{2}$ of the hot sticks pass inspections. Instead of saying that $1\frac{17}{20}$ of the hot sticks passed inspection, which of the following could Ken say?

- A. $\frac{37}{20}$ of the sticks passed
- B. $\frac{7}{11}$ of the sticks passed
- C. $\frac{17}{20}$ of the sticks passed
- D. $\frac{38}{12}$ of the sticks passed

Renaming Fractions to Lowest Terms

Jim is checking the grounding wire spools in two of the line trucks. Jim notes that in one truck, 2 of the 6 spools have been used. What fraction of the grounding wires spools have to be replaced to restock the truck?

- A. $\frac{2}{3}$ of the spools
- B. $\frac{3}{3}$ of the spools
- C. $\frac{3}{4}$ of the spools
- D. $\frac{1}{3}$ of the spools

Holly and the line crew are setting poles for a power upgrade. The crew is required to set 30 poles and they have completed 6 of them. What fraction of the poles has been set?

- A. $\frac{4}{5}$ of the poles
- B. 20% of the poles
- C. $\frac{1}{5}$ of the poles
- D. $\frac{1}{6}$ of the poles

The line crew is using wedge fittings to tie in transformers for a new overhead line system. The crew has 18 transformers to tie in and each transformer uses 1 wedge connector. The crew has completed 8 of the 18 transformers. What fraction of the 18 wedge connectors has been used?

- A. 47% wedge connectors
- B. $\frac{10}{18}$ wedge connectors
- C. 53% of the wedge connectors
- D. $\frac{4}{9}$ of the wedge connectors

Forms of Fractions (Plant Operator)

Scenario

“Where are we at with the coal usage for the day?” asked Byron, a new plant operator, as he began his shift.

“We have used all of Silo #1, which holds 200,000 cubic feet of coal,” Cassandra, the current plant operator, responds. “And it looks like we have 25,000 cubic feet of coal remaining in Silo #2, which holds 250,000 cubic feet.”

What fraction of Silo #2 is full?

- A. $\frac{1}{8}$ full
- B. $\frac{1}{10}$ full
- C. $\frac{2}{5}$ full
- D. $\frac{1}{4}$ full



Coal Silos
*Courtesy Wikimedia Commons,
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Problems

Identifying and Writing Fractions

Cassandra, a plant operator, has inspected 3 of the total 4 boilers in the plant. What fraction of the boilers has she inspected?

- A. $\frac{4}{3}$ of the boilers
- B. $\frac{3}{4}$ of the boilers
- C. 75% of the boilers
- D. 67% of the boilers

Devon, a plant operator, reduced plant power to 400 MW due to decreased demand. If the maximum rated power for the power plant is 500 MW, at what fraction of maximum power is the plant operating?

- A. $\frac{4}{5}$ of maximum power
- B. $\frac{4}{9}$ of maximum power
- C. $\frac{2}{5}$ of maximum power
- D. 100 MW

Changing Improper Fractions to Mixed Numbers

While compiling the weekly usage reports, Devon noted that $\frac{2}{3}$ gallons of the chemical water additive had been added twice. Besides saying that $\frac{4}{3}$ of a gallon had been used, which of the following could Devon also accurately say had been used?

- A. $\frac{3}{4}$ gallon
- B. $1\frac{1}{3}$ gallons
- C. $2\frac{1}{3}$ gallons
- D. $4\frac{1}{3}$ gallons

Cassandra, a plant operator, noted that the coal usage for the past 24 hours was $\frac{5}{8}$ of Silo #2 and $\frac{7}{8}$ of Silo #4. Besides recording that $\frac{12}{8}$ of the total silo volume was used, which of the following could she say was used during the 24-hour period?

- A. $\frac{2}{8}$ of the total silo volume
- B. $1\frac{3}{8}$ of the total silo volume
- C. $1\frac{1}{2}$ of the total silo volume
- D. $1\frac{2}{8}$ of the total silo volume

Changing Mixed Numbers to Improper Fractions

Devon was getting ready to order grease for the equipment maintenance shop. He noted that during the first quarter, $\frac{1}{2}$ of a barrel of grease was used, and during the second quarter, $\frac{3}{4}$ of a barrel of grease was used. Instead of saying $1\frac{1}{4}$ barrels of grease was used, which of the following could he also say was used?

- A. $1\frac{1}{4}$ barrels
- B. $\frac{5}{4}$ barrels
- C. $\frac{5}{2}$ barrels
- D. $\frac{4}{8}$ barrels

While overhauling the plant's three boilers, insulation tiles were replaced. Boiler #1 took $\frac{3}{4}$ pallet of tiles, Boiler #2 took $\frac{5}{8}$ pallet, and Boiler #3 took $\frac{1}{2}$ pallet of tiles. If $1\frac{7}{8}$ pallets of tiles were used, how else could the used amount be recorded?

- A. $\frac{9}{14}$ pallets of tile
- B. $1\frac{7}{8}$ pallets of tile
- C. $\frac{6}{8}$ pallets of tile
- D. $1\frac{5}{8}$ pallets of tile

Renaming Fractions to Lowest Terms

Devon, a plant operator, is currently using 2 of the plant's 4 generators for power production. What fraction of the plant's generators is being used?

- A. $\frac{3}{8}$ of the plant's generators
- B. $\frac{1}{3}$ of the plant's generators
- C. $\frac{2}{6}$ of the plant's generators
- D. $\frac{1}{2}$ of the plant's generators

Cassandra, taking logs on the plant's water purification system, recorded that 24 of the 32 reverse osmosis cylinders were in use and 8 were undergoing a regeneration soak. What fraction, in lowest terms, of the osmosis cylinders were in use?

- A. $\frac{8}{32}$ cylinders
- B. $\frac{3}{4}$ cylinders
- C. $\frac{24}{32}$ cylinders
- D. $\frac{1}{4}$ cylinders

The daily coal train delivery consists of 40 coal cars. If 25 coal cars have unloaded so far, what fraction, in lowest terms, of the coal cars remain to be unloaded?

- A. $\frac{5}{8}$ of the coal cars
- B. $\frac{40}{25}$ of the coal cars
- C. $\frac{3}{8}$ of the coal cars
- D. $\frac{25}{40}$ of the coal cars

Forms of Fractions (Pipefitter/Pipelayer/Welder)

Scenario

“Hey, Tom, are you getting close to finishing?” Jim, the lead meter mechanic, asks.

Tom is applying leak detection fluid to the fittings on 8 gas meters at an apartment complex.

“Getting there. Each gas meter has 3 connections and I’ve checked 12 of the 24 connections.”

“So how much do you have left then?”

What is the remaining fraction of connections Tom has to check?

- A. $11/24$ of the connections
- B. $1/2$ of the connections
- C. $24/11$ of the connections
- D. $13/24$ of the connections



Tom is checking gas meters
Courtesy DOE, image is in the public domain

Problems

Identifying and Writing Fractions

Julie is performing weld inspections on the newly installed stainless steel gas main. Julie has 4 welds to inspect and she has completed 3 of them. What fraction of the welds has Julie inspected?

- A. 75% of the welds
- B. $\frac{3}{4}$ of the welds
- C. $\frac{4}{3}$ of the welds
- D. 13% of the welds

Larry is calibrating gas meters prior to use in the field. There are 10 meters to calibrate and Larry has completed 7 of them. What fraction of the meters has Larry calibrated?

- A. 70% of the meters
- B. $\frac{1}{5}$ of the meters
- C. $\frac{7}{10}$ of the meters
- D. 14% of the meters

Changing Improper Fractions to Mixed Numbers

Yolanda is a distribution gas mechanic who is removing liquid from traps in the gas line. Yolanda has 3 traps to drain during her shift. Yolanda has removed $\frac{3}{4}$ of a gallon from one trap, $\frac{1}{4}$ of a gallon from the second trap and $\frac{3}{4}$ of a gallon from the third trap. This results in $\frac{7}{4}$ total gallons of water removed. What is another way to report this amount?

- A. 2 gallons
- B. $\frac{3}{4}$ of a gallon
- C. $1\frac{3}{4}$ gallons
- D. $1\frac{1}{4}$ gallons

Sam is welding together pieces of plate steel to cover a trench in a roadway and has 3 boxes of welding rods at the job site. Sam has 2 welding ovens for drying his welding rod. Sam puts $\frac{5}{12}$ of one box of the welding rods in one oven and $\frac{9}{12}$ of another box of welding rods in the other oven. Besides saying that Sam used $\frac{14}{12}$ boxes of welding rods, which of the following could Sam also accurately say for the amount of welding rods he used?

- A. 12 boxes of welding rods were used
- B. 82% boxes of the welding rods were used
- C. $1\frac{2}{12}$ or $1\frac{1}{6}$ boxes of the welding rods were used
- D. $1\frac{4}{12}$ or $1\frac{1}{3}$ boxes of the welding rods were used

Chris is operating a backhoe of a gas line installation. Chris is responsible for checking and, if necessary, adding oil to the backhoe on a daily basis. Chris' review of the recent oil check records indicates that $\frac{3}{4}$ of a quart was added yesterday and Chris needs to add an additional $\frac{3}{4}$ of a quart today. Besides saying that $\frac{6}{4}$ of a quart had been added, which of the following could Chris also accurately say had been added?

- A. $\frac{2}{3}$ of a quart
- B. $\frac{6}{8}$ or $\frac{3}{4}$ of a quart
- C. $1\frac{1}{2}$ quarts
- D. $6\frac{1}{4}$ quart

Changing Mixed Numbers to Improper Fractions

Harry is laying gas marking tape for a new gas service line. Harry used $\frac{1}{2}$ of a tape roll on one service and $\frac{4}{5}$ of a tape roll on another service. Instead of saying that Harry used $1\frac{3}{10}$ of the marker tape rolls, which of the following could he also say?

- A. $\frac{13}{10}$ of the rolls
- B. $\frac{7}{10}$ of the rolls
- C. $\frac{5}{7}$ of the rolls
- D. $\frac{14}{12}$ or $\frac{7}{6}$ of the rolls

Yolanda is a distribution gas mechanic who is removing liquid from traps in the gas line. Yolanda has 3 traps to drain during her shift. Yolanda has removed $\frac{3}{4}$ of a gallon from one trap, $\frac{2}{3}$ of a gallon from the second trap, and $\frac{1}{2}$ of a gallon from the third trap. Besides saying that she has removed $1\frac{11}{12}$ of a gallon, which of the following could Yolanda report as an amount of liquid removed from the traps?

- A. $\frac{24}{12}$ or 2 gallons
- B. $\frac{23}{36}$ of a gallon
- C. $1\frac{11}{12}$ gallons
- D. $\frac{23}{12}$ of a gallon

Sue is using leak detection fluid on several meter gas fittings at an apartment complex. Sue used $\frac{1}{2}$ of a quart on one set of meters, $\frac{1}{3}$ of a quart on the second meter set, and $\frac{1}{4}$ of a quart on the third meter set. Instead of reporting that Sue used $1\frac{1}{12}$ quarts of leaking detection fluid, which of the following could she also report?

- A. $\frac{13}{36}$ of a quart
- B. $\frac{14}{12}$ or $\frac{7}{6}$ of a quart
- C. $\frac{9}{3}$ or 3 quarts
- D. $\frac{13}{12}$ of a quart

Renaming Fractions to Lowest Terms

Pete is performing pressure checks on the gas distribution system. He has completed 2 of the 12 inspections. What fraction of the inspections has Pete completed?

- A. $\frac{1}{6}$ of the inspections
- B. $\frac{1}{3}$ of the inspections
- C. 17% of the inspections
- D. $\frac{2}{3}$ of the inspections

Dawn is responding to the smell of gas in a neighborhood. She has 14 houses to check and she has completed 4. What fraction of all the houses has Dawn checked for gas?

- A. $\frac{1}{3}$ of the houses
- B. 29% of the houses
- C. $\frac{1}{7}$ of the houses
- D. $\frac{2}{7}$ of the houses

Gail is drilling holes alongside a foundation of a house to find the source of the natural gas leak, which was reported by the home owner. Gail has to drill 14 holes and she has completed 5 of them. What fraction of the total holes has Gail completed?

- A. 36% of the holes
- B. $\frac{1}{3}$ of the holes
- C. $\frac{5}{14}$ of the holes
- D. $\frac{7}{14}$ of the holes