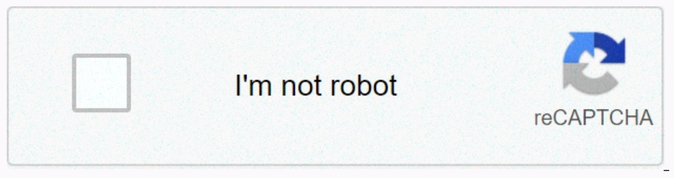

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Metric conversion practice problems pdf

Skip to main contentskip to navigate the math you need > drive conversion > unit conversion practice problems to go to: Density | Scale If you don't have a list of common conversion factors in your book, you can download and print this common geoscience conversion factor sheet (Acrobat (PDF) 40kB Sep3 09). to open the link below for use in calculations. If you need a step reminder, you can download and print this worksheet (Acrobat (PDF) 44kB Apr11 08), which will move you through the drive conversion steps. Finally, you can download a sheet that has all the problems (Acrobat (PDF) 48kB Jul25 09) on it so you can print it and work it on your own. Problem 1: Imagine you're driving your car in Canada. As you drive along, you will notice that speed limit signs have numbers like 120 (on the highway) and 50 (in the city). Before you start to accelerate, you realize that the signs are in km / hour. Unfortunately, your speedometer reads only in me / hour. Find out how fast you can go if the sign says 120km/hr Hide Let's do it using the steps you learned on the previous page. List the units you have (if appropriate as a fraction): Hide the units you want to end up with: Hide Specify appropriate conversion factors (in some cases, there will be more than one conversion factor for each drive you have): Hide Because the clock stays the same at the bottom, you only need one conversion factor: km to me. So you can write 1km = 0.6214 mi Evaluate the appropriate arrangement for fractions (that is, what units belong to the reader (above) fraction? What units must be the denominator (bottom)? Remember that units cancel when one unit is in the reader and the other is in the denominator). Remember that when you multiply fractions (as you will in step 6 below), you can cancel units only when they appear in the reader and denominator. Hide Because km is in the reader's original units, km must be in the denominator so that we can cancel it: Set the conversion of typing fractions in a series with multiple markers between: Hide evaluation. Do the original units cancel so that you left only the unit requested? If not, repeat steps 3 and 4 until the appropriate units are left: Hide Cancel km and end mi/hr (which is what we want!) Multiplication at the top and bottom: If necessary, hide, reduce the fraction. Hide Evaluate your answer. Hide Is the speed limit about 46 mph (mi/hr) a reasonable speed limit? If you have 120 or 0.075, would you know that's not reasonable? You can drive approximately 45 miles per hour 50 km / hour Hide Write units you have (if appropriate as a fraction): Hide Write units you want to quit: Hide Identify appropriate conversion factors (in some cases there will be more than one conversion factor for each of the units you have): Hide Since the clock remains the same at the bottom, you will only need one conversion factor: km up to me. So you can write 1km = 0.6214 mi Evaluate the appropriate arrangement for fractions (that is, what units belong to the reader (above) fraction? What units must be the denominator (bottom)? Remember that units cancel when one unit is in the reader and the other is in the denominator). Remember that when you multiply fractions (as you will in step 6 below), you can cancel units only when they appear in the reader and denominator. Hide Because km is in the reader's original units, km must be in the denominator so that we can cancel it: Set the conversion of typing fractions in a series with multiple markers between: Hide evaluation. Do the original units cancel so that you left only the unit requested? If not, repeat steps 3 and 4 until the appropriate units are left: Hide Cancel km and end mi/hr (which is what we want!) Multiplication at the top and bottom: If necessary, hide, reduce the fraction. Hide Evaluate your answer. Hide Is the speed limit about 30 mph (mi/hr) a reasonable speed limit? If you have 0.80 mph or 30,000 mph, would you realize that's not reasonable? You can drive about 30 mph! Density Conversion (more step problems) Problem 2: Geologists' observations suggest that the two most common rocks exposed to the surface The earth is granite (continental crust) and basalt (oceanic crust). From the travel times of earthquake waves, we also know that the average earth density is about 5.5 g/ cm3. See if you can do some unit conversion using the information listed in the questions below to determine whether the entire Earth could be made of these two types of rocks only. As an astute observer walking around the continental crust (granite), you may choose to test the hypothesis that the Earth is made entirely of granite. You weigh a 1.00 cubic ft piece of granite on your home scale and you'll find it weighs 171 pounds. So you determine that granite has a density of 171 lb/ft3. Change the density of granite to g/cm3. Given the above information, could the earth be completely made of granite? Let's hide this by following the steps from the Drive Conversions page. Copy the number and unit as a fraction: Hide Because the granite block is 1 cubic foot, you can put 1 on the bottom of the fraction. Type the units you want to end up with: Hide the conversion factors for what you have (pounds and feet (or cubic feet)) for what you want (grams and cm (or cubic cm)). Hide pounds per grams: 1 pound = 453.3924 g feet per cm: 1 foot = 30.48 cm feet per cubic foot: 1 ft * 1 ft = 1 ft3 cubic feet per cubic foot centimetres: 1 ft3 = 30.48 cm * 30.48 cm * 30.48 cm = 28.316 cm3 Take note of what you have and what you want to end up with. Then type the conversion factors from step 2 as fractions to cancel the drives. Hide You want to be able to cancel lb (so the unit must be on the underside of the converter fraction) and ft3 (so that the drive must be at the top of the converter fraction): Once you have typed all conversion fractions so that the original value is multiplied by them (see last step), evaluate. Do the original units cancel so that you end up with what the question asks? Hide Multiply Fractions (top and bottom): To get an answer, hide the resulting number. Hide Is that a reasonable answer? Hide This is not the answer we were looking for - 5.5 g/cm3. But it's of the order of magnitude. It is also a number that is greater than the density of water (which is 1 g/cm3) and we know that granite is denser than water! So it's a reasonable number. However, it shows that the Earth can not be completely granite! Since basalt seems good when the ocean crust pulls apart on mid-ocean ridges, you may decide that maybe the entire Earth is made of basalt. On your bathroom scale, a 64 in 3 (4in x 4in x 4in) block basalt weighs 116 ounces. Use this information to calculate whether the average Earth density (5.5 g/cm3) can be explained by the Earth entirely from basalt. Let's hide this by following the steps from the Drive Conversions page. Copy count and units as fraction: Hide Write drives that to finish with: Hide look into conversion factors for what you have (pounds and feet (or cubic feet)) on what you want (grams and cm (or cubic cm)). Hide oz per grams: 1 oz = 28.349523 g in cm: 1 inch = 2.54 cm per cubic inch: 1 v * 1 v * 1 v = 1 in3 cubic to cubic centimeters: 1 in3 = 2.54 cm * 2.54 cm * 2.54 cm = 16.4 cm3 Take note of what you have and what you want to end with. Then type the conversion factors from step 2 as fractions to cancel the drives. Hide You want to be able to cancel oz (so the unit must be on the bottom of the convert fraction) and in3 (so that the unit must be at the top of the converter fraction): Once you have typed all conversion fractions so that the original value is multiplied by them (see last step), evaluate. Do the original units cancel so that you end up with what the question asks? Hide Multiply Fractions (top and bottom): To get an answer, hide the resulting number. Hide Is that a reasonable answer? Hide This is not the answer we were looking for - 5.5 g/cm3. But it's of the order of magnitude. This is also a number that is greater than the density of water (which is 1 g/cm3) and we know that basalt is denser than water (it sinks)! So it's a reasonable number. However, it shows that the Earth can't be completely basalt either! So there must be something denser down there – like an iron/nickel core! Problem 3: You are working with a map that has a fractional scale of 1:24,000 (which means that 1 unit on the map is equal to 24,000 units on the ground - 1 mm = 24,000 mm or 1 in = 24,000 inches). See if you can identify solutions to the following problems that geologists face when working with maps. You are hiking into the field area and measure the length of the trail as 18.5 inches. Calculate how many miles you need to hike to get to interesting rocks/geology? Hide This is actually a two-step conversion problem. First you need to convert the measurements of the map to the measurements on the ground. You can then convert them to drives that you understand. First, think about what you have (18.5 on the map and scale) and what you want to know (how many miles 18.5 inches represents on the ground). It can help you think about thumbs on the map and thumbs on the ground like different units. To get started, write the fractional scale as a fraction (with the distance on the ground on top (because that's what we want to end up with)). You've just calculated how many centimeters you need to cover along the route. But it just looks like a lot, so let's convert those thumbs to miles away! First, let's write the appropriate conversion factors: 1 foot = 12 inches and 1 mile = 5280 feet. Next, we need to write these conversion factors as fractions. Be sure to organize them so that the units you don't want to cancel end up with the units you want! Then we can Units. Are we going to end up with miles? Yes! Now we multiply through the upper and lower part (note that the bottom number has no units, because both are canceled by the other): And when we clear the factions: We find that our hike will be 7 miles! Once you reach the field area, you will create a geological map of the area. You have a mechanical pencil that has lead with a thickness of 0.3 mm. The smallest feature you can map will be something that is 0.3mm wide on the map. How wide (in m) can this function be? Hide it as much as 3.1 is actually a two step conversion problem. First you need to convert the measurements of the map to the measurements on the ground. You can then convert them to drives that you understand. First, think about what you know (0.3 mm on the map and scale) and what you want to know (how many meters 0.3 mm represents on the ground). This can help you think of mm on the map and mm on the ground as different units. To get started, write the fractional scale as a fraction (with the distance on the ground on top (because that's what we want to end up with)). You have just calculated how many millimeters of gross function can be. But because this is a metric system, we can adjust it so you don't have a lot of metrics in your head. First, let's write the appropriate conversion factors: Next, we need to write these conversion factors as fractions. Be sure to organize them so that the units you don't want to cancel end up with the units you want! Finally, cancel the appropriate units (mm in this case) and multiply through the top and bottom. You can map any function wider than 7.2 m. The hide cool thing about the metric system is that it is based on number 10. This means that conversions within the metric system include moving metrics. This also means that when calculating, many times you can cancel zeros. How does it work? Zeros can only be canceled if they occur at the top and bottom of a fraction. In the above issue, you can cancel two zeros on both sides of the fraction: Note that the calculation then becomes 72 divided by 10. Most of us can easily split 10, making this calculation much easier. In fact, when you get to this point, you may not even need a calculator. Keep this in mind as you make calculations! Now you have an idea of the size of the features that can be drawn on the map. Turn your answer in problem 3.2 into legs. Hide This is a simple conversion with just one step. The conversion factor shown in the table (see reference above) is 1 m = 3,281 feet. First, set our equation with fractions: Then clear the units and multiply the top and bottom You can map a function that is about 24 feet wide. Next steps Ok, I'm ready to try the review. Take me there!. When you get there, be sure to sign in with your username and password. Still need more practice? There are many websites that have Drive conversion issues. Some of them are listed below. Please use these links for more practice with unit transfers! « Previous Page Next Page » »

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