

Solution

- a. To begin, we need to find the area of land by multiplying the lengths together.

$$\text{area} = 110 \text{ m} \cdot 150 \text{ m} = 16\,500 \text{ m}^2$$

We can now use the conversion factor $\frac{1 \text{ ha}}{10\,000 \text{ m}^2}$ to convert squared meters into hectares.

$$16\,500 \text{ m}^2 = 16\,500 \cancel{\text{m}^2} \cdot \frac{1 \text{ ha}}{10\,000 \cancel{\text{m}^2}} = 1.65 \text{ ha}$$

Therefore, the land is 1.65 hectares.

- b. We need to use the conversion factor $\frac{1 \text{ L}}{1000 \text{ cm}^3}$ to convert cubic centimeters into liters.

$$5500 \text{ cm}^3 = 5500 \cancel{\text{cm}^3} \cdot \frac{1 \text{ L}}{1000 \cancel{\text{cm}^3}} = 5.5 \text{ L}$$

So, the bowl can hold 5.5 liters of punch.

Skill Check Answers

1. 2.5 feet 2. 1.5 liters 3. 0.022 m²

7.4 Exercises

✓ CONCEPT CHECK

- Conversion factors are always equal to _____.
- The _____ is the measurement system used in most of the world.
- The unit for volume in the metric system is the _____.
- Conversions within the metric system are based on powers of _____.
- One _____ is equivalent to 100 m².

💡 PRACTICE

Convert each measurement to the desired unit of measure.

- | | |
|------------------------|-------------------------------|
| 6. 2232 in. = _____ yd | 7. 13 ft = _____ in. |
| 8. 22 lb = _____ oz | 9. 120 oz = _____ lb _____ oz |

10. 200 fl oz = _____ cups
11. 5 qt = _____ pt
12. 1008 min = _____ days
13. 4.25 hours = _____ minutes
14. 262 yd = _____ mi
15. 3.5 mi = _____ ft
16. 15.5 gal = _____ pt
17. 4 pt = _____ fl oz
18. 11 acres = _____ yd^2
19. 1000 acres = _____ mi^2
20. How many centimeters are in 364 km?
21. Convert 230 m to kilometers.
22. Convert 0.87 km to centimeters.
23. How many meters are in 123 cm?
24. Convert 21 mm to decimeters.
25. How many kiloliters are in 35 600 cL?
26. Convert 7.22 hL to milliliters.
27. How many grams are in 1.2 kg?
28. Convert 45 422 cg to dekagrams.
29. How many square decimeters are in 726 m^2 ?
30. Express 40.93 m^2 in square kilometers.
31. How many square centimeters are in 627.2 m^2 ?
32. How many square millimeters are in 928 cm^2 ?
33. How many cubic centimeters are in 99 m^3 ?
34. Express 8503 mm^3 in cubic meters.
35. Convert 345 m^2 to ares.
36. How many square meters are in 1.72 ares?

APPLICATIONS

37. Men ages 19 to 30 are recommended to intake about 13 cups of water a day. Calculate the number of fluid ounces this would be per day. Round your answer to the nearest tenth, if necessary.
38. A Louisiana gumbo recipe calls for 14.5 ounces of stewed tomatoes. How many cups of stewed tomatoes are required? Round your answer to the nearest tenth, if necessary.

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39. A king-size mattress is 76 inches wide by 80 inches long. If a queen-size mattress is 5 feet wide and about 6.7 feet long, how much wider (in inches) is the king-size mattress than the queen-size mattress?
40. An online gaming company reports that the average player has spent 832 hours on their sight. Assuming their report is correct, how many days has the average player spent on the gaming sight? Round to the nearest half a day.
41. A local coffee shop is calculating the number of gallons of coffee they sell per day. On average, the shop sells two hundred sixty 16 fl oz cups of coffee a day. How many gallons of coffee per day do they sell?
42. A freight train measures 1.3 miles long when all boxcars are attached. If a standard boxcar is 55 feet 5 inches long, what is the maximum number of boxcars the freight train contains?
43. The outer lane (lane 8) of a running track is 453.66 meters compared to the inside lane (lane 1) which has a length of 400 meters. If a runner makes three complete laps around the track in lane 8, how many kilometers has he run? Round your answer to two decimal places.
44. A paper clip is made from galvanized steel wire. When curled, the paperclip measures 4.1 cm in length. Uncurled, it measures 108 mm. What is the maximum number of paper clips that can be made from a straight piece of wire that is 100 m long? Round your answer to the nearest number of whole paperclips.
45. Alex is buying a bag of apples that weighs 720 grams. If the apples are sold for \$3.34 per kilogram, how much will Alex pay for the bag of apples? Round your answer to the nearest cent.
46. Forty centigrams of caffeine per day is considered a safe amount. If there are 95 mg of caffeine in one cup of coffee, what is the maximum number of cups of coffee you can drink in a day and stay under the safe amount of caffeine?
47. Trey is reupholstering his dining room chairs. He plans to place brass upholstery tacks every 2 cm along the back edge of the chair. If the back measures 4.45 dm in length, how many tacks will he need for each chair?
48. To help encourage the safe use of acetaminophen, the maximum daily dose has been reduced from 4 g per day to 3 g per day. If an extra strength tablet contains 500 mg of acetaminophen, how many tablets make up the new maximum daily dose?
49. A rectangular plot of land measures 180 m by 50 m. How many hectares is the plot of land?
50. A community garden is being planned. The garden will measure 52 m by 23 m. Calculate the size of the garden in ares.
51. A small fish tank holds 19 liters of water. How many cubic centimeters of water does the tank hold?

52. The Sawyers' water heater broke, and they need to purchase a new one. Their current water heater holds $120\,000\text{ cm}^3$ of water. If a new water heater is available in capacities of 30 L, 100 L, and 140 L, which size heater should the Sawyers purchase if they want to buy one that is at least as big as the old one.

 **WRITING & THINKING**

53. What metric unit of length would be best to measure the depth of the Pacific Ocean? Explain your reasoning.
54. What metric unit of length would be best to measure the length of a room? Explain your reasoning.
55. What metric unit of length would be best to measure the thickness of a smartphone? Explain your reasoning.
56. What metric unit would be the best choice to measure the mass of a grain of rice? Explain your reasoning.
57. Rank the following mass measurements from smallest to largest:
 100.6 mg 1021 g 0.0000006 kg 0.61 mg
58. Rank the following length measurements from smallest to largest:
 3.4 dm 0.341 dam 0.0000034 km 34 m