

## Temperature & Mass Conversions Assignment

### Multiple Choice

Identify the choice that best completes the statement or answers the question.

- \_\_\_\_\_ 1. The temperature of a windshield on a winter morning is  $15^{\circ}\text{F}$ . If the melting point is  $0^{\circ}\text{C}$ , how many degrees must the temperature of the windshield be raised before the ice can melt?
- a.  $17^{\circ}\text{F}$
  - b.  $21^{\circ}\text{F}$
  - c.  $12^{\circ}\text{F}$
  - d.  $27^{\circ}\text{F}$
- \_\_\_\_\_ 2. The melting point of iron is  $1536^{\circ}\text{C}$ . At what temperature in degrees Fahrenheit will iron melt?
- a.  $2732^{\circ}\text{F}$
  - b.  $2822^{\circ}\text{F}$
  - c.  $835^{\circ}\text{F}$
  - d.  $2797^{\circ}\text{F}$
- \_\_\_\_\_ 3. Julie is visiting family in Oregon, USA. A thermometer outside the house reads  $37^{\circ}\text{F}$ . What is the temperature in degrees Celsius?
- a.  $-4.2^{\circ}\text{C}$
  - b.  $7.8^{\circ}\text{C}$
  - c.  $2.8^{\circ}\text{C}$
  - d.  $14.8^{\circ}\text{C}$
- \_\_\_\_\_ 4. A delivery of patio stones arrives with 60 boxes, each containing 60 pounds of stone. What is the total weight of this delivery, in tons?
- a. 20.0 tons
  - b. 1.8 tons
  - c. 18.0 tons
  - d. 3.6 tons
- \_\_\_\_\_ 5. Smoked salmon is being sold for  $\$13.50$  per pound. What is the cost of 7 ounces of salmon?
- a.  $\$7.88$
  - b.  $\$5.91$
  - c.  $\$7.32$
  - d.  $\$11.81$
- \_\_\_\_\_ 6. A contractor poured 2.5 tn of concrete in the foundations of 6 houses. How much concrete would be needed to build the foundations of another 2 houses?
- a. 1750 lb
  - b. 2000 lb
  - c. 1667 lb
  - d. 1333 lb
- \_\_\_\_\_ 7. A flight attendant loading meals and drinks onto an airplane moves 28, 10-kg boxes of prepared meals and 12 trays containing 24 drink containers, each with a mass of 150 g. What is the total mass of food and drink loaded?
- a. 2080 kg
  - b. 323.2 kg
  - c. 3880 kg
  - d. 43 480 kg
- \_\_\_\_\_ 8. Three-bean salad is sold for  $\$1.11/100\text{ g}$  at the deli. What would be the price for a large, 0.8-kg container of salad?
- a.  $\$8.88$
  - b.  $\$17.76$
  - c.  $\$4.44$
  - d.  $\$10.22$

- \_\_\_\_\_ 9. Ivan can bench press 180 lb at the gym. What is this weight in kilograms?
- |            |            |
|------------|------------|
| a. 94.1 kg | c. 61.6 kg |
| b. 81.6 kg | d. 86.9 kg |
- \_\_\_\_\_ 10. A train on a roller coaster ride can safely carry up to 8500 lb. If the average adult weighs 70 kg, how many passengers can ride the roller coaster at once?
- |       |       |
|-------|-------|
| a. 54 | c. 56 |
| b. 57 | d. 55 |
- \_\_\_\_\_ 11. A diving platform at a public swimming pool has a maximum load of 350 lb. How many 30-kg children can stand on the platform?
- |      |      |
|------|------|
| a. 8 | c. 6 |
| b. 3 | d. 5 |

### Short Answer

1. Before leaving on vacation to Colorado, USA, you check the state's weather forecast. Say time temperatures are predicted to be between 45°F and 55°F for the following week. What range of temperature in degrees Celsius does this represent? Would it make more sense to pack sweaters or T-shirts?
2. The weight of a snow machine is 900 lb. If the ice on a lake is tested to hold weights of up to 0.6 tons, is it safe for a father weighing 195 lb to take his two children, weighing 52 lb and 83 lb, out onto the ice?
3. Your favourite gummy candies are being sold for \$3.00 for a package that weighs 12 ounces. Your other option is to buy them in bulk for \$4.64/pound. Which of these choices would be the best deal?
4. A moving truck has a maximum load capacity of 1.2 tons. If you have an inventory of 110 boxes to move and each box weighs 110 lb, how many trips will be required to move the load?
5. Sherry wants to buy boxes of strawberries when they are on sale at the grocery store, but she will not have time to make jam until the weekend. She buys one crate of 4.3 kg of berries and two additional boxes of 500 g each. If her strawberry jam recipe calls for 4.2 kg of berries, what mass of berries can spoil and still allow her to make jam?
6. Lobster is being sold for \$21.42/lb. What would be the price of a 0.62 kg lobster?
7. Lianne is hosting a dinner party and she knows that the Canada Food Guide serving suggestion for fish is 75 g per person. To have enough fish for 8 people, how many ounces of fish will she buy from the grocery store?

### Problem

1. When you work out at the gym, your body temperature rises and you begin to sweat. Jake starts sweating when his body temperature reaches 99.2°F.
  - a) Jake's normal body temperature is 98.5°F. How much does his temperature rise before he starts sweating?

- b) What is Jake's body temperature in degrees Celsius when he starts sweating?
  - c) What is this temperature change in degrees Celsius?
2. An elevator has a maximum capacity of 1450 lb. Billy weighs 175 lb and he has 35 pallets of paper to deliver in the building. Each pallet weighs 90 kg.
- a) What is the capacity of the elevator in kilograms?
  - b) If Billy always rides the elevator with his paper deliveries, how much remaining capacity does the elevator have in kilograms?
  - c) How many pallets at a time can Billy load into the elevator? He cannot load partial pallets.
  - d) How many trips will Billy make to deliver all the paper?

## Temperature & Mass Conversions Assignment Answer Section

### MULTIPLE CHOICE

1. ANS: A
2. ANS: D
3. ANS: C
4. ANS: B
5. ANS: B
  
6. ANS: C
7. ANS: B
8. ANS: A
9. ANS: B
10. ANS: D
11. ANS: D

### SHORT ANSWER

1. ANS:  
Convert the temperatures to degrees Celsius.  
Minimum temperature:

$$C = \frac{5}{9} (F - 32)$$

$$C = \frac{5}{9} (45 - 32)$$

$$C = 7.2^{\circ}\text{C}$$

Maximum temperature:

$$C = \frac{5}{9} (F - 32)$$

$$C = \frac{5}{9} (55 - 32)$$

$$C = 12.7^{\circ}\text{C}$$

The range of temperatures is from  $7.2^{\circ}\text{C}$  to  $12.7^{\circ}\text{C}$ . It would make more sense to pack sweaters.

2. ANS:  
Add the weights of the snow machine and people.  
 $900 + 195 + 52 + 83 = 1230 \text{ lb}$

Convert to tons.

$$1230 \text{ lb} \times (1 \text{ tn}/2000 \text{ lb}) = 0.615 \text{ tn}$$

No, it is not safe to go out on the ice.

3. ANS:

Calculate the unit price of each option.

$$\text{Package price: } \$3.00 \div 12 \text{ oz} = \$0.25/\text{oz}$$

$$\text{Bulk: } \$4.64 \div 16 \text{ oz} = \$0.29/\text{oz}$$

The package is the best deal.

4. ANS:

Calculate the total weight of the boxes.

$$110 \text{ lb} \times 110 = 12100 \text{ lb}$$

Convert the weight to tons.

$$12100 \text{ lb} \div 2000 \text{ lb/tn} = 6.05 \text{ tn}$$

Divide the total weight by the capacity of the truck to find the number of trips needed.

$$6.05 \text{ tn} \div 1.2 \text{ tn} \approx 6, \text{ rounded up}$$

6 trips are needed.

5. ANS:

Calculate the weight of berries purchased.

$$4.3 \text{ kg} + 0.5 \text{ kg} + 0.5 \text{ kg} = 5.3 \text{ kg}$$

Calculate how much can spoil.

$$5.3 \text{ kg} - 4.2 \text{ kg} = 1.1 \text{ kg}$$

1.1 kg of berries can spoil and Sherry will still be able to make jam.

6. ANS:

Convert the weight of the lobster to pounds.

$$0.62 \text{ kg} \times 2.2 \text{ lb/kg} = 1.364 \text{ lb}$$

Multiply by the cost per pound.

$$1.364 \text{ lb} \times \$21.42/\text{lb} = \$29.22$$

The lobster would cost \$29.22.

7. ANS:

Calculate the total weight of fish in grams.

$$75 \text{ g} \times 8 = 600 \text{ g}$$

Convert to ounces.

$$600 \text{ g} \times 0.03527 \text{ oz/g} = 21.2 \text{ oz}$$

Lianne will have to buy 21.2 oz of fish.

## PROBLEM

1. ANS:

a)  $99.2 - 98.5 = 0.7^{\circ}\text{F}$

His temperature rises  $0.7^{\circ}\text{F}$  before he begins sweating.

b)  $C = \frac{5}{9} (F - 32)$

$$C = \frac{5}{9} (99.2 - 32)$$

$$C = 37.3^{\circ}\text{C}$$

Jake's body temperature is  $37.3^{\circ}\text{C}$  when he starts sweating.

c) Calculate his normal body temperature in degrees Celsius.

$$C = \frac{5}{9} (F - 32)$$

$$C = \frac{5}{9} (98.5 - 32)$$

$$C = 36.9^{\circ}\text{C}$$

Calculate the change in temperature.

$$37.3 - 36.9 = 0.4^{\circ}\text{C}$$

Jake's body temperature changes by  $0.4^{\circ}\text{C}$ .

2. ANS:

a)  $1450 \text{ lb} \times 1 \text{ kg}/2.2 \text{ lb} = 659.1 \text{ kg}$

The capacity of the elevator is 659.1 kg.

b) Convert Billy's weight to kilograms.

$$175 \text{ lb} \times 1 \text{ kg}/2.2 \text{ lb} = 79.5 \text{ kg}$$

$$659.1 \text{ kg} - 79.5 \text{ kg} = 579.5 \text{ kg}$$

The remaining capacity of the elevator is 579.5 kg.

c) Divide the remaining capacity by the weight of one pallet.

$$579.5 \text{ kg} \div 90 \text{ kg/pallet} = 6.44 \text{ pallets}$$

Since Billy cannot load partial pallets, the maximum he can load at a time is 6 pallets.

d) Divide the total number of pallets by the number of pallets that can be loaded into the elevator per trip.

$$35 \div 6 = 6$$

It will take Billy 6 trips to deliver all the paper.