CALCULATING TIME OF DEATH USING ALGOR MORTIS

- For the first 12 hours, the body loses 0.78°C (1.4°F) per hour.
- After the first 12 hours, the body loses about 0.39°C (0.7°F) per hour.
- Normal body temp is 37°C (98.6°F)

Example 1: What is the temperature loss for someone who has been dead for 12 hours?

$$12hr \times \frac{0.78°C}{1hr} = 9.36°C$$

Example 2: Calculate the time of death if a person has been dead for **less than 12 hours** and the temperature of the body was determined to be 32.2°C.

$$37 - 32.2 = 4.8°C$$

$$4.8°C \times \frac{1hr}{0.78} = 6.2 hr \qquad \text{Can round to nearest hour}$$

$$0.2 hr \times \frac{60 min}{hr} = 12 min$$

Example 3: Is the time of death more than 12 hours or less than 12 hours?
- Recall that if a body has been dead for 12 hours or less, the body loses heat at a rate of

    0.78°C per hour.

- If the body has been dead 12 hours, then 0.78°C/hr x 12 hrs = (9.36°C)

- If a body loses 9.36°C, then the person has been dead for 12 hours.

- If a body loses more than 9.36°C, then the person has been dead for more than 12 hours.

- If they lose less than 9.36°C, then the body has been dead for less than 12 hours.

4

For each of the following, state if the body had been dead for more than or less than 12 hours based on the number of degrees lost:

- Total loss of 7.9 °C: **less**

- Total loss of 4.4 °C: **less**

- Total loss of 11.7 °C: **more**

- Total loss of 17.2 °C: **more**

- Total loss of 10.6 °C: **more**

Example 4: Calculate the time of death if the person was dead for more than 12 hours.
If the body has lost more than 9.36°C, then you know that the victim has been dead for more than 12 hours. Recall that after 12 hours, the body loses heat at a rate of 0.39°C per hour. You need to calculate how many hours beyond the 12 hours that someone died and add it to the 12 hours.

- What if the body temp is 22.2°C (72°F)?

$$37 - 22.2 = 14.8°C \overset{12hr}{-} 9.36 = 5.44 °C$$

$$5.44°C \times \frac{1hr}{0.39°C} = 14hr + 12 = \boxed{26hr}$$

Part A
Determine the approximate time of death using evidence from algor mortis. Show your work.

1. Approximately how long has the victim been dead if his body temperature was 33.1°C?

$$37 - 33.1 = 3.9°C$$
$$3.9°C \times \frac{1hr}{0.78} = \boxed{5hr}$$

2. A body found outside in the winter has a temperature of 33.1°C. Has the body been dead a longer or shorter time than in problem 1? Explain your answer.

Shorter b/c could temp made body temp drop faster

3. Approximately how long has the victim been dead if his body temperature was 25.9°C?

$$37 - 25.9°C = 11.1 \overset{12hr}{-} 9.36 = 1.74°C$$
$$1.74°C \times \frac{1hr}{0.39°C} = 4hr + 12 = \boxed{16hr}$$

5

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4. What is the approximate time of death if the body temperature was 15.6°C?

$$37 - 15.6 = 21.4 - \frac{9.36}{12hr} = 12.04°C \times \frac{1hr}{0.39} = 31hr$$

$$31 + 12 = \boxed{43hr}$$

5. What is the approximate time of death if the body temperature was 10°C?

$$37 - 10 = 27 - \frac{9.36}{12hr} = 17.64°C \times \frac{1hr}{0.39} = 45hr$$

$$12hr + 45hr = \boxed{57 hrs}$$

6. What is the approximate time of death if the body temperature was 29.4°C?

$$37 - 29.4 = 7.6°C \times \frac{1hr}{0.78} = \boxed{10hr}$$

7. What is the approximate time of death if the body temperature was 24°C?

$$37 - 24 = 13 - \frac{9.36}{12hr} = 3.64 \times \frac{1hr}{0.39} = 9 hrs$$

$$12 + 9 = \boxed{21 hrs}$$

Part B

Describe the impact on time of death for each of the variables listed. If you based your time of death estimates strictly on temperature loss to be 10 hours earlier, *would you reduce* your 10-hour estimate *or increase* your 10-hour estimate if the body had been:

8. Naked   add 10hr

9. Exposed to windy conditions   add 10hr

10. Suffering from an illness before death   reduce

11. Submerged in a lake   add
    colder
    water

6