Some Questions from Khan Academy

No Calculator

1. Underwater pressure consists of atmospheric pressure, which is 101 kilopascals (kPa), plus 101kPa of hydrostatic pressure for every 10 meters (m) of depth under water. Which inequality best represents the depth, d, in meters, that is permitted for a scuba diver who is advised not to exceed 220 kPa of underwater pressure?

    A) $101 + 101d \leq 220$

    B) $101 + 10.1d \leq 220$

    C) $101 + 10.1d > 220$

    D) $101 + 101d > 220$

2. A local cafe has startup costs of $4,500. The owner estimates quarterly costs (every three months) at the constant rate of $10,200 per quarter. The owner operates for m months without earning a profit. If the owner does not want costs to exceed $12,500, which of the following inequalities best represents this situation?

    A) $4,500 + 2,500 \, m \leq 12,500$

    B) $10,200 + 2,500 \, m \leq 12,500$

    C) $4,500 + 3,400 \, m \leq 12,500$

    D) $4,500 + 3,400m > 12,500$

3. A study by a group of cardiologists determined that maximal heart rate in humans, a parameter used as a basis for prescribing exercise programs, depends on age. Maximal heart rate is around 201 beats per minute (bpm) for a 10-year-old, and decreases at a constant rate of 7 bpm every 10 years. Which of the following inequalities best describes the ages, a, for which maximal heart rate is less than 180 bpm for **a ≥ 10?**

    A) $208 - 0.7a < 180$

    B) $208 - 0.7a \geq 180$

    C) $201 - 0.7a < 180$

    D) $201 - 0.7a \geq 180$

4. An audiologist is testing a patient to determine the softest sound of a specific frequency that the patient reports hearing. She begins with a 10 decibel (dB) sound for trial 1, then increases the volume by 2 dB for each trial after that. If the patient can only hear all sounds of that frequency that have a volume louder than 26 dB, and t represents the trial numbers that the patient can hear, which of the following inequalities best models the situation described above?

    A) $2t + 10 \geq 26$

    B) $2t + 10 > 26$

    C) $2(t - 1) + 10 \geq 26$

    D) $2(t - 1) + 10 > 26$

5. Joanne and Richard volunteer at a hospital. Joanne volunteers 4 hours more per week than Richard does. In a given week, they do not volunteer for more than a combined total of 16 hours. If x is the number of hours that Richard volunteers, which inequality best models this situation?

   A) $x + 4 \leq 16$

   B) $2x + 4 \leq 16$

   C) $2x + 8 \leq 16$

   D) $2x - 4 \leq 16$

Calculator OK

Multiple Choice

6. A car traveling 60 miles per hour (mph) approaches an area with a 50 mph speed limit. In order to reduce the speed to 50 mph or less, the driver slows down the car at a constant rate of 15 feet per second squared (ft/s^2) t seconds. Which of the following inequalities best describes the situation?

1 mile = 5,280 feet and 1 hour = 3,600 seconds

   A) $60 - 15t > 50$

   B) $88 - 15t \leq 73.\overline{3}$

   C) $88 + 15t \leq 73.\overline{3}$

   D) $88 + 15t > 73.\overline{3}$

7. Mikal has a summer project in which he must complete at least 35 hours of community service at a city park. Each day that he goes to the park, he volunteers for 7 hours. It takes him 1.5 hours to walk to the park each way, which also counts toward his community service hours. Which of the following inequalities can be used to find the number of days, d, Mikal must volunteer at the park to complete his summer project?

   A) $7d > 35$

   B) $7d \geq 35$

   C) $7d + 3 > 35$

   D) $10d \geq 35$

8. There are currently about 2.4 million square miles of tropical rainforest, but most experts agree that about 125 square miles of tropical rainforest are being lost per day. If this rate of depletion continues, which of the following inequalities best describes the number of years from now, y, when the rainforest will be depleted to 2 million square miles or less? Assume 1 year = 365 days.

   A) $2{,}400{,}000 - 45{,}625y \leq 2{,}000{,}000$

   B) $2{,}400{,}000 + 45{,}625y \leq 2{,}000{,}000$

   C) $2{,}400{,}000 - 125y > 2{,}000{,}000$

   D) $2{,}400{,}000 + 45{,}625y > 2{,}000{,}000$

Free Response

9. Morgan opens a savings account that earns simple interest at the rate of 4.5% annually. If she initially deposits $50 in the account, what is the minimum number of years it will take for her savings to be at least $68, assuming she makes no other deposits or withdrawals?

10. Laila is buying her friend roses for his birthday. She has $25 to spend, and wants to save at least $1.50 for a card. If roses are $2.00 each, what is the maximum number of roses Laila can purchase and still have enough money left to buy a card?