



Medical Math

Practice Test

Personal Belongings: Under Your Chair	Test #	Competitor ID #
	Division: <input type="checkbox"/> Secondary <input type="checkbox"/> Postsecondary/Collegiate	
	GENERAL DIRECTIONS	
	Check your Test Booklet and Scantron <ul style="list-style-type: none">✓ Do you have the right test?✓ Is the pre-printed information on the Scantron correct?✓ Write your competitor ID on the test booklet and tiebreaker page (if applicable) and mark the division in the boxes above. Write On your Scantron: <ul style="list-style-type: none">✓ Write your test number on the Scantron in the appropriate area. Stray marks in the margin or edges may make your Scantron unreadable for the computer.✓ On your evaluation form, please mark the event code for this event. Testing Tips: <ul style="list-style-type: none">✓ You MAY write on back of pages and margins of test as scratch paper.✓ Use a #2 pencil, fill in the bubble on Scantron completely that corresponds with your chosen answer. If you skip a question, be sure to skip the corresponding number on the Scantron.✓ If the table has a tablecloth, place your Scantron on top of the test booklet before bubbling.✓ Mechanical pencils are discouraged for use on the Scantron. About Your Test: <ul style="list-style-type: none">✓ This is a 50-item test. Read each question carefully as there is only one best answer and answer every question. There is no penalty for guessing, so answer all questions.✓ There are 10 tiebreaker questions. Please print clearly. Do not remove the tiebreaker page from the test booklet.✓ When you are finished, please follow the directions given to you by your event personnel for returning your test materials and completing the event evaluation.	

Cell Phone / Smart Devices / Watches: OFF position and on the table in front of you. DO NOT TOUCH during testing.

Noise:
Do not chew gum or make unnecessary noise during testing.

HELP:
If you have personal needs once the test has begun, please raise your hand. If you must use the restroom, there is no extra time given for the completion of the test. You may remove your

blazer/jacket if needed.	✓ There will be a verbal announcement when there are 15 minutes remaining. You have 90 minutes to complete this test.
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Medical Math

CONFIDENTIALITY STATEMENT: This test is the property of HOSA-Future Health Professionals. Possession of this test by advisors or student members for any reason is prohibited.

1. A physician orders 'heparin anticoagulant 2,000 units subcutaneous q12h'. The vial label reads 10,000 U per mL. How many total mL per day will the patient receive?
2. Calculate the following: $(5^2)(36 \div 4) \times \frac{1}{3} = \underline{\hspace{2cm}}$.
3. A pediatrician recommends that an infant receive 6 oz of a $\frac{2}{3}$ strength Similac solution. Available are six 32-oz cartons per case. How many feedings will one case provide?
4. Death rates from synthetic opioids rose 72.2% from 2014 to 2015. A total of 33,091 Americans died from opioid overdose in 2015. What was the difference in the 2014 opioid death rate per day versus 2015? (year = 365 days)
5. A specimen in the laboratory weighs 13 ounces. How many grams does the specimen weigh?
6. In preparation for a high school football season, ankle tape needs to be purchased in bulk for the entire season. One 24-roll case of $1\frac{1}{2}$ " tape costs \$77.95. Each roll is 1600 cm long, and it will take approximately one roll of tape to tape an athlete's ankles. During the 13-week season, an athlete will be taped 78 times. How many m of tape are allotted for each ankle for the season?
7. How many mg are in 0.0049 kg?
8. A physician orders Augmentin 400 mg po q8h. Augmentin is supplied in oral suspension of 200 mg/5 mL. How many total mL will the patient receive daily?
9. The high temperature yesterday was 95 °F and the low temperature was 68 °F. What is the difference in the average high and low temperature in Celsius?

10. The physician orders 1,200,000 U of penicillin G potassium (Lanacillin) IM. The vial is labeled 10 mL = 6,000,000 U. How many mL are to be administered?
11. A school's air conditioning unit was struck by lightning and the temperature of a western-facing classroom elevated to 42 °C. What is the classroom's elevated temperature in Fahrenheit?
12. A laboratory technician measures 200 mL of a solution in a 16 oz beaker. Approximately how many more oz of solution are necessary to fill the beaker? (Round to the nearest tenth.)
13. A patient is instructed to take 10 mL of a medication q6h. How many tsp of medication will be taken in 48 hours?
14. The stomach produces about 8 cups of gastric acid each day. Approximately how many L are produced weekly?
15. An ophthalmologist instructed a patient to stand 22 ft away from the Snellen eye chart. How far away in meters was the patient told to stand? (Round to the nearest tenth.)
16. In one year, an adolescent patient grew from a height of 5'5" to a height of 6'1". How many cm did the patient grow during the year?
17. A patient is to receive 20 mg of Accolade bid for the treatment of chronic asthma. How many grams will be administered during the three-days after hospitalization? (Answer to the nearest hundredth.)
18. An ophthalmologist orders Zymar Ophthalmic Solution OU to be administered for one week according to the following schedule: Day 1 and 2 administer 1 gtt/eye q2 hrs up to 8 times per day; Days 3-7 administer 1 gtt/eye qid. How many total mL will be administered?
19. A physician orders 1000 mg of a medication to be taken after meals (3meals/day). The medication is available in envelopes containing 0.5 g. How many envelopes are needed for a 30-day supply?
20. Patients with mitral valve prolapse must be pre-medicated with 2 g of Amoxicillin prior to all dental treatments. Amoxicillin comes in 500 mg tablets. How many tablets should the patient take prior to a dental treatment?

21. The physician orders dexamethasone (Decadron) po using the following dosage schedule: 4 tablets in two divided doses for two days, 2 tablets in two divided doses for five days, and 1 tablet in two divided doses for three days. The bottle is labeled 0.75 mg/tablet. How many total mg of this anti-inflammatory drug will be administered during the ten days?
22. The physician orders Keflex 500 mg po q6h. The bottle is labeled 125 mg/5 mL. How many mL of the antibiotic should be administered per dose?
23. A vial of dacarbazine, an antineoplastic drug, is labeled 100 mg = 1 mL. The order is for 2 mg/kg IV qd for ten days. How many total mL of the drug should be available for a patient weighting 105 lbs?
24. A physician ordered 750 mg Ampicillin liquid oral preparation. Available is Ampicillin liquid 125 mg per 5 mL. How many tsp will the patient receive?
25. A patient is to receive 0.25 g IM of the antibiotic cefazolin (Ancef) 250 mg q6h. The Ancef label reads 125 mg/1 mL. How many total mL will be administered each day?
26. A patient is receiving morphine sulfate via IV infusion. The solution concentration is 100 mg of morphine sulfate in 500 mL IV fluid. The infusion rate is 40 mL/hr. How many mg per hour is the patient getting?
27. A 12-year-old child may be given magnesium hydroxide for constipation po q4h up to 4 times in 24 hours. The recommended dose is 15-30 mL po qd or in divided doses. What is the maximum daily dose in tsp the child can be given?
28. The physician orders 1 mg/kg/day of prednisone orally in two divided doses for a child weighing 66 pounds. How many mg of prednisone should the patient receive per dose? (Round to the nearest tenth.)
29. An IV is infusing at 52 gtts/minute. How much IV solution will be delivered in two hours if the gtt factor is 25 gtts/mL?
30. A cleaning solution is to be diluted as follows: 1 tbsp to 64 oz of water. How much water should be added to a container that has 1 tsp of cleaning solution?

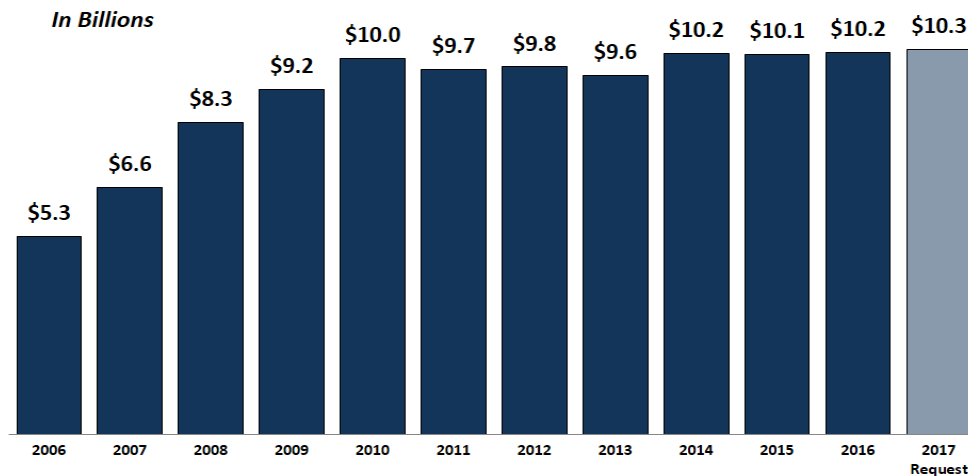
31. A physician ordered 1000 mL of D5W to be infused at 30 gtts/min using an administration set of 15 gtt/mL. Approximately how many hours will it take for the IV to be completed?
32. For a surgical patient, the anesthetist set the IV pump to deliver at 30 gtts/min using an administration set of 15 gtts/mL. How many mL of solution will be delivered in 25 minutes?
33. A child weighing 49 lbs is to receive Ritalin therapy. The recommended optimum daily dose is 2mg/kg po. For this child, how many mg can safely be given daily?
34. A patient is instructed to soak an infected cut on a finger in 3% hydrogen peroxide solution. Available is a 10% concentration of hydrogen peroxide. How many mL of the 10% solution should be diluted with water to result in $\frac{1}{2}$ cup of 3% hydrogen peroxide?
35. An agricultural holding pen needs to be disinfected using a Lysol solution. Available is a 12-oz bottle of 100% Lysol concentrate. How many liters of an 8% solution can be made with the bottle of Lysol? (Answer to nearest tenth.)
36. How many mL of a 96% potassium acetate solution contains 78.5 g of potassium acetate?
37. How many mL of a 11.5% stock solution of ammonium chloride is needed to prepare 0.5 L of a 5% solution?
38. A solution with a concentration of 45% is diluted 1/10 and then again by 1/10. What is the final concentration? (Round to the nearest tenth.)
39. For nuclear accidents, the emergency dose of potassium iodide is 130 mg, which provides 100 mg iodide and 30 mg potassium. The recommended dietary allowance for iodine (as iodide) is 150 mcg/day. How many times larger is the emergency dose of iodine over the daily nutritional need?
40. A physician orders 1 g Penicillin q4h IV piggyback for a patient with a respiratory infection. Available is 1 g per vial. The vial is to be reconstituted with 3.4 mL sterile water and further diluted in 100 mL 0.9% NS. How many total mL are administered in 24 hours?
41. How many grams of NaCl are in 23 deciliters of a 12% NaCl (w/v) solution?
42. A 6% KCl solution is to be diluted to make 250 mL of a 2% KCl solution. How many

mL of the 6% KCl solution are needed?

43. What is the BSA in m^2 of a child who weighs 55 lb and is 34" tall?
(Round to the nearest hundredth.)
44. According to the data in Figure 2 , what is the percentage increase in the annual US Global Health Funding from 2006 through 2013?

Figure 2

U.S. Global Health Funding, FY 2006-FY 2017 Request



Ten patients with Stage 2 hypertension (systolic pressure above 160) were enrolled in a clinical research study to examine the safety and effectiveness of an investigational drug for the treatment of severe hypertension. Use the data set to answer the following questions (#45 - #47). data set = [210 168 186 162 166 176 206 202 198 168]

45. What is the mean for the number of patients admitted to the research study?
46. What is the median for the numbers of patients admitted to the research study?
47. What is the mode for the number of patients admitted to the research study?

Non-Communicable Diseases (NCDs), caused primarily by genetic or behavioral factors, are the leading causes of death and disability globally, killing more than three in five people worldwide and responsible for nearly half of the global burden of disease. Use the following chart to answer questions (#48 and #49) for the Global NCD Indicators.

Global Non-Communicable Disease Indicators						
WHO Region	Mortality Rates by Cause: NCDs Age-Standardized, Deaths per 100,000 Population, 2012	Prevalence of Smoking Any Tobacco Product Adults Aged Above 15 Years, %, 2012		Alcohol Consumption Adults Aged Above 15 Years, Liters of Pure Alcohol per Person/Year, 2015	Obesity Rate Adults Aged Above 18 Years, %, 2014	
		Male	Female		Male	Female
Global	539	36.1	6.8	6.3	10.7	15.2
Africa	652	24.2	2.4	6.3	5.5	15.2
Americas	437	22.8	13.3	8.1	24	29.6
South-East Asia	656	32.1	2.6	3.7	3.2	6.8
Europe	496	39	19.3	10.2	21.5	24.5
Eastern Mediterranean	654	36.2	2.9	0.7	14.6	23.6
Western Pacific	499	48.5	3.4	7.6	5.9	7.9

48. The WHO Global Action Plan for the Prevention and Control of NCDs includes the “25 by 25” goal for reducing deaths from NCDs by 25% by 2025. If the goal is reached, what will the Global Mortality Rate per 100,000 be in 2025?
49. What is the difference per 100,000 between the 2025 Global Mortality Rate goal versus the 2025 Mortality Rate goal for Africa?
50. What is the standard deviation for the following data set of blood lead levels (mcg/dL)

from a study of 8 children whose parents worked around lead?
Data set = [23 18 37 22 38 41 35 29] (Round to the nearest tenth.)



Medical Math Tiebreaker Questions 2019

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Directions: Read the question carefully and calculate the answer in the blank provided. Writing must be clear and labeled correctly.

1. A physician orders amikacin for a patient with a serious gram-negative infection. The patient weighs 185 lbs. The initial dose is 10 mg/kg/day to be followed with 7.5 mg/kg q12h for 9 days. How many total g will the patient receive during the ten days of treatment? (Round to the nearest tenth.)
2. In the emergency room, a patient with supraventricular tachycardia is to receive Esmolol 500 mcg/kg STAT and 50 mcg/kg/min infused over the next four minutes. The patient weighs 265 lbs. How many total mg will the patient receive?
3. For a two-year-old child with a superficial left ear infection, the pediatrician has prescribed a 2% acetic acid otic solution 3 drops qid to the affected ear. The bottle contains 15 mL of solution. How many mL of pure acetic acid will the child receive over the ten days? (Round to the nearest hundredth.)
4. A child is 30" tall and weighs 27 lbs. What is the child's BSA in square meters?

(Round to the nearest tenth.)

5. A child weighs 70 lbs and is 45" tall. The physician orders albuterol for the child based on the BSA. The BSA is 1.2 m^2 . A normal adult BSA is 1.7 m^2 and the adult dose of albuterol is 4.3 mg. The albuterol syrup available is 2 mg/5 mL. Based on the child's dose, how many tsp of albuterol would be administered to the child? (Answer to the nearest tenth.)

For a patient with Crohn's disease, a physician orders Remicade 7 mg/kg IV infusion at weekly intervals. The patient weighs 123 pounds. Remicade is available in 250 mL IV bags to be administered over a 2-hour period. The drop factor is 10 gtts/mL. (Use this information to answer the following questions (#6 and #7).)

6. How many mg Remicade will be delivered each hour?
7. How many drops per minute is required to infuse the IV?
8. The following data set reflects 10 student math test scores for the SAT. Determine the percentile rank for the score of 680.
Data set = [720 800 610 620 590 710 680 540 760 600].
9. A drug manufacturer has been fined \$100 million by the Federal Trade Commission (FTC) for increasing the price of a life-saving drug, which is used to treat seizures in young children, by 85,000%. The price increased from \$40/vial a decade ago to the current price of \$34,000/vial. The drug is packaged and sold only by the case at 12 vials per case. How many total cases must be sold to cover the cost of the FTC fine?
10. What is the standard deviation for the following four urine specific gravity test results? [1.020 1.028 1.010 1.043] (Round the nearest hundredth.)

