

# **SkillsUSA**

## **2015 Contest Projects**

### **Medical Math**

Click the “Print this Section” button above to automatically print the specifications for this contest. Make sure your printer is turned on before pressing the button.



Medical Math

National Competition

June 2015

Mark your answers on the Answer Sheets

Label all answers

Put your contestant number on the Answer Sheets

Use appropriate medical rounding rules

1) A doctor's order is to infuse dopamine at 3 mcg/kg/min. You are able to locate a premixed IV bag containing 800 mg dopamine in 250 mL normal saline. The patient weighs 154 pounds. What is the rate(mL/hr) at which you should set the IV pump?

2) A doctor orders cefaclor (Ceclor) for the patient in room 12. Pediatric dosage is 20 mg/kg to be given over 24 hours in two equal doses. The patient weighs 62 lbs. How much will each dose be?

75 mL (When Mixed) M-5058

**CECLOR®**  
**CEFACTOR® FOR**  
**ORAL SUSPENSION**  
**USP**

**250 mg**  
**per 5 mL**

CAUTION—Federal (USA) law prohibits dispensing without prescription.

**9**  
**0002-5058-18**  
**3**

**TTND**

**25 mL CECLOR® CEFACTOR® FOR ORAL SUSPENSION, USP**  
**250 mg per 5 mL.** Contains both preservatives active against staining. Store in a refrigerator. May be kept for 14 days without significant loss of potency. Keep tightly closed. Discard unused portion after 14 days. SHAKE WELL BEFORE USING.

**Control No.**

**USUAL DOSE:** Pediatric patients, 20 mg per kg a day (40 mg per kg in adults) in two divided doses. Adults, 250 mg twice a day. See package insert for complete information.

**Contents:** Ceclor® (Cefaclor) suspension equivalent to 3.75 g acetylsalicylic acid.

**Directions for Mixing:** Add 45 mL of water in two portions to the dry mixture in the bottle. Shake well after each addition.

**Each 5 mL (teaspoon) also contains:** 250 mg of active ingredient, Cefaclor Monohydrate equivalent to 250 mg anhydrous Cefaclor.

**WV 6475 AMX**

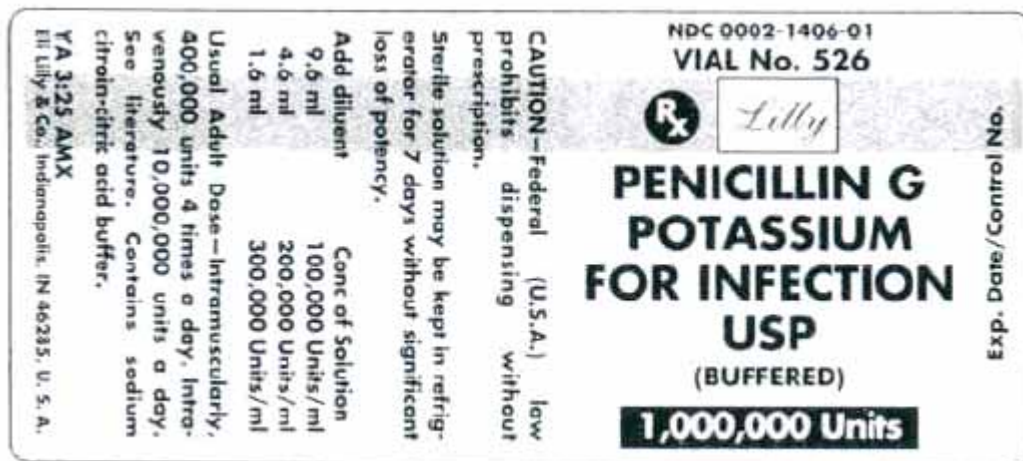
**Eli Lilly and Company**  
Indianapolis, IN 46205, USA

**Expiration Date**

3) Rx: Albuterol oral solution, 3 mg po tid. Disp: 14-day supply. If the pharmacy dispenses albuterol 2-mg/5-ml solution, how much is needed to fill the prescription?

- a. 7.5 ml                      b. 42 ml                      c. 126 ml                      d. 315 ml

4) A nurse adds 1.6ml of diluent to this vial of powdered penicillin G. How many mL will you give the patient to provide a dose of 200,000 U?



5) Rx: Zovirax 400-mg tabs, i po, 5 X daily. Dispense: 100 tabs. What is the days' supply for the prescription?

- a. 10                      b. 20                      c. 30                      d. 50

6) There is a doctor's order for 0.125 mg of Lanoxin. You find it in elixir form as 0.05 mg/ml. How many milliliters will be given?

7) The instructions on a nafcillin vial say to add 3.4 ml of sterile water to the 1g vial resulting in 4.1 ml of solution. How many milliliters would provide a 675 mg dose?

8) Listed below are the ratios of solute to solvent. Which ratio represents a solution which is 40% solute?

- a. 2:3              b. 1:2              c. 4:5              d. 3:8              e. 2:5

9) A doctor orders 1 liter D5W with 0.45%NS in 12 hours. How fast should you run the IV in gtts/min. if you are using 15 gtt/ml tubing?

10) Digoxin 0.25-mg tabs cost \$10.23/100 tabs and the pharmacy applies a 32% markup on cost plus a \$4.50 dispensing fee. What will the patient be charged for 90 tabs?

- a. \$16.65              b. \$13.71              c. \$12.15              d. \$9.21

11) A patient's temperature has spiked from 99.5 °F to 102.5°F in the last 12 hours. How many degrees Celsius per hour did their temperature increase?

12) There is 250 ml remaining in a bag that contained 30g of dextrose in 750 ml of solution. What is the percentage of concentration of the solution?

13) Order: NS 1 L with 35,000 units of heparin infusing @ 30 ml/hr. Calculate the hourly dosage of heparin.

- a. 350 units/hr      b. 700 units/hr      c. 1,400 units/hr      d. 3500 units/hr

14) A doctor's order is for: nitroglycerin 125 mg IV in 500 ml D5W to infuse at 42 mcg/min. Calculate the flow rate in ml/hr to program the infusion pump.

15) Beginning at 0600 and ending at 1800, 800 ml of urine was collected from a patient. The sample was analyzed and found to have a protein concentration of 40 mg/dl. Find the total amount of protein excreted by this patient in mg/day.

16) The order reads: D5W 1000 ml IV at 125 ml/h for 8 h. The drop factor is 10 gtt/ml, and the IV flow rate was correctly set. However, when you check the IV bag the fourth hour after starting the IV, you find 600 ml remaining (instead of the expected 500 ml). thus, the flow rate

is behind schedule, and the hospital allows a 25% IV flow variation with careful patient assessment and if the patient's condition is stable. The patient is stable, so you decide to compute a new flow rate for the remaining 600 ml to complete the IV fluid order in the remaining 4 hours. What is the percent of variation between the two flow rates?

17) Your order is for meperidine (Demerol) 35 mg, IM, STAT. Available is a 2-ml vial containing 50 mg/ml meperidine. On hand are 1ml and 3 ml syringes. How much should you draw up into which syringe?

- a. 2.8 ml in 3 ml syringe
- b. 2 ml in 3 ml syringe
- c. 1.4 ml in 3 ml syringe
- d. 0.7 ml in 3 ml syringe
- e. 0.7 ml in 1 ml syringe

18) You are asked to make 450g of a 3.5% cream. In stock is 7% and 2% cream. How much of each cream in stock should you mix to make the 3.5% cream?

19) Body surface area (BSA) is determined by using one of the following formulas:

$$BSA(m^2) = \sqrt{\frac{weight(kg) \times height(cm)}{3600}}$$

$$BSA(m^2) = \sqrt{\frac{weight(lbs) \times height(in)}{3131}}$$

What is the BSA of a person who is 6 feet 1 inch tall and weighs 207 pounds? Round answer to the nearest tenth.

20) Rx: Cimetidine 300-mg tab po qid- Disp: 3 month supply. How many cimetidine 300-mg tabs are needed to fill the prescription?

- a. 120            b. 180            c. 240            d. 360

21) A patient is receiving 40 mg of ranitidine (Zantac) in 20 ml of D5W every 6 hours. The IV set delivers 20 gtts/ml. Administer the med over 30 minutes. How many drops per minute should the nurse time the IV?

22) An IV was hung at 7:50 AM. It is a liter bag and is infusing at 75 ml/hr. When will this bag need replacement? Give answer in hours and minutes.

23) A health care practitioner has prescribed an Estraderm 0.025 mg/d patch twice weekly. Your patient applied her first patch at 8:00 PM on Monday morning. When should she apply the second patch?





29) Phenobarbital  $180 \text{ mg/m}^2/24 \text{ hours}$  given every eight hours is ordered for a child whose BSA (body surface area) is  $0.29 \text{ m}^2$ . How much will each dose be? (round to the nearest tenth)

30) The physician orders penicillin V 500,000 U po qid for your patient with a hysterectomy. Penicillin V pediatric suspension 4000,000 U per 5 ml is supplied. How many milliliters will you administer?

31) Rx: Heparin IV @ 1400 units/hr. The IV bag contains NS 1 L with 40,000 units of heparin. Calculate the rate in ml/hr.

- a. 29 ml/hr                      b. 30 ml/hr                      c. 35 ml/hr                      d. 40 ml/hr

32) Ordered V-Cillin K suspension 400,000 U po q6 h. V-Cillin K suspension is supplied 300,000 U per 5 ml. How many milliliters will the nurse administer?

33) Rx: Ceftazidime 3 gm x 9 doses. How many ceftazidime 10-gram vials will the technician need to reconstitute to prepare the 9 doses?

- a. 2                      b. 3                      c. 4                      d. 5

34) You are preparing an injection of morphine. The order reads 15 mg IM. The stock morphine is 48 mg/2 ml. How many ml will you draw up?

35) Doxycycline 100-mg caps cost \$23.40/100 capps and the pharmacy applies a 40% markup on cost. What will a patient be charged for 60 caps?

- a. \$5.62                      b. \$14.04                      c. \$19.66                      d. \$21.36

36) How many grams of a 5% sulfur ointment must be mixed with 180 grams of a 20% sulfur ointment to prepare an 8% sulfur ointment?

37) Rx: Heparin IV @ 2000 units/hr. The IV bag contains NS 1 L with 40,000 units of heparin. The IV set delivers 15 gtt/ml. Calculate the rate in gtt/min.

38) The prescription is for: Codeine sulfate gr 1 po q6h . What will you give the patient? (Do not give the answer in mg).



39) You need to compound sorbitol 2.5% 500 ml by mixing sorbitol 70% with sterile water. How much of each will you need?

- a) 321.4 ml of 70% sorbitol and 178.6 ml of sterile water
- b) 250 ml of 70% sorbitol and 175 ml of sterile water
- c) 325 ml of 70% sorbitol and 175 ml of sterile water
- d) 178.6 ml of 70% sorbitol and 321.4 ml of sterile water

40) Using the Birth to 36 Months Boys chart at the end of the exam, find the weight-for-age percentile for a 23-month old boy who weighs 32 pounds.

41) The pharmacist gives the technician 300 ml of a 22% solution. How many 1 oz bottles can be filled if the solution is diluted to make a 3% solution?

42) How many liters of a 5% iodine tincture can be made from 152g of iodine?

43) Two pounds of a viral ointment contains 10.78g of acyclovir. What is the percentage of acyclovir in the ointment?

44) A dosage schedule of a surfactant calls for 4 ml/kg of body weight for a 1200g newborn infant. How many milliliters of surfactant will you need to administer?

45) How many milligrams of active ingredient are there in 5 ml of a 1:250 drug?

46) Your patient with a lumbar laminectomy received heparin 7500 U SQ qid. You have heparin 5000 U per ml available. How many milliliters will you administer?

47) The physician orders heparin 6000 U SQ qd for your patient with a corneal transplant. How many milliliters will you administer?



48-50) Intake & Output. Document the findings on the I & O chart after the answer page, including the 12 hour totals and 24 hour total. The 12 hour totals are questions 48 and 49, with the 24 hour total being question 50. Use these container measurements:

Foam cup = 8 oz	Soup bowl = 180 ml	Gelatin = 120ml
Water carafe = 480 ml	Coffee mug = 6 oz	Juice = 120ml
Popsicle = 90 ml	Sherbet = 120ml	Soda = 8 oz

0700: Polly had abdominal surgery yesterday and has started a clear liquid diet today. She ate 1 Popsicle,  $\frac{1}{2}$  gelatin cup, and  $\frac{1}{2}$  of the strained juice. She also had 100ml in her urine bag that you emptied.

0800: Polly wasn't feeling well and vomited 100ml of emesis.

1000: Feeling better, she ate  $\frac{1}{2}$  of sherbet.

1100: The R.N. discontinued Polly's IV and he documented the 150ml that infused.

1200: For lunch Polly had  $\frac{1}{2}$  bowl of low-fat broth,  $\frac{1}{2}$  mug of coffee, and 100% serving of gelatin. The urine bag was drained of 300ml of urine and then the RN removed the catheter.

1300: The RM emptied Polly's abdominal Hemovac drain of 90ml of bloody drainage.

1400: Polly was assisted to the bathroom where she voided 150ml of clear, yellow urine.

1700: The diet has been increased to a full liquid diet. Polly is helped to the bathroom where she voids 200ml and returns to sit in the chair. Polly has  $\frac{1}{2}$  can of ginger ale, 1 bowl of soup, and  $\frac{3}{4}$  of her sherbet.

1800: The RM gives her 15ml of liquid medicine and  $\frac{1}{2}$  cup of water.

1900: Polly has a small emesis of 50ml after taking a walk and becoming dizzy.

2100: Polly voids 260ml of clear, yellow urine.

2200: At the end of the shift it is noted that  $\frac{1}{3}$  of the water carafe has been consumed by the patient. The RN empties the abdominal drain of 20ml of bloody drainage.

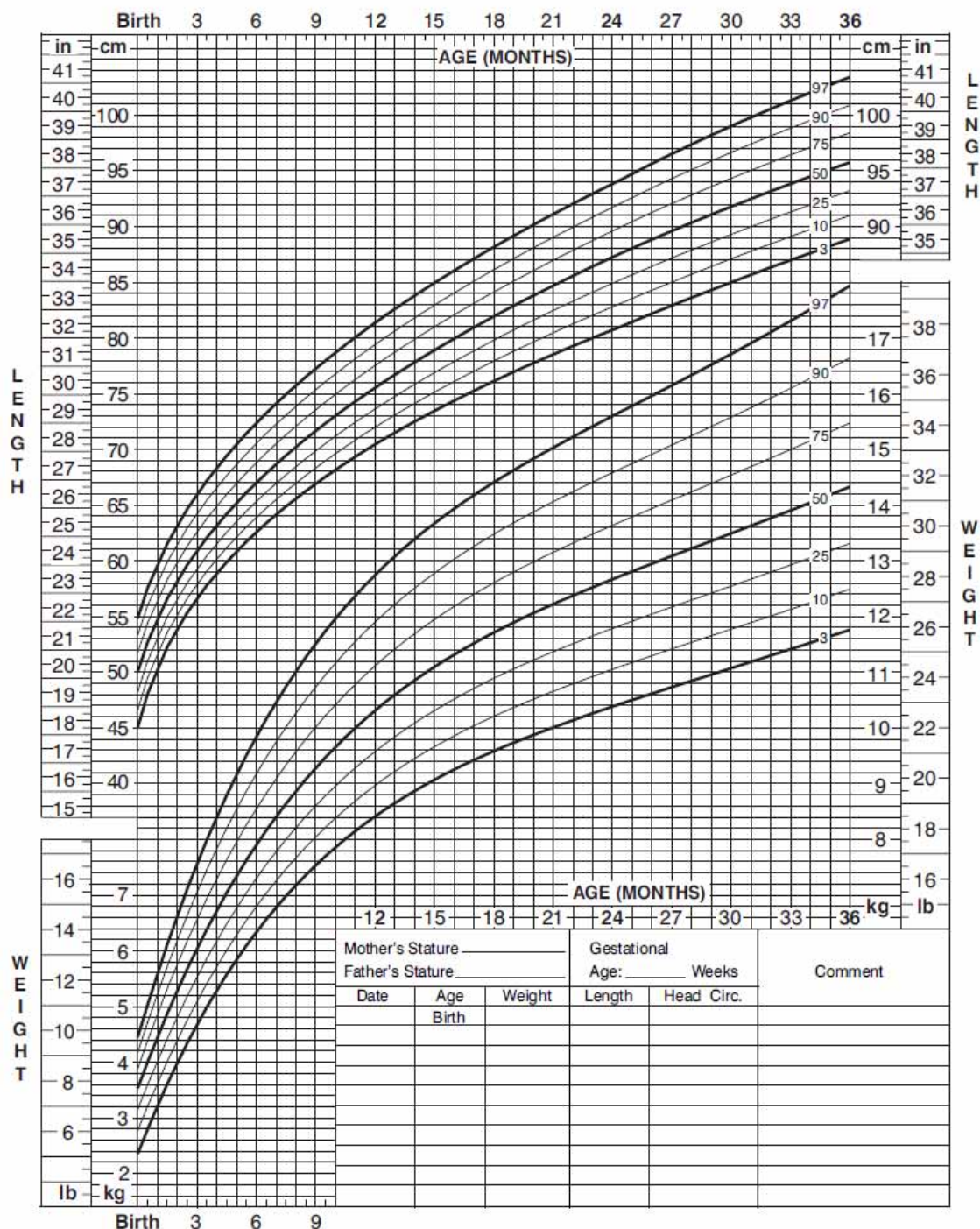
0200: Polly turns on the call light and asks to use the bathroom. She voids 200ml and returns to bed. She is thirsty and drinks  $\frac{1}{3}$  can of lemon-lime soda.

0600: Polly's drain has minimal drainage. She voids 100ml. She drinks  $\frac{1}{2}$  mug of tea while waiting for the breakfast tray to arrive.

**Birth to 36 months: Boys**  
**Length-for-age and Weight-for-age percentiles**

NAME \_\_\_\_\_

RECORD # \_\_\_\_\_





Date\_\_\_\_\_

Contestant Number\_\_\_\_\_

**Answer Sheet for 2015 Skills USA Medical Math Test**

1.	26.
2.	27.
3.	28.
4.	29.
5.	30.
6.	31.
7.	32.
8.	33.
9.	34.
10.	35.
11.	36.
12.	37.
13.	38.
14.	39.
15.	40.
16.	41.
17.	42.
18.	43.
19.	44.
20.	45.
21.	46.
22.	47.
23.	48.
24.	49.
25.	50.

Date: \_\_\_\_\_

COUNTY COMMUNITY HOSPITAL  
MEDICAL/SURGICAL FLOW SHEET

PT: \_\_\_\_\_  
DOB \_\_\_\_\_

room: \_\_\_\_\_

Diagnosis/Surgery: \_\_\_\_\_

Weight: \_\_\_\_\_

INTAKE							OUTPUT				VITAL SIGNS				
HOUR	PO DIET	TUBE FEEDING	IV	IV	IV	BLOOD PRODUCTS	URINE	BOWEL	DRAIN or TUBE	DRAIN or TUBE	BLOOD PRESSURE	PULSES	RESPIRA- TIONS	TEMP.	Sat O2
7															
8															
9															
10															
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24															
1															
2															
3															
4															
5															
6															
12 hr total															
24 hr total															

MEDICAL RECORD

MED/SURG FLOW SHEET