Practice Math Problems for Family 1

Key

1. The physician has prescribed tobramycin (Nebcin) injection 7.5 mg per kg of body weight per day to be administered in divided doses every 8 hour, IM, for a 9 month old, who is 19 pounds. The manufacturer's recommended daily pediatric dose is 7.5 mg/kg/day in divided doses every 6 to 8 hours. Available on hand is tobramycin (Nebcin) injectable 80 mg/2 mL.
   The nurse should give 0.5 mL/dose.

$$x\ mL/dose = \frac{2\ mL}{80\ mg} \times \frac{7.5\ mg}{1\ kg} \times \frac{1\ kg}{2.2\ lb} \times \frac{19\ lb}{1\ day} \times \frac{1\ day}{3\ doses} =$$

$$\frac{2 \times 7.5 \times 19}{80 \times 2.2 \times 3} = \frac{285}{528} = 0.54\ mL/dose = 0.5\ mL/dose$$

2. The physician orders a maintenance dose of 0.075 mg of digoxin elixir every 12 hours by mouth for a 33 pound, 18 month old. In checking the manufacturer's recommended dosage, the nurse finds that the maintenance dose for children under 2 years of age is 0.01 to 0.02 mg per kg of body weight daily in divided doses every 12 hours. Available on hand is Digoxin Elixir 50 mcg/mL.

   Safe Range 0.15 – 0.3 mg/day

   Is the dose the physician ordered safe? (Yes) or No?

Low
$$x\ mg/day = \frac{0.01\ mg}{1\ kg} \times \frac{1\ kg}{2.2\ lb} \times \frac{33\ lb}{1\ day} = \frac{0.33}{2.2} = 0.15\ mg/day$$

High
$$x\ mg/day = \frac{0.02\ mg}{1\ kg} \times \frac{1\ kg}{2.2\ lb} \times \frac{33\ lb}{1\ day} = \frac{0.66}{2.2} = 0.3\ mg/day$$

Ordered dose
$$x\ mg/day = \frac{0.075\ mg}{1\ dose} \times \frac{2\ doses}{1\ day} = 0.15\ mg/day$$

   If it is safe, the nurse should give 1.5 mL/dose.

$$x\ mL/dose = \frac{1\ mL}{50\ mcg} \times \frac{1000\ mcg}{1\ mg} \times \frac{0.075\ mg}{1\ dose} = \frac{75}{50} = 1.5\ mL/dose$$

   How many mg should the patient receive in a 24 hour time?

$$x\ mg/day = \frac{0.075\ mg}{1\ dose} \times \frac{2\ doses}{1\ day} = 0.15\ mg/day$$

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3. The physician orders prednisone 0.15 mg/kg/daily by mouth for a 14 year old patient who weighs 110 pounds. The nurse checks the drug book and finds that the manufacturer's recommended dose for prednisone is 0.1 to 0.15 mg/kg/day. On hand are tablets labeled 2.5 mg. The nurse, after determining the patient's weight to be 50 kg, should administer 3 tablets/dose.

$$X \frac{\text{tabs}}{\text{dose (day)}} = \frac{1\text{ tab}}{2.5\text{mg}} \times \frac{0.15\text{mg}}{1\text{kg}} \times \frac{1\text{kg}}{2.2\text{lb}} \times \frac{110\text{lb}}{1\text{day}} = \frac{16.5}{5.5} = 3\text{ tab/day}$$

$$X\text{ kg} = \frac{1\text{kg}}{2.2\text{lb}} \times \frac{110\text{lb}}{1\text{ (person)}} = \frac{110}{2.2} = 50\text{ kg}$$

4. The physician orders amoxicillin (Amoxil) oral suspension 20 mg/kg/day in three divided doses by mouth for a 4 year old who weighs 33 lbs. The nurse checks the drug book and finds that the manufacturer's recommended dose for amoxicillin is 20 to 40 mg/kg/day in three divided doses every 8 hours. On hand is a bottle of oral suspension labeled 125 mg per 5 mL. The nurse, after determining the child's weight to be 15 kg, should administer 4 mL every 8 hours.

$$X\text{mL/dose} = \frac{5\text{mL}}{125\text{mg}} \times \frac{20\text{mg}}{1\text{kg}} \times \frac{1\text{kg}}{2.2\text{lb}} \times \frac{33\text{lb}}{1\text{day}} \times \frac{1\text{day}}{3\text{doses}} =$$

$$\frac{5 \times 20 \times 33}{125 \times 2.2 \times 3} = \frac{3300}{825} = 4\text{ mL/dose}$$

$$X\text{ kg} = \frac{1\text{kg}}{2.2\text{lb}} \times \frac{33\text{lb}}{1\text{ (person)}} = \frac{33}{2.2} = 15\text{ kg}$$

Key

5. The anesthesiologist orders hydroxyzine hydrochloride (Vistaril) 0.5 mg/pound IM stat for a 10 year old who weighs 35 kg. The nurse checks the drug book and finds the manufacturer's recommended dose for Vistaril is 0.5 mg/lb/day. On hand is a multidose vial labeled 25 mg per mL. The nurse should administer 1.5 mL/dose.

$$x\ mL/dose = \frac{1\ mL}{25\ mg} \times \frac{0.5\ mg}{1\ lb} \times \frac{2.2\ lb}{1\ kg} \times \frac{35\ kg}{1\ day} \times \frac{1\ day}{1\ dose} =$$

$$\frac{0.5 \times 2.2 \times 35}{25} = \frac{38.5}{25} = 1.54 = 1.5\ mL/dose$$

6. The physician orders cefazolin sodium (Ancef) 80 mg/kg/day in 3 divided doses IM for a 9 month old who weighs 22 pounds. The nurse checks the drug book and finds that the manufacturer's recommended dose for Ancef is 75 to 100 mg/kg/day in three divided doses, maximum of 6 grams/day. On hand is a vial of powdered Ancef labeled 500 mg. To reconstitute the drug, the manufacturer recommends that the Ancef be diluted with 2 mL of sterile water for injection to yield a solution of 2.2 mL that contains 225 mg/1 mL. ☆

What is the therapeutic dosage that the patient should receive in 24 hours?

750 mg to 1000 mg

$$x\ mg\ low = \frac{75\ mg}{1\ kg} \times \frac{1\ kg}{2.2\ lb} \times \frac{22\ lb}{1\ day} = \frac{75 \times 22}{2.2} = \frac{1650}{2.2} = 750\ mg/day$$

$$x\ mg\ high = \frac{100\ mg}{1\ kg} \times \frac{1\ kg}{2.2\ lb} \times \frac{22\ lb}{1\ day} = \frac{100 \times 22}{2.2} = \frac{2200}{2.2} = 1000\ mg/day$$

The nurse should give 1.2 mL/dose.

$$x\ mL/dose = \frac{1\ mL}{225\ mg} \times \frac{80\ mg}{1\ kg} \times \frac{1\ kg}{2.2\ lb} \times \frac{22\ lb}{1\ day} \times \frac{1\ day}{3\ doses} =$$

$$\frac{80 \times 22}{225 \times 2.2 \times 3} = \frac{1760}{1485} = 1.18 = 1.2\ mL/dose$$

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7. A patient is to receive amoxicillin oral suspension (Amoxil) 0.25 grams by mouth.
   Available is a bottle labeled 125 mg per 5 mL.
   The nurse should administer 10 mL/dose

$$x\ mL/dose = \frac{5\ mL}{125\ mg} \times \frac{1000\ mg}{1\ gram} \times \frac{0.25\ gram}{1\ dose} =$$

$$\frac{5 \times 1000 \times 0.25}{125} = \frac{1250}{125} = 10\ mL/dose$$

8. The physician has prescribed amikacin sulfate (Amikin injectable) 275 mg IM every 12 hours for an 11 year old who weighs 83 pounds. The nurse, needing to check if this dose falls within the safe range, finds that the manufacturer's recommended dose is 7.5 mg per kg twice a day.
   On hand are single-dose vials labeled Amikin injectable 500 mg per 2 mL.
   The nurse evaluates that this:

   Is a safe dose and administers 1.1 mL Yes, it is safe

   Is an unsafe dose and questions the physician _____. The reason the dose is

   unsafe is because: _____

Rec. dose

$$x\ mg/day = \frac{7.5\ mg}{1\ kg} \times \frac{1\ kg}{2.2\ \#} \times \frac{83\ \#}{1\ dose} \times \frac{2\ doses}{1\ day} =$$

$$\frac{7.5 \times 83 \times 2}{2.2 \times 1} = \frac{1245}{2.2} = 565.9\ mg/day$$

Ordered Dose

$$x\ mg/day = \frac{275\ mg}{1\ dose} \times \frac{2\ doses}{1\ day} = \frac{275 \times 2}{1} = 550\ mg/day$$

Ordered dose is SAFE

$$x\ mL/dose = \frac{2\ mL}{500\ mg} \times \frac{275\ mg}{1\ dose} = \frac{2 \times 275}{500} = \frac{550}{500} = 1.1\ mL$$

(1.1 mL)

Key

9. The physician has prescribed clindamycin palmitrate hydrochloride oral solution (Cleocin Pediatric) 45 mg orally every 8 hours for a 1 ½ year old who weighs 28 pounds. The nurse, need to check if this dose falls within the safe range for Cleocin Pediatric, finds that the manufacturer's recommended dose is 8 to 12 mg per kg per day in three or four divided doses. On hand is a bottle of oral solution labeled Cleocin Pediatric 75 mg/5 mL. the nurse evaluates that this:

   Is a safe dose and administers 3 mL/dose Yes, dose is safe.

   Is an unsafe dose and questions the physician_____. The reason the dose is

   unsafe is because: _____

Safe Dose Low mg/day $= \frac{8\text{mg}}{1\text{kg}} \times \frac{1\text{kg}}{2.2\text{lb}} \times \frac{28\text{lb}}{1\text{day}} = \frac{8\times28}{2.2} = \frac{224}{2.2} = 101.8$

Safe Dose High mg/day $= \frac{12\text{mg}}{1\text{kg}} \times \frac{1\text{kg}}{2.2\text{lb}} \times \frac{28\text{lb}}{1\text{day}} = \frac{12\times28}{2.2} = \frac{336}{2.2} = 152.7$

Safe range = 101.8 mg to 152.7 mg per day

Ordered dose

$x\text{ mg/day} = \frac{45\text{mg}}{1\text{dose}} \times \frac{3\text{doses}}{1\text{day}} = \frac{45\times3}{1} = 135\text{mg/day}$

135 mg is within the safe range.

$x\text{ mL/dose} = \frac{5\text{mL}}{75\text{mg}} \times \frac{45\text{mg}}{1\text{dose}} = \frac{5\times45}{75} = \frac{225}{75} = 3\text{mL/dose}$