

# ANSWERS

## CHAPTER 18 Dimensional Analysis—Work Sheet, pp. 545–548

1. b.  $\frac{x \text{ mg}}{\text{day}} = \frac{25 \text{ mg}}{\text{kg/day}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{50 \text{ lb}}{1} = 568.18$  or 568.2 mg/day (minimum)  
 $\frac{x \text{ mg}}{\text{day}} = \frac{50 \text{ mg}}{\text{kg/day}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{50 \text{ lb}}{1} = 1136.36$  or 1136.4 mg/day (maximum)  
 c. Yes, the order is safe to administer.  
 d.  $x \text{ cap} = \frac{1 \text{ cap}}{250 \text{ mg}} \times \frac{250 \text{ mg}}{1} = 1$  capsule
2. b.  $\frac{x \text{ mg}}{\text{day}} = \frac{0.035 \text{ mg}}{\text{kg/day}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{6.5 \text{ lb}}{1} = 0.1$  mg/day (minimum)  
 $\frac{x \text{ mg}}{\text{day}} = \frac{0.06 \text{ mg}}{\text{kg/day}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{6.5 \text{ lb}}{1} = 0.18$  mg/day (maximum)  
 c. No, the order is not safe.  
 d. Question this order.
3. b.  $\frac{x \text{ mg}}{\text{dose}} = \frac{5 \text{ mg}}{\text{kg/day}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{50 \text{ lb}}{1} \times \frac{1 \text{ day}}{4 \text{ doses}} = 28.4$  mg/dose  
 c. The order is safe as 25 mg is below 28.4 mg.  
 d.  $x \text{ mL} = \frac{1 \text{ mL}}{12.5 \text{ mg}} \times \frac{25 \text{ mg}}{1} = 2$  mL
4. a.  $x \text{ kg} = \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{28 \text{ lb}}{1} = 12.7$  kg  
 First 10 kg:  $x \text{ mL} = \frac{100 \text{ mL}}{\text{kg}} \times \frac{10 \text{ kg}}{1} = 1000$  mL/day  
 Remaining 2.7 kg:  $x \text{ mL} = \frac{50 \text{ mL}}{\text{kg}} \times \frac{2.7 \text{ kg}}{1} = 135$  mL/day  
 b.  $1000 + 135 = 1135$  mL/day  
 $\frac{x \text{ mL}}{\text{h}} = \frac{1135 \text{ mL}}{24 \text{ h}} = 47.3$  or 47 mL/h
5. b.  $\frac{x \text{ mg}}{\text{dose}} = \frac{14 \text{ mg}}{\text{kg/day}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{22 \text{ lb}}{1} \times \frac{1 \text{ day}}{2 \text{ doses}} = 70$  mg/dose  
 Yes, 70 mg is ordered.  
 c.  $x \text{ mL} = \frac{5 \text{ mL}}{125 \text{ mg}} \times \frac{70 \text{ mg}}{1} = 2.8$  mL
6. b.  $\frac{x \text{ mg}}{\text{day}} = \frac{20 \text{ mg}}{\text{kg/day}} \times \frac{30.3 \text{ kg}}{1} = 606$  mg/day (minimum)  
 $\frac{x \text{ mg}}{\text{day}} = \frac{30 \text{ mg}}{\text{kg/day}} \times \frac{30.3 \text{ kg}}{1} = 909$  mg/day (maximum)  
 c.  $\frac{x \text{ mg}}{\text{dose}} = \frac{606 \text{ mg}}{\text{day}} \times \frac{1 \text{ day}}{2 \text{ doses}} = 303$  mg/dose (minimum)  
 $\frac{x \text{ mg}}{\text{dose}} = \frac{909 \text{ mg}}{\text{day}} \times \frac{1 \text{ day}}{2 \text{ doses}} = 454.5$  mg/dose (maximum)  
 d.  $x \text{ mL} = \frac{5 \text{ mL}}{250 \text{ mg}} \times \frac{300 \text{ mg}}{1} = 6$  mL
7. b.  $\frac{x \text{ mg}}{\text{day}} = \frac{0.5 \text{ mg}}{\text{kg/day}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{94 \text{ lb}}{1} = 21.36$  or 21.4 mg/day (minimum)  
 $\frac{x \text{ mg}}{\text{day}} = \frac{2 \text{ mg}}{\text{kg/day}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{94 \text{ lb}}{1} = 85.45$  or 85.5 mg/day (maximum)  
 c. No, 90 mg exceeds the maximum dose of 85.5 mg.  
 d. No, call the licensed prescriber who wrote the order.

8. b.  $\frac{x \text{ mg}}{\text{day}} = \frac{5 \text{ mg}}{\text{kg/day}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{40 \text{ lb}}{1} = 90.9 \text{ mg/day (minimum)}$   
 $\frac{x \text{ mg}}{\text{day}} = \frac{7 \text{ mg}}{\text{kg/day}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{40 \text{ lb}}{1} = 127.27 \text{ or } 127.3 \text{ mg/day (maximum)}$   
 c. Yes, 60 mg q 12 h = 120 mg/day.  
 d.  $x \text{ tab} = \frac{1 \text{ tab}}{30 \text{ mg}} \times \frac{60 \text{ mg}}{1} = 2 \text{ chewtabs}$
9. b.  $\frac{x \text{ mg}}{\text{kg/day}} = \frac{750 \text{ mg}}{\text{dose}} \times \frac{4 \text{ doses}}{1 \text{ day}} \times \frac{2.2 \text{ lb}}{1 \text{ kg}} \times \frac{1}{68 \text{ lb}} = 97.05 \text{ or } 97.1 \text{ mg/kg/day}$   
 c. No, it exceeds the recommended range of 40–60 mg/kg/24 h.
10. b.  $\frac{x \text{ mg}}{\text{dose}} = \frac{25 \text{ mg}}{\text{kg/day}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{42 \text{ lb}}{1} \times \frac{1 \text{ day}}{2 \text{ doses}} = 238.63 \text{ mg/dose (minimum)}$   
 $\frac{x \text{ mg}}{\text{dose}} = \frac{50 \text{ mg}}{\text{kg/day}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{42 \text{ lb}}{1} \times \frac{1 \text{ day}}{2 \text{ doses}} = 477.27 \text{ mg/dose (maximum)}$   
 c.  $x \text{ mL} = \frac{5 \text{ mL}}{125 \text{ mg}} \times \frac{300 \text{ mg}}{1} = 12 \text{ mL}$
11. b.  $\frac{x \text{ mg}}{\text{dose}} = \frac{10 \text{ mg}}{\text{kg/day}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{58 \text{ lb}}{1} \times \frac{1 \text{ day}}{3 \text{ doses}} = 87.88 \text{ mg/dose (minimum)}$   
 $\frac{x \text{ mg}}{\text{dose}} = \frac{20 \text{ mg}}{\text{kg/day}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{58 \text{ lb}}{1} \times \frac{1 \text{ day}}{3 \text{ doses}} = 175.76 \text{ mg/dose (maximum)}$   
 c. Yes, the order is safe.  
 d.  $x \text{ mL} = \frac{5 \text{ mL}}{100 \text{ mg}} \times \frac{150 \text{ mg}}{1} = 7.5 \text{ mL}$
12. a.  $x \text{ kg} = \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{72 \text{ lb}}{1} = 32.7 \text{ kg}$   
 b. First 20 kg:  $x \text{ mL} = \frac{1500 \text{ mL}}{\text{day}} = 1500 \text{ mL/day}$   
 Remaining 12.7 kg:  $x \text{ mL} = \frac{20 \text{ mL}}{\text{kg}} \times \frac{12.7 \text{ kg}}{1} = 254 \text{ mL/day}$   
 $1500 + 254 = 1754 \text{ mL/24 h}$   
 c.  $\frac{x \text{ mL}}{\text{h}} = \frac{1754 \text{ mL}}{24 \text{ h}} = 73.1 \text{ or } 73 \text{ mL/h}$
13. b.  $\frac{x \text{ mg}}{\text{dose}} = \frac{5 \text{ mg}}{\text{kg/dose}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{52 \text{ lb}}{1} = 118.18 \text{ or } 118.2 \text{ mg/dose (minimum)}$   
 $\frac{x \text{ mg}}{\text{dose}} = \frac{10 \text{ mg}}{\text{kg/dose}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{52 \text{ lb}}{1} = 236.36 \text{ or } 236.4 \text{ mg/dose (maximum)}$   
 c.  $x \text{ mL} = \frac{5 \text{ mL}}{100 \text{ mg}} \times \frac{100 \text{ mg}}{1} = 5 \text{ mL}$
14. b.  $\frac{x \text{ mg}}{\text{dose}} = \frac{25 \text{ mg}}{\text{kg/day}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{81 \text{ lb}}{1} \times \frac{1 \text{ day}}{4 \text{ doses}} = 230.11 \text{ or } 230.1 \text{ mg/dose (minimum)}$   
 $\frac{x \text{ mg}}{\text{dose}} = \frac{50 \text{ mg}}{\text{kg/day}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{81 \text{ lb}}{1} \times \frac{1 \text{ day}}{4 \text{ doses}} = 460.22 \text{ or } 460.2 \text{ mg/dose (maximum)}$   
 c. Yes, 350 mg/dose is safe to administer.  
 d.  $x \text{ mL} = \frac{5 \text{ mL}}{500 \text{ mg}} \times \frac{350 \text{ mg}}{1} = 3.5 \text{ mL}$

15. b.  $\frac{x \text{ mg}}{\text{dose}} = \frac{15 \text{ mg}}{\text{kg/day}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{16 \text{ lb}}{1} \times \frac{1 \text{ day}}{3 \text{ doses}} = 36.36$  or 36.4 mg/dose (minimum)  
 $\frac{x \text{ mg}}{\text{dose}} = \frac{20 \text{ mg}}{\text{kg/day}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{16 \text{ lb}}{1} \times \frac{1 \text{ day}}{3 \text{ doses}} = 48.48$  or 48.5 mg/dose (maximum)
- c. No, the order of 60 mg q 8 h exceeds the safe dose range.
- d.  $\frac{x \text{ mg}}{\text{kg/day}} = \frac{60 \text{ mg}}{\text{dose}} \times \frac{3 \text{ doses}}{\text{day}} \times \frac{2.2 \text{ lb}}{1 \text{ kg}} \times \frac{1}{16 \text{ lb}} = 24.75$  or 24.8 mg/kg/day
- e. This is not safe; do not administer. Call the licensed prescriber or pharmacist to check.
16. b.  $\frac{x \text{ mg}}{\text{day}} = \frac{0.5 \text{ mg}}{\text{kg/day}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{19 \text{ lb}}{1} = 4.31$  or 4.3 mg/day (minimum)  
 $\frac{x \text{ mg}}{\text{day}} = \frac{2 \text{ mg}}{\text{kg/day}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{19 \text{ lb}}{1} = 17.27$  or 17.3 mg/day (maximum)
- c. Yes, it is safe to administer.
- d.  $x \text{ mL} = \frac{5 \text{ mL}}{5 \text{ mg}} \times \frac{8 \text{ mg}}{1} = 8 \text{ mL}$
17. a.  $x \text{ mL} = \frac{1 \text{ mL}}{10 \text{ mg}} \times \frac{40 \text{ mg}}{1} = 4 \text{ mL}$
- b.  $x \text{ mL} = \frac{1 \text{ mL}}{2 \text{ mg}} \times \frac{40 \text{ mg}}{1} = 20 \text{ mL}$   
 $20 \text{ mL} - 4 \text{ mL} = 16 \text{ mL}$
- c.  $\frac{x \text{ gtt}}{\text{min}} = \frac{60 \text{ gtt}}{1 \text{ mL}} \times \frac{20 \text{ mL}}{20 \text{ min}} = 60 \text{ gtt/min}$

\_\_\_\_\_ 18. The child is ordered to receive 1250 mg/day.

X 19. The dose is safe, but may not be therapeutic.

\_\_\_\_\_ 20. The concentration of the cefazolin is 300 mg/mL.

X 21. The child's weight is 14.5 kg (rounded to the nearest tenth).

\_\_\_\_\_ 22. The safe and therapeutic dose for this child is 1350.54 or 1350.5 mg/day.

X 23. The nurse should administer 1.2 mL (rounded to the nearest tenth) of cefazolin with each dose.

**Rationale:**

$$18. \frac{x \text{ mg}}{\text{day}} = \frac{400 \text{ mg}}{\text{dose}} \times \frac{3 \text{ doses}}{\text{day}} = 1200 \text{ mg/day}$$

19. The dose is safe because 1200 mg/day is not above the safe and therapeutic daily dose of 1454.5 mg/day, but may not be therapeutic.

20. The label states the concentration of cefazolin is 330 mg/mL.

$$21. x \text{ kg} = \frac{1 \text{ kg}}{2.2 \text{ lbs}} \times \frac{32 \text{ lbs}}{1} = 14.54 \text{ rounded to } 14.5 \text{ kg}$$

$$22. \frac{x \text{ mL}}{\text{day}} = \frac{100 \text{ mg}}{\text{kg/day}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{32 \text{ lb}}{1} = 1454.54 \text{ or } 1454.5 \text{ mg/day}$$

$$23. x \text{ mL} = \frac{1 \text{ mL}}{330 \text{ mg}} \times \frac{400 \text{ mg}}{1} = 1.21 \text{ rounded to } 1.2 \text{ mL}$$

### CHAPTER 18 Dimensional Analysis—Posttest 1, pp. 549–552

$$1. \text{ b. } \frac{x \text{ mg}}{\text{dose}} = \frac{4 \text{ mg}}{\text{kg/day}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{55 \text{ lb}}{1} \times \frac{1 \text{ day}}{2 \text{ doses}} = 50 \text{ mg/dose (minimum)}$$

$$\frac{x \text{ mg}}{\text{dose}} = \frac{6 \text{ mg}}{\text{kg/day}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{55 \text{ lb}}{1} \times \frac{1 \text{ day}}{2 \text{ doses}} = 75 \text{ mg/dose (maximum)}$$

c. Yes, 60 mg is ordered, and it falls within the 50 to 75 mg/dose range.

$$d. x \text{ mL} = \frac{5 \text{ mL}}{20 \text{ mg}} \times \frac{60 \text{ mg}}{1} = 15 \text{ mL}$$

$$2. \text{ b. } \frac{x \text{ mg}}{\text{dose}} = \frac{25 \text{ mg}}{\text{kg/day}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{44 \text{ lb}}{1} \times \frac{1 \text{ day}}{4 \text{ doses}} = 125 \text{ mg/dose (minimum)}$$

$$\frac{x \text{ mg}}{\text{dose}} = \frac{50 \text{ mg}}{\text{kg/day}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{44 \text{ lb}}{1} \times \frac{1 \text{ day}}{4 \text{ doses}} = 250 \text{ mg/dose (maximum)}$$

c. No, 500 mg q 6 h exceeds the recommended dosage for weight.

d. Question this order.

$$3. \text{ b. } \frac{x \text{ mg}}{\text{kg/day}} = \frac{300 \text{ mg}}{\text{dose}} \times \frac{3 \text{ doses}}{1 \text{ day}} \times \frac{2.2 \text{ lb}}{1 \text{ kg}} \times \frac{1}{34 \text{ lb}} = 58.23 \text{ or } 58.2 \text{ mg/kg/day}$$

c. Dosage is safe and therapeutic; it falls in the recommended range.

$$x \text{ mL} = \frac{5 \text{ mL}}{125 \text{ mg}} \times \frac{300 \text{ mg}}{1} = 12 \text{ mL}$$

$$4. \text{ b. } \frac{x \text{ mg}}{\text{dose}} = \frac{0.1 \text{ mg}}{\text{kg/dose}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{78 \text{ lb}}{1} = 3.54 \text{ or } 3.5 \text{ mg/dose (minimum)}$$

$$\frac{x \text{ mg}}{\text{dose}} = \frac{0.2 \text{ mg}}{\text{kg/dose}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{78 \text{ lb}}{1} = 7.09 \text{ or } 7.1 \text{ mg/dose (maximum)}$$

c. Yes, 4 mg is between 3.54 and 7.09 mg.

$$d. x \text{ mL} = \frac{1 \text{ mL}}{15 \text{ mg}} \times \frac{4 \text{ mg}}{1} = 0.27 \text{ mL}$$

$$5. \text{ b. } \frac{x \text{ mg}}{\text{dose}} = \frac{10 \text{ mg}}{\text{kg/dose}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{62 \text{ lb}}{1} = 281.81 \text{ or } 281.8 \text{ mg/dose (minimum)}$$

$$\frac{x \text{ mg}}{\text{dose}} = \frac{15 \text{ mg}}{\text{kg/dose}} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{62 \text{ lb}}{1} = 422.72 \text{ or } 422.7 \text{ mg/dose (maximum)}$$