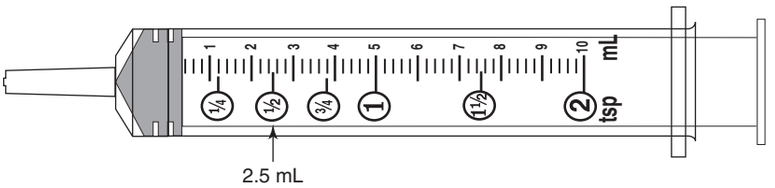
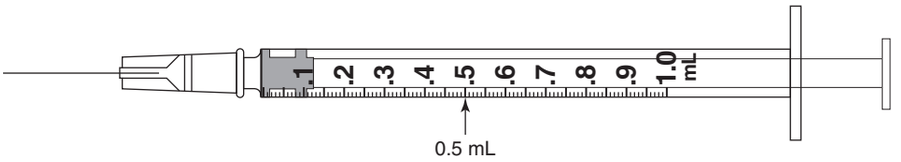
Essential Skills Evaluation: Pretest and Posttest from pages 4–20

1) $\frac{1}{2}$; 3 times a day **2)** 3; 2 times a day **3)** 10; 2; once a day **4)** $\frac{1}{2}$; every 3 hours as needed for moderate pain

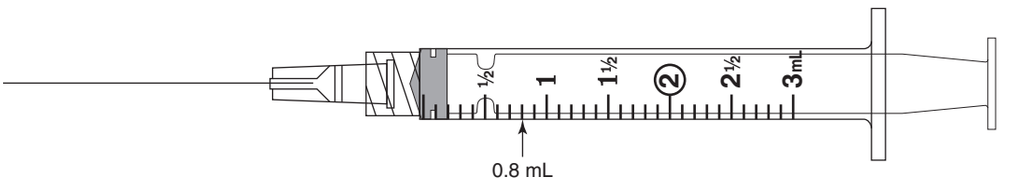
5) 2; once every morning **6)** 2.5; every 8 hours



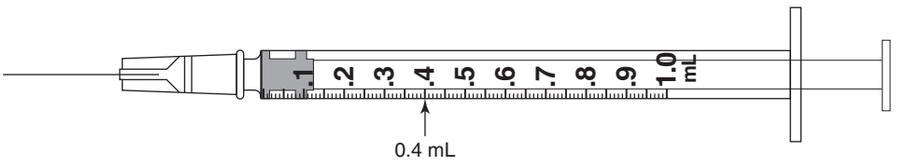
7) 0.5; every 4 hours as needed for nausea



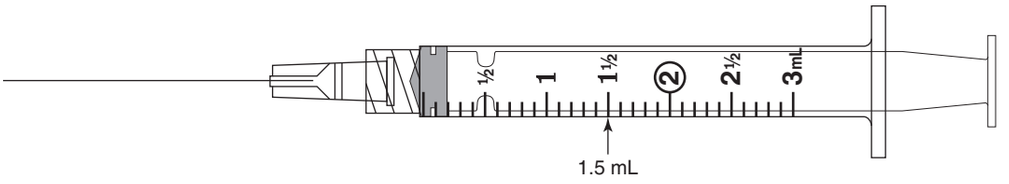
8) 0.8; once, immediately



9) 0.4; every 4 hours as needed for severe pain

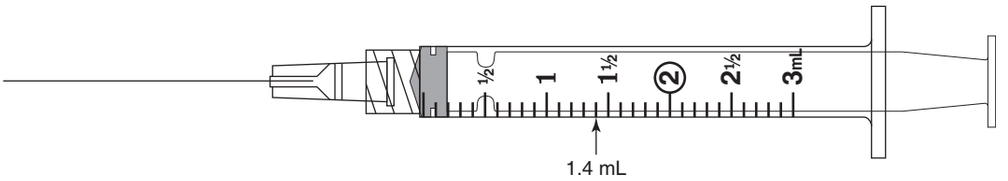


10) 1.5; once, immediately

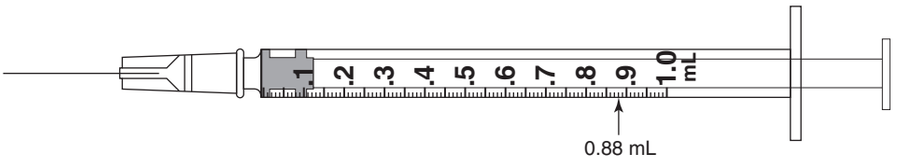


Essential Skills Evaluation — Pages 4–20

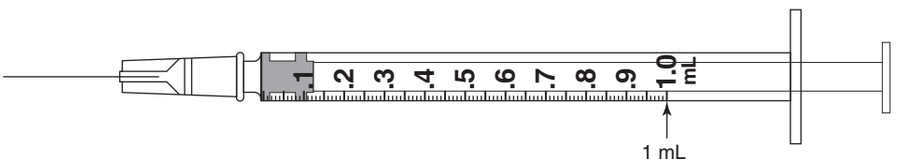
11) 1.4; every 8 hours

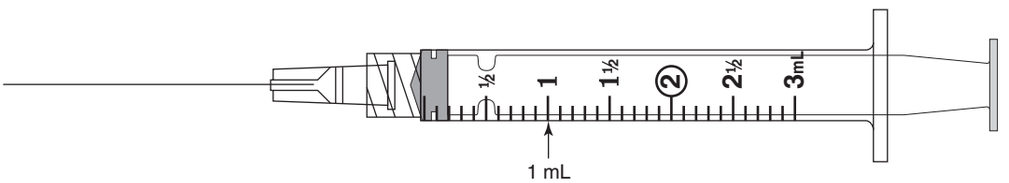


12) 0.88; once, immediately

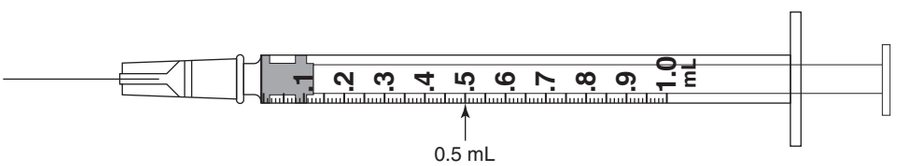


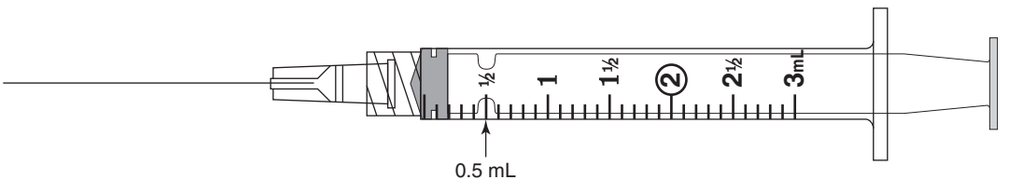
13) 1; once, immediately; either syringe is appropriate



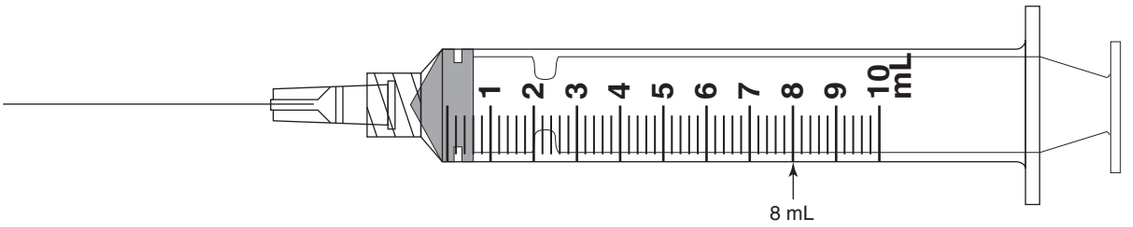


14) 0.5; once, every morning; either syringe is appropriate

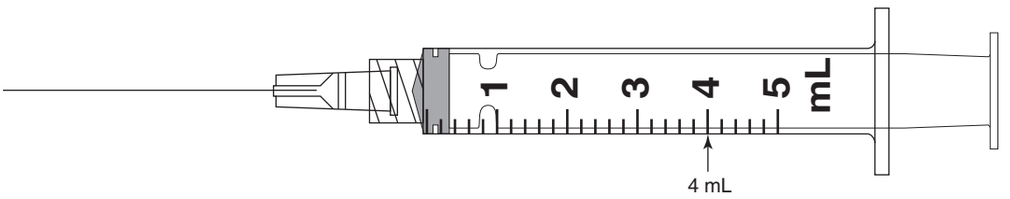




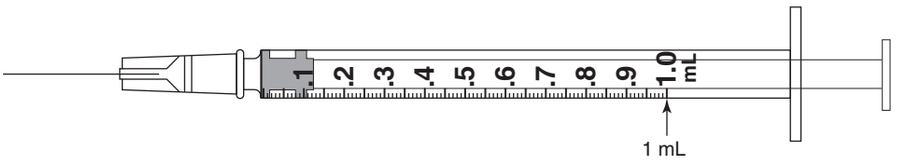
15) 8; every 12 hours



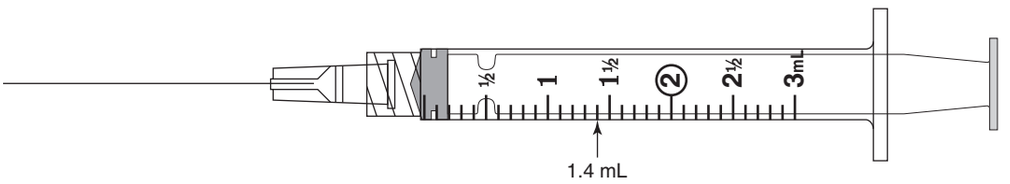
16) 4; every 12 hours



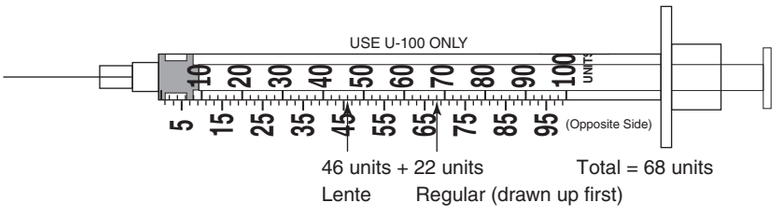
17) 1; 1; 0.25; every 8 hours



18) 1.4; 75; every 6 hours

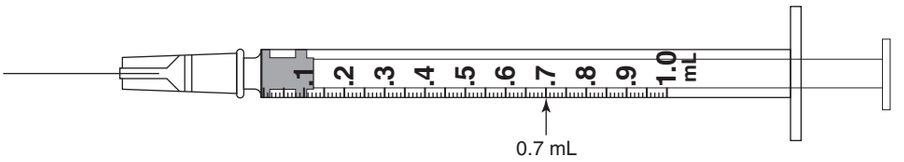


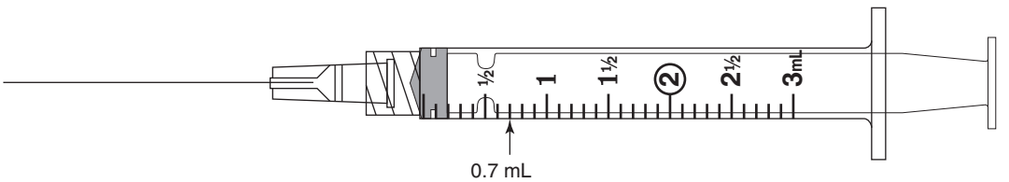
19) 68; once a day before breakfast



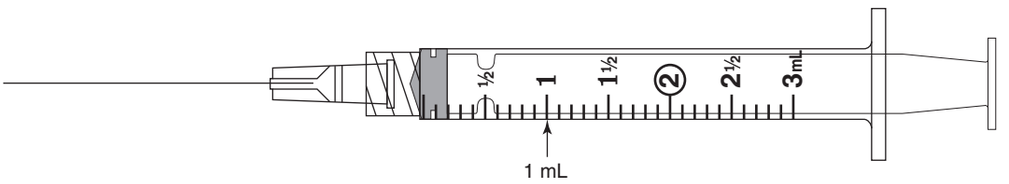
20) 1

21) Benadryl; 0.7; either syringe is appropriate



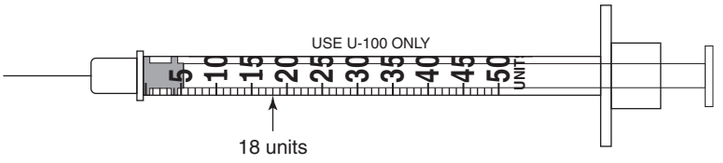


22) Narcan; 1



23) Yes. Her temperature is 102.2°F. Tylenol every 4 hours as needed is indicated for fever greater than 101°F. It has been 5 hours and 5 minutes since her last dose. **24)** 2 **25)** 18.8; 138 **26)** 138 **27)** 8; 2 **28)** 1; 0700; 1200; 1700

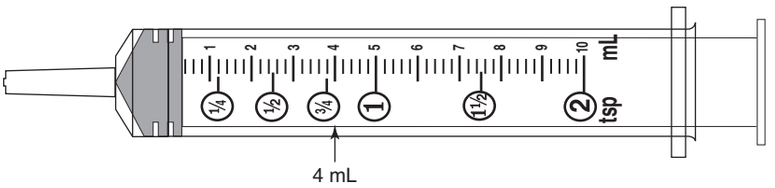
29) 18; subcutaneous



30) 113

31) Yes; the usual dosage is 20–40 mg/kg/day divided into 3 doses q.8h, which is equivalent to 67–133 mg per dose for a 22 lb (10 kg) child.

32) 4



33) Yes; the usual dosage is 40 mg/kg/day divided into 3 doses q.8h, which is equivalent to 240 mg per dose for a 40 lb (approx. 18 kg) child.

34) 3; dosage is safe **35)** 103.3 **36)** 282; 423 **37)** 9.4 **38)** 250–375; Yes **39)** 1.7; 26 **40)** 880 **41)** 25 **42)** 1 **43)** 5; 5 **44)** 50 **45)** 0030; 12:30 AM the next day **46)** 10 **47)** 100; 1 **48)** 5

49)

1/30/xx, 1500, reconstituted as 100 mg/mL. Expires 1/31/xx, 1500. G.D.P.

50) Prevention: The importance of checking a medication label at least three times to verify supply dosage cannot be overemphasized. It is also important NEVER to assume that the supply dosage is the same as a supply dosage used to calculate previously. Always read the label carefully. Writing the calculation down will also help improve accuracy.

Solutions—Essential Skills Evaluation: Pretest and Posttest

1) $\frac{D}{H} \times Q = \frac{\overset{1}{\cancel{40}\ \cancel{mg}}}{\underset{2}{\cancel{80}\ \cancel{mg}}} \times 1 \text{ tablet} = \frac{1}{2} \text{ tablet}$

2) $\frac{D}{H} \times Q = \frac{1.5\ \cancel{mg}}{0.5\ \cancel{mg}} \times 1 \text{ tablet} = 3 \text{ tablets}$

3) Use 10 mg capsules; 40 mg capsule cannot be split to provide the 20 mg dose.

$\frac{D}{H} \times Q = \frac{\overset{2}{\cancel{20}\ \cancel{mg}}}{\underset{1}{\cancel{10}\ \cancel{mg}}} \times 1 \text{ capsule} = 2 \text{ capsules}$

4) $\frac{D}{H} \times Q = \frac{2.5\ \cancel{mg}}{5\ \cancel{mg}} \times 1 \text{ tablet} = \frac{2.5}{5.0} \text{ tab} = \frac{1}{2} \text{ tablet}$

5) $\frac{D}{H} \times Q = \frac{0.3\ \cancel{mg}}{0.15\ \cancel{mg}} \times 1 \text{ tablet} = \frac{0.30}{0.15} \text{ tab} = 2 \text{ tablets}$

6) $\frac{D}{H} \times Q = \frac{\overset{1}{\cancel{100}\ \cancel{mg}}}{\underset{2}{\cancel{200}\ \cancel{mg}}} \times 5 \text{ mL} = \frac{5}{2} \text{ mL} = 2.5 \text{ mL}$

7) $\frac{D}{H} \times Q = \frac{12.5\ \cancel{mg}}{25\ \cancel{mg}} \times 1 \text{ mL} = \frac{12.5}{25.0} \text{ mL} = 0.5 \text{ mL}$

8) $\frac{D}{H} \times Q = \frac{\overset{4}{\cancel{40}\ \cancel{mg}}}{\underset{5}{\cancel{50}\ \cancel{mg}}} \times 1 \text{ mL} = \frac{4}{5} \text{ mL} = 0.8 \text{ mL}$

9) $\frac{D}{H} \times Q = \frac{4\ \cancel{mg}}{10\ \cancel{mg}} \times 1 \text{ mL} = 0.4 \text{ mL}$

10) $\frac{D}{H} \times Q = \frac{3\ \cancel{mg}}{2\ \cancel{mg}} \times 1 \text{ mL} = 1.5 \text{ mL}$

11) $\frac{D}{H} \times Q = \frac{350\ \cancel{mg}}{500\ \cancel{mg}} \times 2 \text{ mL} = \frac{700}{500} \text{ mL} = 1.4 \text{ mL}$

12) $\frac{D}{H} \times Q = \frac{35\ \cancel{mg}}{80\ \cancel{mg}} \times 2 \text{ mL} = \frac{70}{80} \text{ mL} = 0.875 \text{ mL} = 0.88 \text{ mL}$

13) 1 mg = 1,000 mcg (known equivalent)

$0.2\ \cancel{mg} \times 1{,}000 \text{ mcg}/\cancel{mg} = 0.200. = 200 \text{ mcg}$

$\frac{D}{H} \times Q = \frac{\overset{1}{\cancel{200}\ \cancel{mcg}}}{\underset{1}{\cancel{200}\ \cancel{mcg}}} \times 1 \text{ mL} = 1 \text{ mL}$

14) 1 mg = 1,000 mcg (known equivalent)

$0.125\ \cancel{mg} \times 1{,}000 \text{ mcg}/\cancel{mg} = 0.125. = 125 \text{ mcg}$

$\frac{D}{H} \times Q = \frac{125\ \cancel{mcg}}{500\ \cancel{mcg}} \times 2 \text{ mL} = \frac{\overset{1}{\cancel{250}}}{\underset{2}{\cancel{500}}} \text{ mL} = 0.5 \text{ mL}$

15) $\frac{D}{H} \times Q = \frac{80\ \cancel{mg}}{\underset{10}{\cancel{100}\ \cancel{mg}}} \times \overset{1}{\cancel{10}} \text{ mL} = \frac{\overset{8}{\cancel{80}}}{\underset{1}{\cancel{10}}} \text{ mL} = 8 \text{ mL}$

16) 1 g = 1,000 mg (known equivalent)

$0.4\ \cancel{g} \times 1{,}000 \text{ mg}/\cancel{g} = 0.400. = 400 \text{ mg}$

$\frac{D}{H} \times Q = \frac{\overset{4}{\cancel{400}\ \cancel{mg}}}{\underset{1}{\cancel{100}\ \cancel{mg}}} \times 1 \text{ mL} = 4 \text{ mL}$

ANSWERS

17) $\frac{D}{H} \times Q = \frac{\overset{1}{\cancel{50\ mg}}}{\underset{5}{\cancel{250\ mg}}} \times 5\ mL = \frac{5}{5}\ mL = 1\ mL$

250 mg/5 mL = 50 mg/1 mL

Do not exceed 50 mg/1 min. The 1 mL dose = 50 mg. Administer at 1 mL/1 min or 0.25 mL/15 seconds.

$\frac{1\ mL}{60\ sec} \times \frac{X\ mL}{15\ sec}$

$60X = 15$

$\frac{60X}{60} = \frac{15}{60}$

$X = \frac{1}{4}\ mL = 0.25\ mL$

Either syringe could measure the amount, but the 1 mL syringe will provide greater control for pushing medication at the rate recommended.

18) $\frac{D}{H} \times Q = \frac{35\ \cancel{mg}}{25\ \cancel{mg}} \times 1\ mL = \frac{35}{25}\ mL = 1.4\ mL$

$\frac{V\ (mL)}{T\ (min)} \times C\ (gtt/mL) = \frac{100\ \cancel{mL}}{20\ min} \times 15\ gtt/\cancel{mL}$

$= \frac{1{,}500}{20}\ gtt/min = 75\ gtt/min$

19) 46 units + 22 units = 68 units (total)

20) $\frac{D}{H} \times Q = \frac{\overset{1}{\cancel{30\ mg}}}{\underset{2}{\cancel{60\ mg}}} \times 2\ mL = \frac{2}{2}\ mL = 1\ mL$

21) $\frac{D}{H} \times Q = \frac{\overset{7}{\cancel{35\ mg}}}{\underset{10}{\cancel{50\ mg}}} \times 1\ mL = \frac{7}{10}\ mL = 0.7\ mL$

22) $\frac{D}{H} \times Q = \frac{\overset{1}{\cancel{0.4\ mg}}}{\underset{1}{\cancel{0.4\ mg}}} \times 1\ mL = 1\ mL$

23) °F = 1.8°C + 32 = (1.8 × 39) + 32

= 70.2 + 32 = 102.2°F;

102.2°F is greater than 101°F;

2400 − 2110 = 0250 or 2 h 50 min;

0215 = 2 h 15 min after 2400;

2 h 50 min + 2 h 15 min = 5 h 5 min

24) $\frac{D}{H} \times Q = \frac{\overset{2}{\cancel{650\ mg}}}{\underset{1}{\cancel{325\ mg}}} \times 1\ tablet = 2\ tablets$

25) $\frac{D}{H} \times Q = \frac{100\ \cancel{mg}}{\underset{16}{\cancel{80\ mg}}} \times \overset{3}{\cancel{15}}\ mL = \frac{300}{16}\ mL = 18.75\ mL$

= 18.8 mL

Measure the 18.8 mL precisely to add to the IV PB bag. But for the drip-rate calculation, such a precise measurement is not necessary. You may round the 18.8 mL to 19 mL for the computation of the drip rate only.

50 mL + 19 mL = 69 mL

$\frac{V\ (mL)}{T\ (min)} \times C\ (gtt/mL) = \frac{69\ \cancel{mL}}{\underset{1}{\cancel{30\ min}}} \times \overset{2}{\cancel{60}}\ gtt/\cancel{mL}$

= 138 gtt/min

26) Pump measured in mL/h. 69 mL in 30 min = 138 mL in 60 min.

$\frac{69\ mL}{30\ min} \times \frac{X\ mL}{60\ min}$

$30X = 4{,}140$

$\frac{30X}{30} = \frac{4{,}140}{30}$

$X = 138\ mL$

27) $\frac{D}{H} \times Q = \frac{\overset{1}{\cancel{125\ mg}}}{\underset{4}{\cancel{500\ mg}}} \times 8\ mL = \frac{\overset{2}{\cancel{8}}}{\underset{1}{\cancel{4}}}\ mL = 2\ mL$

28) $\frac{D}{H} \times Q = \frac{1\ \cancel{g}}{1\ \cancel{g}} \times 1\ tablet = 1\ tablet$

31) 1 kg = 2.2 lb (known equivalent)

22 lb ÷ 2.2 lb/kg = 22 $\cancel{lb}$ × 1 kg/2.2 $\cancel{lb}$ = 10 kg

Minimum dosage: 20 mg/$\cancel{kg}$/day × 10 $\cancel{kg}$ = 200 mg/day

200 mg/day ÷ 3 doses/day = 200 mg/$\cancel{day}$ × 1 $\cancel{day}$/3 doses = 66.6 mg/dose = 67 mg/dose

Maximum dosage: 40 mg/$\cancel{kg}$/day × 10 $\cancel{kg}$ = 400 mg/day

400 mg/day ÷ 3 doses/day = 400 mg/$\cancel{day}$ × 1 $\cancel{day}$/3 doses = 133.3 mg/dose = 133 mg/dose

32) $\frac{D}{H} \times Q = \frac{\overset{4}{\cancel{100\ mg}}}{\underset{5}{\cancel{125\ mg}}} \times 5\ mL = \frac{20}{5}\ mL = 4\ mL$

33) 1 kg = 2.2 lb (known equivalent)

40 lb ÷ 2.2 lb/kg = 40 $\cancel{lb}$ × 1 kg/2.2 $\cancel{lb}$ = 18.18 kg = 18.2 kg

40 mg/$\cancel{kg}$/day × 18.2 $\cancel{kg}$ = 728 mg/day

728 mg/day ÷ 3 doses/day = 728 mg/$\cancel{day}$ × 1 $\cancel{day}$/3 doses = 242.6 mg/dose = 243 mg/dose

close approximation to ordered dosage of 240 mg; dosage is safe.

34) $\frac{D}{H} \times Q = \frac{240\ \cancel{mg}}{\underset{80}{\cancel{400\ mg}}} \times \overset{1}{\cancel{5}}\ mL = \frac{240}{80}\ mL = 3\ mL$

35) °F = 1.8 °C + 32 = (1.8 × 39.6) + 32 = 71.28 + 32

= 103.28°F = 103.3°F

36) 1 kg = 2.2 lb (known equivalent)

62 lb ÷ 2.2 lb/kg = 62 $\cancel{lb}$ × 1 kg/2.2 $\cancel{lb}$

= 28.18 kg = 28.2 kg

Minimum dosage: 10 mg/$\cancel{kg}$ × 28.2 $\cancel{kg}$ = 282 mg

Maximum dosage: 15 mg/$\cancel{kg}$ × 28.2 $\cancel{kg}$ = 423 mg

37) $\frac{D}{H} \times Q = \frac{\overset{30}{\cancel{300\ mg}}}{\underset{8}{\cancel{80\ mg}}} \times 2.5\ mL = \frac{75}{8}\ mL = 9.37\ mL$

= 9.4 mL

38) 1 kg = 2.2 lb (known equivalent)

110 lb ÷ 2.2 lb/kg = 110 ~~lb~~ × 1 kg/2.2 ~~lb~~ = 50 kg

Minimum dosage: 20 mg/~~kg~~/day × 50 ~~kg~~ = 1,000 mg/day

1,000 mg/day ÷ 4 doses/day = 1,000 mg/~~day~~ × 1 ~~day~~/4 doses = 250 mg/dose

Maximum dosage: 30 mg/~~kg~~/day × 50 ~~kg~~ = 1,500 mg/day

1,500 mg/day ÷ 4 doses/day = 1,500 mg/~~day~~ × 1 ~~day~~/4 doses = 375 mg/dose

39) $\frac{D}{H} \times Q = \frac{\overset{5}{250}\ \text{mg}}{\underset{6}{300}\ \text{mg}} \times 2\ \text{mL} = \frac{10}{6}\ \text{mL} = 1.66\ \text{mL} = 1.7\ \text{mL}$

1.7 mL (medication) + 50 mL (IV fluid) = 51.7 mL = 52 mL (to be infused)

$$\frac{V\ (mL)}{T\ (min)} \times C\ (gtt/mL) = \frac{52\ \text{mL}}{\underset{2}{20}\ \text{min}} \times \overset{1}{10}\ gtt/\text{mL} = \frac{52}{2}\ gtt/min = 26\ gtt/min$$

40)

IV fluid: 50 mL + 50 mL = 100 mL

Gelatin: 4 fl oz = 4 ~~fl oz~~ × 30 mL/~~fl oz~~ = 120 mL

Water: 3 fl oz × 2 = 6 fl oz = 6 ~~fl oz~~ × 30 mL/~~fl oz~~ = 180 mL

Apple juice: 16 fl oz = 16 ~~fl oz~~ × 30 mL/~~fl oz~~ = 480 mL

Total = 880 mL

41) $$\frac{V\ (mL)}{T\ (min)} \times C\ (gtt/mL) = \frac{600\ \text{mL}}{\underset{24}{240}\ \text{min}} \times \overset{1}{10}\ gtt/\text{mL} = \frac{600}{24}\ gtt/min = 25\ gtt/min$$

42) $\frac{D}{H} \times Q = \frac{1\ \text{mg}}{\underset{1}{50}\ \text{mg}} \times \overset{1}{50}\ \text{mL} = 1\ \text{mL}$

43) 1 mg/~~dose~~ × 5 ~~doses~~ = 5 mg

1 mL/~~dose~~ × 5 ~~doses~~ = 5 mL

44) 50 mg ÷ 1 mg/dose = 50 ~~mg~~ × 1 dose/1 ~~mg~~ = 50 doses

45) 50 doses ÷ 5 doses/h = 50 ~~doses~~ × 1 h/5 ~~doses~~ = 10 h;

1430 h + 1000 h = 2430 h = 0030 = 12:30 AM

(or 30 min after midnight, the next day)

46) 1 g = 1,000 mg (known equivalent)

1,000 mg ÷ 100 mg/mL = 1,000 ~~mg~~ × 1 mL/100 ~~mg~~ = 10 mL;

therefore, after adding 9.6 mL to the vial, the resulting volume totals 10 mL.

47) 100; 1

48) 1 g = 1,000 mg (known equivalent)

0.5 ~~g~~ × 1,000 mg/~~g~~ = 0.500. = 500 mg

$$\frac{D}{H} \times Q = \frac{\overset{5}{500}\ \text{mg}}{\underset{1}{100}\ \text{mg}} \times 1\ \text{mL} = 5\ \text{mL}$$

49) Clinical reasoning indicates that the full reconstituted solution will be used up within 2 doses, so storage unrefrigerated for 24 hours is satisfactory.

Mathematics Diagnostic Evaluation from pages 28–30

1) 1,517.63 **2)** 20.74 **3)** 100.66 **4)** $323.72 **5)** 46.11 **6)** 754.5 **7)** 16.91 **8)** 19,494.7 **9)** $173.04 **10)** 403.26 **11)** 36 **12)** 2,500 **13)** $\frac{2}{3}$ **14)** 6.25 **15)** $\frac{4}{5}$ **16)** 40% **17)** 0.4% **18)** 0.05 **19)** 1:3 **20)** 0.02 **21)** $1\frac{1}{4}$ **22)** $6\frac{13}{24}$ **23)** $1\frac{11}{18}$ **24)** $\frac{3}{5}$ **25)** $14\frac{7}{8}$ **26)** $\frac{1}{100}$ **27)** 0.009 **28)** 320 **29)** 3 **30)** 0.05 **31)** 4 **32)** 0.09 **33)** 0.22 **34)** 25 **35)** 4 **36)** 0.75 **37)** 3 **38)** 500 **39)** 18.24 **40)** 2.4 **41)** $\frac{1}{5}$ **42)** 1:50 **43)** 5 tablets **44)** 2 milligrams **45)** 30 kilograms **46)** 3.3 pounds **47)** 6.67 centimeters **48)** 7.5 centimeters **49)** 90% **50)** 5:1

Solutions—Mathematics Diagnostic Evaluation

1)
$$\begin{array}{r} 1{,}517 \\ +\ 0.63 \\ \hline 1{,}157.63 \end{array} \quad \begin{array}{l} \\ \text{(1,517 + 0.63 = 1,517.00)} \\ \\ \end{array}$$

2)
$$\begin{array}{r} 0.700 \\ 0.035 \\ +\ 20.006 \\ \hline 20.741 \end{array} \quad (0.7 + 0.035 + 20.006 = 20.74)$$

3)
$$\begin{array}{r} 9.50 \\ 17.06 \\ 32.00 \\ 41.11 \\ +\ 0.99 \\ \hline 100.66 \end{array}$$

4)
$$\begin{array}{r} \$\ 19.69 \\ +\ 304.03 \\ \hline \$323.72 \end{array} \quad (\$19.69 + \$304.03 = \$323.72)$$

5)
$$\begin{array}{r} \overset{8}{9}\overset{13}{\not{3}}.\overset{1}{\not{2}}\overset{10}{0} \\ -\ 47.09 \\ \hline 46.11 \end{array} \quad (93.2 - 47.09 = 46.11)$$

6)
$$\begin{array}{r} 1{,}005.0 \\ -\ 250.5 \\ \hline 754.5 \end{array}$$

7)
$$\begin{array}{r} \overset{6}{17}.\overset{11}{1}56 \\ -\ 0.250 \\ \hline 16.906 \end{array} \quad (17.156 - 0.25 = 16.91)$$

8)
$$\begin{array}{r} 509 \\ \times\ 38.3 \\ \hline 1527 \\ 4072 \\ 1527 \\ \hline 194947 \end{array} \quad (509 \times 38.3 = 19{,}494.7)$$

ANSWERS

9) $\$4.12 \times 42 =$

$$\begin{array}{r} \$4.12 \\ \times\ 42 \\ \hline 824 \\ 1648 \\ \hline \$173.04 \end{array}$$

10)

$$\begin{array}{r} 17.16 \\ \times\ 23.5 \\ \hline 8580 \\ 5148 \\ 3432 \\ \hline 403.260 \end{array} = 403.26$$

11) $972 \div 27 = 27\overline{)972}$

$$\begin{array}{r} 36 \\ \hline 81 \\ 162 \\ 162 \end{array}$$

12)

$$\begin{array}{r} 2500. \\ 0.001.\overline{)2.500.\uparrow} \end{array} = 2{,}500$$

13) $\frac{1}{4} \div \frac{3}{8} = \frac{1}{\cancel{4}_{1}} \times \frac{\overset{2}{\cancel{8}}}{3} = \frac{2}{3}$

14) $\frac{1{,}500}{240} = 240\overline{)1{,}500.00}$

$$\begin{array}{r} 6.25 \\ \hline 1\,440\downarrow \\ 60\,0 \\ 48\,0\downarrow \\ 12\,00 \\ 12\,00 \end{array}$$

15) $0.8 = \frac{\overset{4}{\cancel{8}}}{\underset{5}{\cancel{10}}} = \frac{4}{5}$

16) $\frac{2}{5} = 5\overline{)2.0}$

$$\begin{array}{r} 0.4 \\ \hline 2\,0 \end{array}$$

$0.4 \times 100 = 0.40. = 40\%$

17) $0.004 \times 100 = 0.00.4 = 0.4\%$

18) $5\% = \frac{5}{100} = 5 \div 100 = .05. = 0.05$

19) $33\frac{1}{3}\% = \frac{33\frac{1}{3}}{100} = \frac{\frac{100}{3}}{100} = \frac{100}{3} \div \frac{100}{1}$

$$= \frac{\cancel{100}}{3} \times \frac{1}{\cancel{100}} = \frac{1}{3} =$$

20) $1{:}50 = 50\overline{)1.00}$

$$\begin{array}{r} 0.02 \\ \hline 1\,00 \end{array}$$

21) $\frac{1}{2} + \frac{3}{4}$

$$\begin{array}{r} \frac{1}{2} = \frac{2}{4} \\ +\frac{3}{4} = +\frac{3}{4} \\ \hline \frac{5}{4} = 1\frac{1}{4} \end{array}$$

22) $1\frac{2}{3} + 4\frac{7}{8}$

$$\begin{array}{r} 1\frac{2}{3} = 1\frac{16}{24} \\ +4\frac{7}{8} = +4\frac{21}{24} \\ \hline 5\frac{37}{24} = 6\frac{13}{24} \end{array}$$

23) $1\frac{5}{6} - \frac{2}{9}$

$$\begin{array}{r} 1\frac{5}{6} = 1\frac{15}{18} \\ -\frac{2}{9} = -\frac{4}{18} \\ \hline 1\frac{11}{18} \end{array}$$

24) $\frac{1}{100} \times 60 = \frac{1}{\underset{5}{\cancel{100}}} \times \frac{\overset{3}{\cancel{60}}}{1} = \frac{3}{5}$

25) $4\frac{1}{4} \times 3\frac{1}{2} = \frac{17}{4} \times \frac{7}{2} = \frac{119}{8} = 14\frac{7}{8}$

26) $\frac{1}{150}$; $\frac{1}{200}$; $\frac{1}{100}$

$\frac{1}{100}$ is the greatest

27)

$$\begin{array}{l} 0.009 \\ 0.190 \\ 0.900 \\ \quad\uparrow \end{array}$$

0.009 has the smallest value in the tenth place

28) $\frac{6.4}{0.02} = 0.02.\overline{)6.40!} = 320$

$$\begin{array}{r} 3\,20. \\ \hline 6\downarrow \\ 04 \\ 4\downarrow \\ 00 \end{array}$$

29) $\frac{0.02 + 0.16}{0.4 - 0.34}$

$$\begin{array}{rr} 0.02 & 0.40 \\ +\ 0.16 & -\ 0.34 \\ \hline 0.18 & 0.06 \end{array}$$

$\frac{0.18}{0.06} = 0.06.\overline{)0.18!} = 3$

30) $\frac{3}{12+3} \times 0.25 = \frac{3}{15} \times \frac{\overset{1}{\cancel{25}}}{\underset{4}{\cancel{100}}} = \frac{3}{60} = 60\overline{)3.00}$

$$\begin{array}{r} 0.05 \\ \hline 0\,0\downarrow \\ 3\,00 \\ 3\,00 \end{array}$$

31) 8% of 50 = $0.08 \times 50 = 4$

32) $\frac{1}{2}\% = 0.5\% = 0.005$

$$\begin{array}{r} 18 \\ \times 0.005 \\ \hline 0.090 = 0.09 \end{array}$$

33) $0.9\% \times 24 = 0.009 \times 24 = 0.216 = 0.22$

34) $\frac{1{:}1{,}000}{1{:}100} \times 250 = \frac{\frac{1}{1{,}000}}{\frac{1}{100}} \times 250 = \frac{1}{1{,}000} \div \frac{1}{100} \times 250$

$$= \frac{1}{\underset{10}{\cancel{1{,}000}}} \times \frac{\overset{1}{\cancel{100}}}{1} \times \frac{250}{1} = \frac{250}{10} = 25$$

35) $\frac{300}{150} \times 2 = X$

$\frac{\overset{2}{\cancel{300}}}{\underset{1}{\cancel{150}}} \times 2 = X$

$X = 4$

36) $\frac{2.5}{5} \times 1.5 = X$

$X = 0.5 \times 1.5 = 0.75$

37) $\frac{1{,}000{,}000}{250{,}000} \times X = 12$

$\frac{\overset{4}{\cancel{1{,}000{,}000}}}{\underset{1}{\cancel{250{,}000}}} \times X = 12$

$4X = 12$

$\frac{4X}{4} = \frac{12}{4}$

$X = 3$

38) $\frac{0.51}{1.7} \times X = 150$

$0.3X = 150$

$\frac{0.3X}{0.3} = \frac{150}{0.3}$

$X = 500$

39) $X = (82.4 - 52)\frac{3}{5}$

$X = 30.4 \times \frac{3}{5} = \frac{30.4}{1} \times \frac{3}{5} = \frac{91.2}{5} = 18.24$

40) $\frac{\frac{1}{150}}{\frac{1}{300}} \times 1.2 = X$

$\left(\frac{1}{150} \div \frac{1}{300}\right) \times 1.2 = X$

$\left(\frac{1}{\underset{1}{\cancel{150}}} \times \frac{\overset{2}{\cancel{300}}}{1}\right) \times 1.2 = X$

$2 \times 1.2 = X$

$2.4 = X$

41) $2{:}10 = \frac{2}{10} = \frac{1}{5}$

42) $2\% = \frac{2}{100} = \frac{1}{50} = 1{:}50$

43) $25 \div 5 = 5$ tablets

44) $0.5 \times 4 = 2$ milligrams/day

45) 66 pounds $= \frac{66}{2.2} = 30$ kilograms or

$\frac{2.2 \text{ pounds}}{1 \text{ kilogram}} \quad \frac{66 \text{ pounds}}{X \text{ kilograms}}$

$2.2X = 66$

$\frac{2.2X}{2.2} = \frac{66}{2.2}$

$X = 30$ kilograms

46) $\frac{2.2 \text{ pounds}}{1 \text{ kilogram}} \quad \frac{X \text{ pounds}}{1.5 \text{ kilograms}}$

$X = 3.3$ lb

$\begin{array}{r} 2.2 \\ \times 1.5 \\ \hline 110 \\ 22 \\ \hline 3.30 \end{array}$

47) $\frac{1 \text{ centimeter}}{\frac{3}{8} \text{ inch}} \quad \frac{X \text{ centimeter}}{2\frac{1}{2} \text{ inches}}$

$\frac{3}{8}X = 2\frac{1}{2}$

$\frac{3}{8}X = \frac{5}{2}$

$\frac{\frac{3}{8}X}{\frac{3}{8}} = \frac{\frac{5}{2}}{\frac{3}{8}}$

$X = \frac{5}{2} \div \frac{3}{8} = \frac{5}{\underset{1}{\cancel{2}}} \times \frac{\overset{4}{\cancel{8}}}{3} = \frac{20}{3} = 6.666 = 6.67$

48) $\frac{2.5 \text{ centimeters}}{1 \text{ inch}} \quad \frac{X \text{ centimeters}}{3 \text{ inches}}$

$X = 7.5$ centimeters

49) $\begin{array}{r} 50 \text{ items} \\ -\ 5 \text{ incorrect} \\ \hline 45 \text{ correct} \end{array}$ $\frac{45}{50} = \frac{9}{10} = 90\%$ (correct)

50) 5 females to 1 male
5:1

Review Set 1 from pages 37–38

1) $\frac{6}{6}, \frac{7}{5}$ **2)** $\frac{\frac{1}{100}}{\frac{1}{150}}$ **3)** $\frac{1}{4}, \frac{1}{14}$ **4)** $1\frac{2}{9}, 1\frac{1}{4}, 5\frac{7}{8}$ **5)** $\frac{3}{4} = \frac{6}{8}, \frac{1}{5} = \frac{2}{10}, \frac{3}{9} = \frac{1}{3}$ **6)** $\frac{13}{2}$ **7)** $\frac{6}{5}$ **8)** $\frac{32}{3}$ **9)** $\frac{47}{6}$ **10)** $\frac{411}{4}$ **11)** 2 **12)** 1

13) $3\frac{1}{3}$ **14)** $1\frac{1}{3}$ **15)** $2\frac{3}{4}$ **16)** $\frac{6}{8}$ **17)** $\frac{4}{16}$ **18)** $\frac{8}{12}$ **19)** $\frac{4}{10}$ **20)** $\frac{6}{9}$ **21)** $\frac{1}{100}$ **22)** $\frac{1}{10{,}000}$ **23)** $\frac{5}{9}$ **24)** $\frac{3}{10}$ **25)** $\frac{2}{5}$ bottle **26)** $1\frac{1}{2}$ bottles

27) $\frac{2}{5}$ of the students are men **28)** $\frac{9}{10}$ of the questions were answered correctly **29)** $\frac{1}{2}$ dose **30)** $\frac{1}{2}$ teaspoon

Solutions—Review Set 1

1) Improper fraction: numerator is greater than or equal to denominator

$\frac{6}{6}, \frac{7}{5}$

2) Complex fraction: numerator and/or denominator is a fraction

$\frac{\frac{1}{100}}{\frac{1}{150}}$

ANSWERS

3) Proper fraction: numerator is less than denominator and value is less than 1

$\frac{1}{4}, \frac{1}{14}$

4) Mixed number reduced to lowest terms: whole number + reduced fraction

$1\frac{2}{9}, 1\frac{1}{4}, 5\frac{7}{8}$

5) $\frac{3}{4} = \frac{3\times2}{4\times2} = \frac{6}{8}$; $\frac{3}{4} = \frac{6}{8}$

$\frac{1}{5} = \frac{1\times2}{5\times2} = \frac{2}{10}$; $\frac{1}{5} = \frac{2}{10}$

$\frac{3}{9} = \frac{3\div3}{9\div3} = \frac{1}{3}$; $\frac{3}{9} = \frac{1}{3}$

6) $6\frac{1}{2} = \frac{(6\times2)+1}{2} = \frac{13}{2}$

7) $1\frac{1}{5} = \frac{(1\times5)+1}{5} = \frac{6}{5}$

8) $10\frac{2}{3} = \frac{(10\times3)+2}{3} = \frac{32}{3}$

9) $7\frac{5}{6} = \frac{(7\times6)+5}{6} = \frac{47}{6}$

10) $102\frac{3}{4} = \frac{(102\times4)+3}{4} = \frac{411}{4}$

11) $\frac{24}{12} = 12\overline{)24}$ $\quad 2$, $\quad \underline{24}$

12) $\frac{\overset{1}{\cancel{8}}}{\underset{1}{\cancel{8}}} = 1$

13) $\frac{30}{9} = 9\overline{)30}$ $\quad 3\frac{3}{9}$, $\quad \underline{27}$, $\quad 3$

$3\frac{3}{9} = 3\frac{1}{3}$

14) $\frac{100}{75} = 1\frac{25}{75} = 1\frac{1}{3}$

15) $\frac{44}{16} = 16\overline{)44}$ $\quad 2\frac{12}{16}$, $\quad \underline{32}$, $\quad 12$

$2\frac{12}{16} = 2\frac{3}{4}$

16) $\frac{3}{4} = \frac{3\times2}{4\times2} = \frac{6}{8}$

17) $\frac{1}{4} = \frac{1\times4}{4\times4} = \frac{4}{16}$

18) $\frac{2}{3} \times \frac{2\times4}{3\times4} = \frac{8}{12}$

19) $\frac{2}{5} = \frac{2\times2}{5\times2} = \frac{4}{10}$

20) $\frac{2}{3} = \frac{2\times3}{3\times3} = \frac{6}{9}$

21) $\frac{1}{100}$ is larger than $\frac{1}{150}$

The numerators are the same. The fraction with the smaller denominator has the greater value.

22) $\frac{1}{10{,}000}$ is smaller than $\frac{1}{1{,}000}$

23) $\frac{5}{9}$ is larger than $\frac{2}{9}$

The denominators are both the same. The fraction with the larger numerator has the greater value.

24) $\frac{3}{10}$ is smaller than $\frac{5}{10}$

25) 10 fluid ounces – 6 fluid ounces = 4 fluid ounces remaining

$\frac{\overset{2}{\cancel{4}}}{\underset{5}{\cancel{10}}} = \frac{2}{5}$ bottle remaining

26) $\frac{1 \text{ bottle}}{12 \text{ doses}} \times \frac{X \text{ bottles}}{18 \text{ doses}}$

$12X = 18$

$\frac{12X}{12} = \frac{18}{12}$

$X = 1\frac{6}{12} = 1\frac{1}{2}$ bottles

27)
$$\begin{array}{rl} 24 & \text{men} \\ +\ 36 & \text{women} \\ \hline 60 & \text{people in class} \end{array}$$

The men represent $\frac{24}{60}$ or $\frac{2}{5}$ of the students in the class.

28) $\frac{18}{20} = \frac{18\div2}{20\div2} = \frac{9}{10}$

29) $\frac{160 \text{ mg}}{1 \text{ dose}} \times \frac{80 \text{ mg}}{X \text{ doses}}$

$160X = 80$

$\frac{160X}{160} = \frac{80}{160}$

$X = \frac{1}{2}$ dose

30) $\frac{160 \text{ mg}}{1 \text{ t}} \times \frac{80 \text{ mg}}{X \text{ t}}$

$160X = 80$

$\frac{160X}{160} = \frac{80}{160}$

$X = \frac{1}{2}$ teaspoon

Review Set 2 from pages 40–41

1) $8\frac{7}{15}$ **2)** $1\frac{5}{12}$ **3)** $17\frac{5}{24}$ **4)** $1\frac{1}{24}$ **5)** $32\frac{5}{6}$ **6)** $5\frac{7}{12}$ **7)** $1\frac{1}{3}$ **8)** $5\frac{53}{72}$ **9)** 43 **10)** $5\frac{118}{119}$ **11)** $2\frac{8}{15}$ **12)** $\frac{53}{132}$ **13)** $\frac{1}{2}$ **14)** $4\frac{5}{6}$ **15)** $\frac{1}{24}$ **16)** $63\frac{2}{3}$ **17)** $299\frac{4}{5}$ **18)** $\frac{1}{6}$ **19)** $1\frac{2}{5}$ **20)** $7\frac{1}{16}$ **21)** $7\frac{2}{9}$ **22)** $1\frac{1}{4}$ **23)** $24\frac{6}{11}$ **24)** $\frac{7}{12}$ **25)** $\frac{1}{25}$ **26)** $5\frac{5}{6}$ fluid ounces **27)** $1\frac{1}{8}$ inches **28)** 8 inches **29)** $21\frac{1}{2}$ pints **30)** $13\frac{1}{4}$ pounds

9) 0.125 mg = 0.125. = 125 mcg

$\frac{D}{H} \times Q = \frac{\overset{1}{\cancel{125\ mcg}}}{\underset{2}{\cancel{250\ mcg}}} \times 1\ \text{tablet} = \frac{1}{2}\ \text{tablet}$

0.125 mg ordered daily means you will need $\frac{1}{2}$ tablet per 24 h.

10) $\frac{D}{H} \times Q = \frac{\overset{1}{\cancel{20\ mg}}}{\underset{1}{\cancel{20\ mg}}} \times 1\ \text{tablet} = 1\ \text{tablet}$

11) $\frac{D}{H} \times Q = \frac{\overset{2}{\cancel{13\ mg}}}{\underset{1}{\cancel{6.5\ mg}}} \times 1\ \text{caplet} = 2\ \text{caplet}$

12) 1 g = 1,000 mg

$\frac{D}{H} \times Q = \frac{\overset{2}{\cancel{1{,}000\ mg}}}{\underset{1}{\cancel{500\ mg}}} \times 1\ \text{tablet} = 2\ \text{tablet}$

14) Order is for 80 mL/h—this is the setting for the infusion pump.

15) $\frac{D}{H} \times Q = \frac{\overset{5}{\cancel{50\ mg}}}{\underset{1}{\cancel{10\ mg}}} \times 1\ \text{mL} = 5\ \text{mL}$

16) $\frac{D}{H} \times Q = \frac{2\ \cancel{mg}/\cancel{min}}{\underset{4}{\cancel{2{,}000\ mg}}} \times \overset{1}{\cancel{500}}\ \text{mL} = \frac{\overset{1}{\cancel{2}}}{\underset{2}{\cancel{4}}} = 0.5\ \text{mL/min}$

0.5 mL/$\cancel{\text{min}}$ × 60 $\cancel{\text{min}}$/h = 30 mL/h

17) 110 lb ÷ 2.2 lb/kg = 110 $\cancel{\text{lb}}$ × 1 kg/2.2 $\cancel{\text{lb}}$ = 50 kg

Minimum: 5 mcg/$\cancel{\text{kg}}$/min × 50 $\cancel{\text{kg}}$ = 250 mcg/min

Maximum: 10 mcg/$\cancel{\text{kg}}$/min × 50 $\cancel{\text{kg}}$ = 500 mcg/min

Ordered dosage is safe.

$\frac{D}{H} \times Q = \frac{\overset{5}{\cancel{400\ mg}}}{\underset{1}{\cancel{80\ mg}}} \times 1\ \text{mL} = 5\ \text{mL}$

18) 500 mcg/min = .500. = 0.5 mg/min

$\frac{D}{H} \times Q = \frac{0.5\ \cancel{mg}/\text{min}}{\underset{8}{\cancel{400\ mg}}} \times \overset{5}{\cancel{250}}\ \text{mL} = \frac{2.5\ \text{mL}}{8\ \text{min}}$

= 0.312 mL/min = 0.31 mL/min

0.31 mL/$\cancel{\text{min}}$ × 60 $\cancel{\text{min}}$/h = 18.6 mL/h

(program in tenths of mL)

19) 500 mcg/$\cancel{\text{min}}$ × 60 $\cancel{\text{min}}$/h = 30,000 mcg/h

30,000 mcg/h = 30.000. = 30 mg/h

20) $\frac{D}{H} \times Q = \frac{4\ \cancel{mg}/\text{min}}{\underset{4}{\cancel{2{,}000\ mg}}} \times \overset{1}{\cancel{500}}\ \text{mL} = \frac{\overset{1}{\cancel{4}}}{\underset{1}{\cancel{4}}} = 1\ \text{mL/min}$

1 mL/$\cancel{\text{min}}$ × 60 $\cancel{\text{min}}$/h = 60 mL/h

21) 33 lb ÷ 2.2 lb/kg = 33 $\cancel{\text{lb}}$ × 1 kg/2.2 $\cancel{\text{lb}}$ = 15 kg

15 mg/$\cancel{\text{kg}}$/day × 15 $\cancel{\text{kg}}$ = 225 mg/day

Maximum: $\frac{\overset{75}{\cancel{225}\ \text{mg}}}{\underset{1}{\cancel{3}\ \text{doses}}} = 75\ \text{mg/dose}$

The order is safe. It is obvious that 2 mL should be given.

25 mL (total IV solution) − 2 mL (Kantrex) = 23 mL ($D_5\frac{1}{2}$NS)

25 mL (total solution) + 15 mL (flush) = 40 mL (total in 1 h)

40 mL over 1 h is 40 mL/h.

22) 66 lb ÷ 2.2 lb/kg = 66 $\cancel{\text{lb}}$ × 1kg/2.2 $\cancel{\text{lb}}$ = 30 kg

40 mg/$\cancel{\text{kg}}$/day × 30 $\cancel{\text{kg}}$ = 1,200 mg/day

$\frac{\overset{300}{\cancel{1200}\ \text{mg}}}{\underset{1}{\cancel{4}\ \text{doses}}} = 300\ \text{mg/dose}$

23) $\frac{D}{H} \times Q = \frac{300\ \cancel{mg}}{\underset{50}{\cancel{500\ mg}}} \times \overset{1}{\cancel{10}}\ \text{mL} = \frac{\overset{6}{\cancel{300}}}{\underset{1}{\cancel{50}}}\ \text{mL} = 6\ \text{mL}$

50 mL (total IV volume) − 6 mL (vancomycin)

44 mL ($D_5\frac{1}{2}$NS); 50 mL/$\cancel{\text{h}}$ × 24 $\cancel{\text{h}}$ = 1,200 mL

24) Child weighs 30 kg.

100 mL/$\cancel{\text{kg}}$/day × 10 $\cancel{\text{kg}}$ = 1,000 mL/day (for first 10 kg)

50 mL/$\cancel{\text{kg}}$/day × 10 $\cancel{\text{kg}}$ = 500 mL/day (for next 10 kg)

20 mL/$\cancel{\text{kg}}$/day × 10 $\cancel{\text{kg}}$ = 200 mL/day (for remaining 10 kg)

Total: 1,000 mL/day + 500 mL/day + 200 mL/day = 1,700 mL/day or per 24 h

1,700 mL/day ÷ 24 h/day

= 1,700 mL/$\cancel{\text{day}}$ × 1 $\cancel{\text{day}}$/24 h = 70.8 mL/h

The ordered rate is less than the recommended daily rate of maintenance fluids. The nurse should consider possible clinical reasons for the difference and consult the physician as needed for clarification.

25) The vial size is 1.5 g. Choose the diluent that corresponds to the vial chosen. Adding 3.2 mL will yield a total of 4.0 mL containing 1.5 g.

27) $\frac{D}{H} \times Q = \frac{\overset{1}{\cancel{500\ mg}}}{\underset{3}{\cancel{1{,}500\ mg}}} \times 4\ \text{mL} = \frac{4}{3}\ \text{mL}$

= 1.33 mL = 1.3 mL

28) 50 mL (IV PB fluid) + 1.3 mL (med) = 51.3 mL (total fluid to infuse in 30 min) Round 51.3 to 51 for the purpose of calculating the infusion rate.

$\frac{51\ \text{mL}}{\underset{1}{\cancel{30\ min}}} \times \overset{2}{\cancel{60}}\ \cancel{\text{min}}/\text{h} = 102\ \text{mL/h}$

29) $\frac{D}{H} \times Q = \frac{\overset{2}{\cancel{10{,}000\ units}}}{\underset{1}{\cancel{5{,}000\ units}}} \times 1\ \text{mL} = 2\ \text{mL}$

$\frac{D}{H} \times Q = \frac{1{,}200\ \cancel{\text{units}}/\text{h}}{\underset{20}{\cancel{10{,}000\ units}}} \times \overset{1}{\cancel{500}}\ \text{mL} = \frac{\overset{60}{\cancel{1{,}200}}}{\underset{1}{\cancel{20}}}\ \text{mL/h}$

= 60 mL/h

30) 125 lb ÷ 2.2 lb/kg = 125 $\cancel{\text{lb}}$ × 1 kg/2.2 $\cancel{\text{lb}}$

= 56.81 kg = 56.8 kg

80 units/$\cancel{\text{kg}}$ × 56.8 $\cancel{\text{kg}}$ = 4,544 units

$\frac{D}{H} \times Q = \frac{4{,}544\ \cancel{\text{units}}}{1{,}000\ \cancel{\text{units}}} \times 1\ \text{mL} = \frac{4{,}544}{1{,}000}\ \text{mL}$

= 4.54 mL = 4.5 mL

ANSWERS

18 units/~~kg~~/h × 56.8 ~~kg~~ = 1,022.4 units/h

= 1,022 units/h

$\frac{D}{H} \times Q = \frac{1{,}022 \text{ units/h}}{\overset{100}{\cancel{25{,}000}} \text{ units}} \times \overset{1}{\cancel{250}} \text{ mL} = \frac{1{,}022}{100} \text{ mL/h}$

= 10.22 mL/h = 10.2 mL/h

31) Decrease rate by 2 units/kg/h.

2 units/~~kg~~/h × 56.8 ~~kg~~ = 113.6 units/h = 114 units/h

1,022 units/h − 114 units/h = 908 units/h

$\frac{D}{H} \times Q = \frac{908 \text{ units/h}}{\overset{100}{\cancel{25{,}000}} \text{ units}} \times \overset{1}{\cancel{250}} \text{ mL} = \frac{908}{100} \text{ mL/h}$

= 9.08 mL/h = 9.1 mL/h

32) $\frac{D}{H} \times Q = \frac{8 \text{ units}}{100 \text{ units}} \times 1 \text{ mL} = \frac{8}{100} \text{ mL} = 0.08 \text{ mL}$

U-100 insulin should only be administered with a U-100 insulin syringe. This question and solution are provided to evaluate your understanding of the insulin syringe and insulin concentration. 8 units of U-100 insulin equals a dose volume of 0.08 mL.

33) 15 units + 45 units = 60 units

34) $\frac{D}{H} \times Q = \frac{\overset{3}{\cancel{300}} \text{ units}}{\underset{1}{\cancel{100}} \text{ units}} \times 1 \text{ mL} = 3 \text{ mL}$

Total IV volume: 150 mL (NS) + 3 mL (insulin)

= 153 mL

$\frac{D}{H} \times Q = R$

$\frac{D \text{ units/h}}{300 \text{ units}} \times 153 \text{ mL} = 10 \text{ mL/h}$

$\frac{D}{300} \times 153 = 10$

$\frac{153D}{300} \times \frac{10}{1}$

$153D = 3{,}000$

$\frac{153D}{153} = \frac{3{,}000}{153}$

$D = 19.6 \text{ units/h} = 20 \text{ units/h}$

35) 8 ~~fl oz~~ × 30 mL/~~fl oz~~ = 240 mL

$D \times Q = X$

$\frac{1}{4} \times Q = 240 \text{ mL}$

$\frac{1}{4} Q = 240 \text{ mL}$

$\frac{\frac{1}{4} Q}{\frac{1}{4}} = \frac{240}{\frac{1}{4}}$

$Q = 240 \times \frac{4}{1}$

$Q = 960 \text{ mL}$ (total volume of reconstituted $\frac{1}{4}$ strength Isomil)

960 mL (total solution) − 240 mL (solution or Isomil)

= 720 mL solvent or water

36) 16 lb ÷ 2.2 lb/kg = 16 ~~lb~~ × 1 kg/2.2 ~~lb~~

= 7.27 kg = 7.3 kg

100 mL/~~kg~~/day × 7.3 ~~kg~~ = 730 mL/day

730 mL/24 h = 30.4 mL/h = 30 mL/h

37) 5 ~~ft~~ × 12 in/~~ft~~ = 60 in; 60 in + 2 in = 62 in

Household:

$\text{BSA } (m^2) = \sqrt{\frac{\text{ht (in)} \times \text{wt (lb)}}{3{,}131}} = \sqrt{\frac{62 \times 103}{3{,}131}} = \sqrt{\frac{6{,}386}{3{,}131}}$

$= \sqrt{2.039\ldots} = 1.428 \text{ m}^2 = 1.43 \text{ m}^2$

38) 10 mg/~~m²~~ × 1.43 ~~m²~~ = 14.3 mg

20 mg/~~m²~~ × 1.43 ~~m²~~ = 28.6 mg

Yes, the order is safe.

39) Concentration: 40 mg/80 mL = 0.5 mg/mL

$\frac{D}{H} \times Q = \frac{28 \text{ mg}}{0.5 \text{ mg}} \times 1 \text{ mL} = \frac{28}{0.5} \text{ mL} = 56 \text{ mL}$

$\frac{56 \text{ mL}}{10 \text{ min}} = 5.6 \text{ mL/min}$ (or 5.6 mL per 60 sec)

$\frac{5.6 \text{ mL}}{60 \text{ sec}} \times \frac{X \text{ mL}}{15 \text{ sec}}$

$60X = 84$

$\frac{60X}{60} = \frac{84}{60}$

$X = 1.4 \text{ mL}$ (per 15 sec)

40) Dextrose:

$\frac{5 \text{ g}}{100 \text{ mL}} \times \frac{X \text{ g}}{1{,}000 \text{ mL}}$

$100X = 5{,}000$

$\frac{100X}{100} = \frac{5{,}000}{100}$

$X = 50 \text{ g}$

NaCl:

$\frac{0.45 \text{ g}}{100 \text{ mL}} \times \frac{X \text{ g}}{1{,}000 \text{ mL}}$

$100X = 450$

$\frac{100X}{100} = \frac{450}{100}$

$X = 4.5 \text{ g}$

41) $\frac{D}{H} \times Q = \frac{600 \text{ mg}}{100 \text{ mg}} \times 1 \text{ mL} = \frac{\overset{6}{\cancel{600}}}{\underset{1}{\cancel{100}}} \text{ mL} = 6 \text{ mL}$

50 mL (total fluid) − 6 mL (med) = 44 mL (IV fluid). Note: Add the medicine to the chamber and then add IV fluid up to 50 mL.

42) $\frac{10 \text{ mg}}{1 \text{ mL}} \times \frac{600 \text{ mg}}{X \text{ mL}}$

$10X = 600$

$\frac{10X}{10} = \frac{600}{10}$

$X = 60 \text{ mL}$ (per 600 mg) maximal dilution

$\frac{40 \text{ mg}}{1 \text{ mL}} \times \frac{600 \text{ mg}}{X \text{ mL}}$

$40X = 600$

$\frac{40}{40} = \frac{600}{40}$

$X = 15 \text{ mL}$ (per 600 mg) minimal dilution

43) 400,000 units/~~dose~~ × 4 ~~doses~~/day = 1,600,000 units/day

Minimum: 150,000 units/~~kg~~/day × 10 ~~kg~~ = 1,500,000 units/day

Maximum: 250,000 units/~~kg~~/day × 10 ~~kg~~ = 2,500,000 units/day

Reconstitute with 1.8 mL for a concentration of 500,000 units/mL. This concentration is selected because it will be further diluted.

$$\frac{D}{H} \times Q = \frac{\overset{4}{\cancel{400{,}000}\ \text{units}}}{\underset{5}{\cancel{500{,}000}\ \text{units}}} \times 1\ \text{mL} = \frac{4}{5}\ \text{mL}$$

= 0.8 mL penicillin G potassium

44) 100 mL (NS) + 0.8 mL (penicillin G potassium) = 100.8 or 101 mL (to be infused in 60 min, or 1 h). Set IV pump at 101 mL/h.

45) 1,000 mL ÷ 125 mL/h =

1,000 ~~mL~~ × 1 h/125 ~~mL~~ = 8 h

The primary IV will infuse for 8 hours. The IV PB will infuse for 30 minutes. Therefore, the primary IV will be interrupted by the IV PB and then will resume. The IV will be completely infused in 8 hours and 30 min.

(1315 + 8 h 30 min = 1315 + 0830 = 2145)

46) $\frac{D}{H} \times Q = \frac{12.5\ \cancel{\text{mg}}}{25\ \cancel{\text{mg}}} \times 1\ \text{mL} = \frac{12.5}{25}\ \text{mL} = 0.5\ \text{mL}$

Think: Although the recommendation is "not to exceed 25 mg/min," which is 1 mL of the dosage you have on hand, you don't have to give it that rapidly. The order requires 12.5 mg or half the maximum allowable amount to give in 1 min. Use the dose amount (0.5 mL) and administer that over 1 min (60 sec).

Give 0.5 mL/min or

$$\frac{0.5\ \text{mL}}{60\ \text{sec}} \times \frac{X\ \text{mL}}{15\ \text{sec}}$$

$60X = 7.5$

$\frac{60X}{60} = \frac{7.5}{60}$

$X = 0.125\ \text{mL} = 0.13\ \text{mL}$ (per 15 sec)

47) $\frac{D}{H} \times Q = \frac{\overset{15}{\cancel{1{,}500}\ \cancel{\text{mg}}}}{\underset{1}{\cancel{100}\ \cancel{\text{mg}}}} \times 1\ \text{mL} = \frac{15}{1}\ \text{mL} = 15\ \text{mL}$

48) 100 mL (IV PB) + 15 mL (med) = 115 mL (total to infuse in 30 min)

$$\frac{115\ \text{mL}}{\underset{1}{\cancel{30}\ \cancel{\text{min}}}} \times \overset{2}{\cancel{60}\ \cancel{\text{min}}}/\text{h} = 230\ \text{mL/h}$$