

**MEDICAL
MATHEMATICS
AND
DOSAGE
CALCULATIONS**



**FOR VETERINARY
PROFESSIONALS**

Second Edition

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SELF-ASSESSMENT

Objectives

1. Conduct a self-assessment.
2. Identify areas needed for review.

In a medical situation, the most beneficial drug can be rendered worthless or dangerous if the veterinarian or veterinary technician does not accurately calculate the dose. As many veterinary professionals can testify, it is not enough to have a superficial understanding of dosage calculation because superficial knowledge often fails in the crisis situation of an emergency. Therefore, it is important that veterinary professionals have the basics of dose and dosage calculation firmly entrenched in their working memory.

Learning theory and common sense tell us that any mental activity practiced on a routine basis becomes second nature. It is important that the veterinary professional practice these routine dosage calculation procedures on a regular basis in order to ensure greatest accuracy whenever a dose for a patient needs to be administered.

Another obligation of professionals is to accurately define the limits of their knowledge and to strengthen the weaker areas of their

skills or knowledge. To help you define the areas of math and dosage calculation that you need to refresh or review, complete the following self-assessment exercises.

For those sections of the self-assessment that you identify as areas where a review would be useful, work through the chapters and sections of the book to which that section of the self-assessment exercise refers.

SELF-ASSESSMENT EXERCISE

1. Add or subtract the following decimal numbers:

a) $1.5 + 2 =$

b) $1.9 + 9.7 =$

c) $4.55 + 7.43 =$

d) $0.52 + 0.09 =$

e) $0.003 + 1.0 =$

f) $5.5 - 2.5 =$

g) $6.0 - 3.9 =$

h) $13.125 - 1.50 =$

i) $0.251 - 0.095 =$

j) $0.00252 - 0.0009 =$

2. Multiply or divide the following decimal numbers:

a) $5 \times 2.5 =$

b) $3.0 \times 8.35 =$

c) $24.75 \times 12.35 =$

d) $0.02 \times 15.5 =$

e) $0.003 \times 0.0125 =$

f) $15 \div 2.5 =$

g) $2.5 \div 1.5 =$

h) $35 \div 0.5 =$

i) $0.25 \div 0.125 =$

j) $0.010 \div 0.0025 =$

3. Round the following decimal numbers to the nearest $1/100$ and the nearest $1/10$:

a) $10.594 =$

b) $4.682 =$

c) $1.233 =$

d) $9.452 =$

e) $23.675 =$

4. Simplify the following fractions to their lowest form (e.g., $6/8 = 3/4$):

a) $\frac{2}{10} =$

b) $\frac{4}{16} =$

c) $\frac{3}{12} =$

d) $1\frac{6}{8} =$

e) $5\frac{4}{32} =$

5. Add or subtract the following fractions:

a) $\frac{3}{4} + \frac{1}{4} =$

b) $\frac{1}{16} + \frac{3}{32} =$

c) $\frac{2}{5} + \frac{1}{6} =$

d) $1\frac{1}{2} + 2\frac{3}{4} =$

e) $4\frac{2}{3} + 5\frac{7}{8} =$

f) $\frac{1}{2} - \frac{1}{4} =$

g) $\frac{2}{3} - \frac{1}{6} =$

h) $1\frac{3}{4} - \frac{7}{8} =$

i) $3\frac{15}{16} - 2\frac{3}{8} =$

j) $45\frac{1}{5} - 33\frac{7}{8} =$

6. Multiply the following fractions:

a) $\frac{1}{2} \times \frac{1}{2} =$

b) $\frac{3}{4} \times \frac{1}{2} =$

c) $\frac{3}{4} \times \frac{12}{16} =$

d) $\frac{7}{8} \times 1\frac{1}{2} =$

e) $\frac{11}{16} \times \frac{3}{4} =$

f) $2\frac{3}{4} \times 4\frac{1}{2} =$

g) $5\frac{4}{7} \times 1\frac{3}{4} =$

h) $10\frac{3}{8} \times 9\frac{1}{3} =$

7. Divide the following fractions:

a) $\frac{1}{2} \div \frac{1}{4} =$

b) $2\frac{1}{2} \div \frac{1}{2} =$

c) $3\frac{3}{4} \div \frac{1}{16} =$

d) $22\frac{4}{8} \div \frac{2}{32} =$

e) $125\frac{1}{5} \div \frac{4}{25} =$

8. Convert the following fractions to decimal numbers (e.g., $1/2 = 0.5$):

a) $\frac{2}{10} =$

b) $\frac{14}{28} =$

c) $\frac{3}{21} =$

d) $1\frac{1}{2} =$

e) $4\frac{5}{6} =$

f) $15\frac{7}{16} =$

9. Convert the following decimal numbers to the common fraction (e.g., $0.5 = 1/2$):

a) $0.25 =$

b) $0.333 =$

c) $0.75 =$

d) $0.125 =$

e) $1.5 =$

f) $2.500 =$

10. Convert the following percentages to decimal numbers:

a) $25\% =$

b) $79\% =$

c) $100\% =$

d) $6\% =$

e) $0.2\% =$

f) $0.0087\% =$

11. Convert the following decimal numbers to percentages:

a) $0.5 =$

b) $0.45 =$

c) $1.00 =$

d) $0.103 =$

e) $0.90023 =$

12. Convert the following percentages to commonly used fractions (e.g., $50\% = 1/2$):

a) $25\% =$

b) $75\% =$

c) $33.3\% =$

d) $10\% =$

e) $80\% =$

13. Convert the following fractions to percentages (e.g., $1/2 = 50\%$):

a) $\frac{3}{4} =$

b) $\frac{8}{10} =$

c) $\frac{15}{45} =$

d) $\frac{10}{10} =$

e) $\frac{1}{1000} =$

14. What is 25% of 40?

15. A veterinarian wants to use 50% of 150 mg calculated dose. How much drug (in milligrams) would he be giving?

16. What percentage is 3 of 15?

17. A veterinary technician has drawn up 5 mg of the total dose of 20 mg of drug that she needs to give an animal. What percentage of the total dose has she drawn up so far?

18. Solve for the missing X for each of the following:

a) $15 + X = 30 + 45$

b) $5 + 10 = 7 + X$

c) $X + 2.5 = 5.25 + 1.05$

d) $40 - X = 65 - 38$

e) $6.5 - 2.3 = 7.8 - X$

f) $X - 14.2 = 53.4 - 41.9$

19. Solve for the missing X for each of the following:

a) $2 \times 6 = 3 \times X$

b) $30 \times X = 120 \times 2$

c) $X \times 25.5 = 43.2 \times 12.25$

d) $25 \div 5 = 10 \div X$

e) $300 \div X = 12.5 \div 8.125$

f) $X \div 25 = 0.5 \div 0.75$

20. Solve for the missing X in the following proportions:

a) $\frac{2}{8} = \frac{X}{16}$

b) $\frac{4}{16} = \frac{3}{X}$

c) $\frac{X}{32} = \frac{18}{9}$

d) $\frac{12}{2} = \frac{X}{6}$

e) $\frac{9}{X} = \frac{36}{12}$

SELF-ASSESSMENT EXERCISE ANSWERS

Check the answers below for each of the questions above. Each answer section directs you to a section of this book that reviews how to perform each set of equations.

1. *FOR REVIEW OF THIS SECTION, SEE Chapter 2, Sections I and II.*

- a) 3.5
- b) 11.6
- c) 11.98
- d) 0.61
- e) 1.003
- f) 3
- g) 2.1
- h) 11.625
- i) 0.156
- j) 0.00162 or 1.62×10^{-3}

2. *FOR REVIEW OF THIS SECTION, SEE Chapter 2, Sections III and IV.*

- a) 12.5
- b) 25.05
- c) 305.6625
- d) 0.31

e) 0.0000375 or 3.75×10^{-5}

f) 6

g) 1.667

h) 70

i) 2

j) 4

3. *FOR REVIEW OF THIS SECTION, SEE*
Chapter 2, Section V.

a) 10.59 10.6

b) 4.68 4.7

c) 1.23 1.2

d) 9.45 9.5

e) 23.68 23.7

4. *FOR REVIEW OF THIS SECTION, SEE*
Chapter 3, Section I.

a) $\frac{1}{5}$

b) $\frac{1}{4}$

c) $\frac{1}{4}$

d) $1\frac{3}{4}$

e) $5\frac{1}{8}$

5. FOR REVIEW OF THIS SECTION, SEE Chapter 3, Section II.

a) 1

b) $\frac{5}{32}$

c) $\frac{17}{30}$

d) $4\frac{1}{4}$

e) $10\frac{13}{24}$

f) $\frac{1}{4}$

g) $\frac{3}{6} = \frac{1}{2}$

h) $\frac{7}{8}$

i) $1\frac{9}{16}$

j) $11\frac{13}{40}$

6. *FOR REVIEW OF THIS SECTION, SEE Chapter 3, Section III.*

a) $\frac{1}{4}$

b) $\frac{3}{8}$

c) $\frac{9}{16}$

d) $1\frac{5}{16}$

e) $\frac{33}{64}$

f) $12\frac{3}{8}$

g) $9\frac{3}{4}$

h) $96\frac{10}{12} = 96\frac{5}{6}$

7. *FOR REVIEW OF THIS SECTION, SEE Chapter 3, Section IV.*

a) 2

b) 5

c) 60

d) 360

e) $782\frac{1}{2}$

8. *FOR REVIEW OF THIS SECTION, SEE Chapter 3, Section V.*

a) 0.2

b) 0.5

c) 0.142857

d) 1.5

e) 4.833

f) 15.4375

9. *FOR REVIEW OF THIS SECTION, SEE*
Chapter 3, Section VI.

a) $\frac{1}{4}$

b) $\frac{1}{3}$

c) $\frac{3}{4}$

d) $\frac{1}{8}$

e) $1\frac{1}{2}$

f) $2\frac{1}{2}$

10. *FOR REVIEW OF THIS SECTION, SEE*
Chapter 4, Section I.

a) 0.25

b) 0.79

c) 1

d) 0.06

e) 0.002

f) 0.000087

11. *FOR REVIEW OF THIS SECTION, SEE Chapter 4, Section I.*

a) 50%

b) 45%

c) 100%

d) 10.3%

e) 90.023%

12. *FOR REVIEW OF THIS SECTION, SEE Chapter 4, Section I.*

a) $\frac{1}{4}$

b) $\frac{3}{4}$

c) $\frac{1}{3}$

d) $\frac{1}{10}$

e) $\frac{8}{10} = \frac{4}{5}$

13. *FOR REVIEW OF THIS SECTION, SEE Chapter 4, Section I.*

- a) 75%
- b) 80%
- c) 33.3%
- d) 1%
- e) 0.1%

FOR REVIEW OF QUESTIONS 14 THROUGH 17, SEE Chapter 4, Section II.

14. 10

15. 75 mg

16. 20%

17. 25%

18. *FOR REVIEW OF THIS SECTION, SEE Chapter 5, Section I.*

- a) $X = 60$
- b) $X = 8$
- c) $X = 3.8$
- d) $X = 13$

e) $X = 3.6$

f) $X = 25.7$

19. *FOR REVIEW OF THIS SECTION, SEE Chapter 5, Section II.*

a) $X = 4$

b) $X = 8$

c) $X = 20.75$

d) $X = 2$

e) $X = 195$

f) $X = 16.67$

20. *FOR REVIEW OF THIS SECTION, SEE Chapter 5, Section II.*

a) $X = 4$

b) $X = 12$

c) $X = 64$

d) $X = 36$

e) $X = 3$