

Pharmacy Math Practice Set: 50 Original Questions with Worked Answers

Not affiliated with PTCB or NHA. This is an original math practice set written for study only. Every question uses made-up numbers and is not taken from any real exam. It is not medical advice; never use it to dose a real patient. Always follow your pharmacist, your employer's policies and the official exam content outline.

Questions

Conversions

1. Convert 2.5 grams to milligrams.
2. Convert 750 micrograms to milligrams.
3. How many milliliters are in 1.8 liters?
4. A patient weighs 154 lb. What is the weight in kilograms? (1 kg = 2.2 lb)
5. Convert 32 kg to pounds. (1 kg = 2.2 lb)
6. How many teaspoons are in 30 mL? (1 tsp = 5 mL)
7. How many milliliters are in 3 tablespoons? (1 tbsp = 15 mL)
8. Convert 8 fluid ounces to milliliters. (1 fl oz = 30 mL, the common pharmacy rounding)
9. Convert 104 °F to °C. Use $^{\circ}\text{C} = (^{\circ}\text{F} - 32) \times 5/9$.
10. Convert 15 °C to °F. Use $^{\circ}\text{F} = (^{\circ}\text{C} \times 9/5) + 32$.
11. Write the Roman numeral XIV as a number.
12. Write 90 as a Roman numeral.

Ratio, proportion and dose

13. A liquid contains 125 mg per 5 mL. How many mL contain 300 mg?
14. Tablets are 25 mg each. How many tablets supply a 62.5 mg dose?
15. A vial holds 40 mg/mL. How many mL are needed for 100 mg?
16. An oral liquid is 250 mg/5 mL. How many mg are in 8 mL?
17. A 10 mL vial contains 500 mg total. What is the concentration in mg/mL?
18. A prescriber orders 0.2 g. Tablets on hand are 100 mg. How many tablets?
19. An order calls for 4 mg/kg for a 25 kg child. What is the dose?
20. An order is 15 mg/kg/day divided into 3 equal doses for a 20 kg child. How many mg per dose?
21. A patient weighs 176 lb. The order is 2 mg/kg. What is the dose? (1 kg = 2.2 lb)
22. A suspension is 100 mg/5 mL. The dose is 150 mg. How many teaspoons is that? (1 tsp = 5 mL)

Days supply and quantity

23. Sig: 1 tablet twice daily. Quantity 60. What is the days supply?
24. Sig: 2 capsules three times daily for 10 days. How many capsules to dispense?
25. Sig: 10 mL twice daily. Bottle is 300 mL. Days supply?
26. Sig: 1 tablet every 6 hours. Quantity 28. Days supply?
27. Sig: 1 tablet daily for 5 days, then $\frac{1}{2}$ tablet daily for 10 days. How many tablets total?
28. An inhaler holds 200 puffs. Sig: 2 puffs four times daily. Days supply?

29. Eye drops: 1 drop in each eye twice daily. A 5 mL bottle; assume 20 drops per mL. Days supply?

30. Insulin vial: 10 mL at 100 units/mL. Sig: 25 units daily. How many full days does it last?

Percent, ratio strength and dilution

31. How many grams of drug are in 200 mL of a 5% w/v solution?

32. How many grams of active ingredient are in 60 g of a 2.5% w/w cream?

33. What is the percent strength (w/v) of 4 g in 250 mL?

34. Express a 1:500 ratio strength as a percent.

35. How many mg are in 1 mL of a 1:1,000 solution (w/v)?

36. How many mL of a 20% stock are needed to make 400 mL of a 5% solution? ($C_1V_1 = C_2V_2$)

37. You dilute 50 mL of a 10% solution to 250 mL. What is the new strength?

38. How many grams of dextrose are in 500 mL of D10W? (D10W = 10% dextrose w/v)

39. Alligation: how many parts of 70% and 20% alcohol make 40%? Give the parts and the mL of each for 500 mL.

40. Alligation: mix 15% and 5% ointment to make 120 g of 10%. How many grams of each?

IV flow rates

41. Infuse 1,000 mL over 8 hours. What is the rate in mL/hr?

42. Infuse 500 mL over 4 hours with a 15 gtt/mL set. Drops per minute?

43. A bag runs at 75 mL/hr. How long will 900 mL last?

44. 100 mL to run over 30 minutes with a 10 gtt/mL set. Drops per minute?

45. A bag contains 250 mg of drug in 250 mL. The order is 20 mg/hr. What is the rate in mL/hr?

46. A pump runs at 50 mL/hr. How many mL are given in 24 hours?

Business math

47. Acquisition cost is \$40.00. Markup is 25% of cost. What is the selling price?

48. A bottle of 500 tablets costs \$85.00. What is the cost of 30 tablets?

49. Selling price \$36.00, cost \$27.00. What is the gross profit, and the markup as a percent of cost?

50. An item is \$120.00 and is discounted 15%. What is the sale price?

Answer key with worked solutions

1. **2,500 mg.** $1\text{ g} = 1,000\text{ mg}$, so $2.5 \times 1,000 = 2,500\text{ mg}$.
2. **0.75 mg.** $1\text{ mg} = 1,000\text{ mcg}$, so $750 \div 1,000 = 0.75\text{ mg}$.
3. **1,800 mL.** $1\text{ L} = 1,000\text{ mL}$, so $1.8 \times 1,000 = 1,800\text{ mL}$.
4. **70 kg.** $154 \div 2.2 = 70\text{ kg}$.
5. **70.4 lb.** $32 \times 2.2 = 70.4\text{ lb}$.
6. **6 teaspoons.** $30 \div 5 = 6\text{ tsp}$.
7. **45 mL.** $3 \times 15 = 45\text{ mL}$.
8. **240 mL.** $8 \times 30 = 240\text{ mL}$.
9. **40 °C.** $(104 - 32) \times 5/9 = 72 \times 5/9 = 40\text{ °C}$.
10. **59 °F.** $15 \times 9/5 = 27$; $27 + 32 = 59\text{ °F}$.
11. **14.** $X = 10$, $IV = 4$, so $10 + 4 = 14$.
12. **XC.** $90 = 100 - 10$, written XC.
13. **12 mL.** $125\text{ mg} / 5\text{ mL} = 300\text{ mg} / x$. $x = 300 \times 5 \div 125 = 12\text{ mL}$.
14. **2.5 tablets.** $62.5 \div 25 = 2.5\text{ tablets}$.
15. **2.5 mL.** $100 \div 40 = 2.5\text{ mL}$.
16. **400 mg.** $250 \div 5 = 50\text{ mg/mL}$; $50 \times 8 = 400\text{ mg}$.
17. **50 mg/mL.** $500 \div 10 = 50\text{ mg/mL}$.
18. **2 tablets.** $0.2\text{ g} = 200\text{ mg}$; $200 \div 100 = 2\text{ tablets}$.
19. **100 mg.** $4 \times 25 = 100\text{ mg}$.
20. **100 mg per dose.** $15 \times 20 = 300\text{ mg/day}$; $300 \div 3 = 100\text{ mg per dose}$.
21. **160 mg.** $176 \div 2.2 = 80\text{ kg}$; $80 \times 2 = 160\text{ mg}$.
22. **1.5 teaspoons.** $150 \div 100 \times 5 = 7.5\text{ mL}$; $7.5 \div 5 = 1.5\text{ tsp}$.
23. **30 days.** 2 tablets/day ; $60 \div 2 = 30\text{ days}$.
24. **60 capsules.** $2 \times 3 = 6\text{ per day}$; $6 \times 10 = 60\text{ capsules}$.
25. **15 days.** 20 mL/day ; $300 \div 20 = 15\text{ days}$.
26. **7 days.** $24 \div 6 = 4\text{ tablets/day}$; $28 \div 4 = 7\text{ days}$.
27. **10 tablets.** $5 \times 1 = 5$; $10 \times 0.5 = 5$; total 10 tablets.
28. **25 days.** 8 puffs/day ; $200 \div 8 = 25\text{ days}$.
29. **25 days.** $5 \times 20 = 100\text{ drops}$. $2\text{ eyes} \times 2\text{ times} = 4\text{ drops/day}$. $100 \div 4 = 25\text{ days}$.
30. **40 days.** $10 \times 100 = 1,000\text{ units}$; $1,000 \div 25 = 40\text{ days}$.

- 31. 10 g.** $5\% \text{ w/v} = 5 \text{ g per } 100 \text{ mL}; 200 \text{ mL} \times 5/100 = 10 \text{ g}.$
- 32. 1.5 g.** $60 \times 0.025 = 1.5 \text{ g}.$
- 33. 1.6% w/v.** $4 \div 250 \times 100 = 1.6\%.$
- 34. 0.2%.** $1 \div 500 \times 100 = 0.2\%.$
- 35. 1 mg.** $1:1,000 = 1 \text{ g per } 1,000 \text{ mL} = 1 \text{ mg/mL}.$
- 36. 100 mL of stock (plus 300 mL diluent).** $20 \times V_1 = 5 \times 400; V_1 = 2,000 \div 20 = 100 \text{ mL}.$
- 37. 2%.** $10 \times 50 = C_2 \times 250; C_2 = 500 \div 250 = 2\%.$
- 38. 50 g.** $10 \text{ g/}100 \text{ mL} \times 500 = 50 \text{ g}.$
- 39. 200 mL of 70% and 300 mL of 20% (2:3 ratio).** 70% gets $40 - 20 = 20$ parts; 20% gets $70 - 40 = 30$ parts. Total 50 parts. 70%: $20/50 \times 500 = 200 \text{ mL};$ 20%: $30/50 \times 500 = 300 \text{ mL}.$
- 40. 60 g of 15% and 60 g of 5%.** 15% gets $10 - 5 = 5$ parts; 5% gets $15 - 10 = 5$ parts. Equal parts: 60 g each.
- 41. 125 mL/hr.** $1,000 \div 8 = 125 \text{ mL/hr}.$
- 42. About 31 gtt/min.** $500 \div 240 \text{ min} = 2.083 \text{ mL/min}; \times 15 = 31.25,$ about 31 gtt/min.
- 43. 12 hours.** $900 \div 75 = 12 \text{ hours}.$
- 44. About 33 gtt/min.** $100 \times 10 = 1,000 \text{ drops} \div 30 \text{ min} = 33.3,$ about 33 gtt/min.
- 45. 20 mL/hr.** $250 \text{ mg} \div 250 \text{ mL} = 1 \text{ mg/mL}; 20 \text{ mg/hr} \div 1 = 20 \text{ mL/hr}.$
- 46. 1,200 mL.** $50 \times 24 = 1,200 \text{ mL}.$
- 47. \$50.00.** $40 \times 0.25 = \$10.00; 40 + 10 = \$50.00.$
- 48. \$5.10.** $85 \div 500 = \$0.17 \text{ per tablet}; 0.17 \times 30 = \$5.10.$
- 49. \$9.00 profit; 33.3% markup on cost.** $36 - 27 = \$9.00; 9 \div 27 \times 100 = 33.3\%.$
- 50. \$102.00.** $120 \times 0.15 = \$18.00; 120 - 18 = \$102.00.$

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