

Ratios and Proportions Worksheet

with Examples from Geography, Nursing, Medical, Science Professions

Nursing

1. A pediatric nurse receives an order from the doctor to administer a certain drug to a patient. The order reads 25 mg per kg of body weight. The drug is packaged such that there is 5 g of the drug per 20 cc of solution. How many cc do you administer to a 30 lb. child?
2. A nurse anesthetist is ordered to administer 1000 cc of a drug over an 8-hour period. What should the drip rate be per minute?
3. Every minute a human breathes 10 pints of air into the lungs. How many pints are breathed in a 24-hour period.
4. A client who weighs 60kg is to be given a drug at 2 mg/kg. Stock strength is 40 mg/2ml. What volume of the drug should they be given?
5. The order reads 500 mcg. Scored tablets available contain 1.2 mg. How many tablets should be given?

Medical

6. Mometasone cream is used to treat Atopic Dermatitis (aka Eczema). Within each gram of cream in the tube is 1 mg Mometasone furoate (the active ingredient), 600 mg of petroleum/petroleum derivatives, 190 mg of purified water, 9 mg of phosphoric acid, and the rest white wax. If you are asked to prepare a 15 gram tube, how much of each ingredient listed will be needed?
7. The ratio of the weight of an average adult male to his weight as a year-old baby is 81 to 11.1. What would be the adult weight of a male who weighed 20 pounds at 1 year of age?
8. You are a pharmacist at a hospital. You see that a doctor has requested 300 mg of morphine. 250 cc containers contain 208 and a third mg of morphine. How many cc's should the pharmacist prepare to fill the doctor's order?
9. A certain drug must be administered at a rate of 10 mg per pound of body weight per day. If a 45-pound dog is given this medication in three doses per day, how much should each dose contain?

Science

10. It is reported from sensors that 240 inches of snow was dropped in NYC in a 5-hour timeframe. To report this finding to the public, you are asked to report how many feet of snow fell per hour.
11. The current exchange rate for 1 USD is 0.94 Euros. You sell 10 shares of a stock for a client that is listed in France at 56 Euros per share. How many USD will the client receive in their cash account?
12. A map of Utah says that 1 cm is equal to 25 miles. If 2 towns on the map are 3 cm apart, how far apart are they in real life?
13. x ml of a non-alcoholic solution are added to y ml of a 30% alcohol solution to weaken it. How many ml of alcohol are in the resulting mixture?

Ratios and Proportions

① 25 mg/kg

Packaged: $5\text{g}/20 \text{ cc sol.}$

How many cc do you administer to a 30 lb. child?

$$30 \text{ lb} = 13.6078 \text{ Kg.}$$

$$13.6078 (25) = 340.195 \text{ mg/Kg}$$

$$1\text{g} = 1,000 \text{ mg}$$

$$340.195 \text{ mg} = 0.340195 \text{ g}$$

$$\frac{5\text{g}}{20\text{cc}} = \frac{0.340195\text{g}}{x \text{ (cc)}}$$

$$x = 1.36078 \text{ cc}$$

$$x \approx 1.4 \text{ cc of solution}$$

② 1000 cc of drug over 8 hour period
What's the drip rate per minute?

$$8 \text{ hours} = 60(8) = 480 \text{ minutes}$$

$$1\text{cc} = 1\text{ml}$$

$$1000 \text{ cc} = 1\text{ml}$$

$$\frac{1000\text{ml}}{480\text{min}} = \frac{x}{1\text{min}}$$

$$\frac{1000\text{ml} (1\text{min})}{480} = \frac{480 \text{ min} (x)}{480}$$

$$x = 2.08\bar{3}$$

$$x \approx 2 \text{ drops/min}$$

③ 10 pints of air/min.

of pints in 24 hours?

24 hrs = 1440 min

(by 24 (60 min = 1 hr))

$$\frac{10 \text{ pints}}{1 \text{ min}} = \frac{x \text{ pints}}{1440 \text{ min}}$$

$$10(1440) = x \text{ pints}$$

$$\boxed{14,400 \text{ pints} = x}$$

④ 60 kg @ 2 mg/kg \rightarrow 1000 ml/kg \rightarrow 1000 ml = 1 kg

Stock strength: 40 mg / 2 ml \rightarrow $\frac{40 \text{ mg}}{0.002 \text{ kg}}$

What volume of the drug should they be given?

$$\frac{2 \text{ mg}}{1 \text{ kg}} = \frac{40 \text{ mg}}{0.002 \text{ kg}}$$

$$\frac{2}{60 \text{ kg}} = \frac{20,000 \text{ mg/kg}}{x}$$

⑤ Order: 500 mcg (micrograms) \rightarrow ORDER 0.5 mg

Tablets are available: 1.2 mg (milligrams)

How many tablets should be given?

$$500 \text{ mcg} = 0.5 \text{ mg}$$

$\boxed{1 \text{ tablet needs to be given}}$

⑥ 1 gram = 1000 mg.

- 1000 mg of cream \rightarrow 1 mg \rightarrow mometasone
 \rightarrow 600 mg \rightarrow petroleum
 \rightarrow 190 mg \rightarrow water
 \rightarrow 9 mg \rightarrow phosphoric acid
 \rightarrow x mg \rightarrow white wax

$$1 + 600 + 190 + 9 + x = 1000$$
$$\begin{array}{r} 800 + x = 1000 \\ - 800 \quad - 800 \\ \hline x = 200 \end{array}$$

x = 200 mg of white wax

To prep a 15 gram tube, how much of each ingredient listed is needed?

15g = 15,000 mg \rightarrow 1 mg of

$$\frac{15g}{x} = \frac{1g}{1000}$$

- | | |
|-------------------------|---|
| \rightarrow 600 mg of | mometasone \rightarrow 1 (15) = 15 mg |
| \rightarrow 190 mg of | petroleum \rightarrow 600 (15) = 9000 mg |
| \rightarrow 9 mg of | water \rightarrow 190 (15) = 2850 mg |
| \rightarrow 200 mg of | phosphoric acid \rightarrow 9 (15) = 135 mg |
| | white wax \rightarrow 200 (15) = 3000 mg |

Check:
 $15 + 9,000 + 2,850 + 135 + 3,000 \stackrel{?}{=} 15,000$
 $15000 = 15000 \checkmark$

⑦ 81 adult: 11.1 baby

$$\frac{81}{11.1} = \frac{x}{20} \rightarrow \frac{81(20)}{11.1} = \frac{11.1x}{11.1}$$

$$x = \frac{81(20)}{11.1} \rightarrow x = \frac{1620}{11.1} \rightarrow \boxed{x \approx 145.95 \text{ lbs}}$$

⑧ Request: 300 mg of morphine

250 cc containers have 208 $\frac{1}{3}$ mg of morphine.

How many cc's should the pharmacist prep to fill the doctor's order?

$$208 \frac{1}{3} = \frac{625}{3} \text{ for } 250 \text{ cc}$$

$$\frac{625}{3} (2) = \frac{1250}{3} \text{ for } 500 \text{ cc}$$

$$\frac{500 \text{ cc}}{2 \text{ cont.}} = \frac{\frac{1250}{3}}{x}$$

$$\frac{(\frac{1250}{3})2}{500} = \frac{500x}{500}$$

$$x = 1.\bar{6}$$

x \approx 1.7 containers

$$\frac{500 \text{ cc}}{2 \text{ containers}} = \frac{x \text{ cc}}{1.7 \text{ cont.}}$$

$$\frac{500(1.7)}{2} = \frac{2x}{2}$$

$$\boxed{x = 425 \text{ cc}}$$

9) 10 mg/lb. of body weight/day

45 lb dog \rightarrow 3 doses a day

$$\frac{10 \text{ mg}}{1 \text{ lb}} = \frac{x}{45 \text{ lb}} \rightarrow 10(45) = x$$
$$450 \text{ mg/lb} = x$$

3 doses a day $\rightarrow \frac{450}{3} = \boxed{150 \text{ mg per dose}}$

10) 240" / 5 hours

$$\frac{240 \text{ inches}}{5 \text{ hrs}} = \frac{20 \text{ ft}}{5 \text{ hrs.}} \rightarrow \frac{20 \text{ ft}}{5 \text{ hrs.}} = \frac{x}{1 \text{ hr.}}$$

$$\frac{20 \text{ ft/hr}}{5 \text{ hours}} = \frac{5 \text{ hrs (x)}}{5 \text{ hrs.}}$$

$$\boxed{x = 4 \text{ ft.}}$$

11) 1 USD = 0.94 Euros

Sell 10 shares of stock at 56 Euros/share

How much is 56 Euros in USD?

$$\frac{1 \text{ USD}}{0.94 \text{ E}} = \frac{x}{56 \text{ E}}$$

$$\frac{0.94 \text{ E } x}{0.94 \text{ E}} = \frac{1 \text{ USD } (56 \text{ E})}{0.94 \text{ E}}$$

$$\boxed{x = 59.57 \text{ USD}}$$

(12) $1 \text{ cm} = 25 \text{ miles}$

$3 \text{ cm} = x$

$$\frac{1 \text{ cm}}{25 \text{ mi}} = \frac{3 \text{ cm}}{x \text{ mi}}$$

$$\frac{(1 \text{ cm})(x \text{ mi})}{1 \text{ cm}} = \frac{25 \text{ mi}(3 \text{ cm})}{1 \text{ cm}}$$

$$x \text{ mi} = 25 \text{ m}(3)$$

$$x = 75 \text{ miles}$$

(13)

$$.3y$$