

Section 2.1 – Practice Problems

Simplify the following fractions and write the answer as a ratio.

$$1. \frac{12}{24} = \frac{1}{2} \quad \left| \quad 2. \frac{14}{21} = \frac{2}{3} \quad \left| \quad 3. \frac{6}{15} = \frac{2}{5} \quad \left| \quad 4. \frac{15}{25} = \frac{3}{5}$$

Multiply the following proper fractions, simplify the answer and write the result as a ratio.

$$5. \frac{2}{18} \cdot \frac{8}{7} = \frac{4}{7} \quad 4:7 \quad \left| \quad 6. \frac{14}{18} \cdot \frac{20}{40} = \frac{4}{10} = \frac{2}{5} \quad 2:5 \quad \left| \quad 7. \frac{1}{18} \cdot \frac{8}{11} = \frac{2}{11} \quad 2:11$$

$$8. \frac{1}{8} \cdot \frac{16}{35} = \frac{2}{35} \quad 2:35 \quad \left| \quad 9. \frac{12}{12} \cdot \frac{12}{22} = \frac{1}{2} \quad 1:2 \quad \left| \quad 10. \frac{14}{17} \cdot \frac{7}{56} = \frac{7}{14} = \frac{1}{2} \quad 1:2$$

Multiply the following improper fractions, simplify the answer and write the result as a ratio.

$$11. \frac{5}{18} \cdot \frac{9}{4} = \frac{15}{4} \quad 15:4 \quad \left| \quad 12. \frac{17}{15} \cdot \frac{60}{40} = \frac{12}{7} \quad 12:7 \quad \left| \quad 13. \frac{38}{18} \cdot \frac{22}{11} = \frac{6}{1} \quad 6:1$$

$$14. \frac{13}{18} \cdot \frac{16}{24} = \frac{26}{27} = \frac{13}{12} \quad 13:12 \quad \left| \quad 15. \frac{13}{12} \cdot \frac{48}{22} = \frac{26}{11} \quad 26:11 \quad \left| \quad 16. \frac{315}{17} \cdot \frac{56}{88} = \frac{24}{11} \quad 24:11$$

17. Explain why multiplying always works when doing conversions.

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18. When you are adjusting a list of measurements by a given ratio, what item should you base your conversions on and why?

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19. Find a recipe that you like to cook or would want to cook and list the ingredients and their quantities below.

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Using that recipe as a guide.

i) Triple the batch

ii) Half the batch

Section 2.2 – Practice Problems

Perform the following conversions and show the ratio being used and the cancelling of units, does your answer make sense?

Convert the following measurements to centimeters.

1. 3245 km

$$3245 \text{ km} \cdot \frac{1000 \text{ m}}{1 \text{ km}} = 3\,245\,000 \text{ m}$$

$$3\,245\,000 \text{ m} \cdot \frac{100 \text{ cm}}{1 \text{ m}} = \boxed{324\,500\,000 \text{ cm}}$$

2. 6.2 miles

$$6.2 \text{ miles} \cdot \frac{5280 \text{ ft}}{1 \text{ mile}} = 32736 \text{ ft} \rightarrow 392832 \text{ in} \cdot \frac{2.54 \text{ cm}}{1 \text{ in}}$$

$$32736 \text{ ft} \cdot \frac{12 \text{ in}}{1 \text{ ft}} = 392832 \text{ in} = \boxed{997\,793.3 \text{ cm}}$$

3. 984 yards

$$984 \text{ yds} \cdot \frac{3 \text{ ft}}{1 \text{ yd}} = 2952 \text{ ft} \rightarrow 35424 \text{ in} \cdot \frac{2.54 \text{ cm}}{1 \text{ in}}$$

$$2952 \text{ ft} \cdot \frac{12 \text{ in}}{1 \text{ ft}} = 35424 \text{ in} = \boxed{89\,977.0 \text{ cm}}$$

4. 784.56 ft

$$784.56 \text{ ft} \cdot \frac{12 \text{ in}}{1 \text{ ft}} = 9414.72 \text{ in}$$

$$9414.72 \text{ in} \cdot \frac{2.54 \text{ cm}}{1 \text{ in}} = \boxed{23\,913.4 \text{ cm}}$$

5. 0.003 yards

$$0.003 \text{ yds} \cdot \frac{3 \text{ ft}}{1 \text{ yd}} \cdot \frac{12 \text{ in}}{1 \text{ ft}} \cdot \frac{2.54 \text{ cm}}{1 \text{ in}} = 0.003 \cdot 3 \cdot 12 \cdot 2.54$$

$$= \boxed{0.274 \text{ cm}}$$

Convert the following measurements to feet.

6. 12 690 miles

$$12690 \text{ miles} \cdot \frac{5280 \text{ ft}}{1 \text{ mile}} = \boxed{67\,003\,200 \text{ ft}}$$

7. 0.567 km

$$0.567 \text{ km} \cdot \frac{1000 \text{ m}}{1 \text{ km}} \cdot \frac{1 \text{ ft}}{0.305 \text{ m}} = \frac{0.567 \cdot 1000}{0.305} = \boxed{1859.0 \text{ ft}}$$

8. 1 234 567 mm

$$1234567 \text{ mm} \cdot \frac{1 \text{ cm}}{10 \text{ mm}} \cdot \frac{1 \text{ m}}{100 \text{ cm}} \cdot \frac{1 \text{ ft}}{0.305 \text{ m}} = \frac{1234567}{10 \cdot 100 \cdot 0.305} = \boxed{4047.8 \text{ ft}}$$

9. 3.4 cm

$$3.4 \text{ cm} \cdot \frac{1 \text{ m}}{100 \text{ cm}} \cdot \frac{1 \text{ ft}}{0.305 \text{ m}} = \frac{3.4}{100 \cdot 0.305} = \boxed{0.11 \text{ ft}}$$

Convert the following measurement to miles.

10. 43 567 in

$$43567 \text{ in} \cdot \frac{1 \text{ ft}}{12 \text{ in}} \cdot \frac{1 \text{ mile}}{5280 \text{ ft}} = \frac{43567}{12 \cdot 5280} = \boxed{0.69 \text{ mile}}$$

11. 3562 cm

$$3562 \text{ cm} \cdot \frac{1 \text{ m}}{100 \text{ cm}} \cdot \frac{1 \text{ km}}{1000 \text{ m}} \cdot \frac{1 \text{ mile}}{1.609 \text{ km}} = \frac{3562}{100 \cdot 1000 \cdot 1.609} = \boxed{0.02 \text{ mile}}$$

12. 0.392 m

$$0.392 \text{ m} \cdot \frac{1 \text{ km}}{1000 \text{ m}} \cdot \frac{1 \text{ mile}}{1.609 \text{ km}} = \frac{0.392}{1000 \cdot 1.609} = \boxed{0.0002 \text{ mile}}$$

Convert the following measurements to meters.

13. 9 miles

$$9 \text{ miles} \cdot \frac{5280 \text{ ft}}{1 \text{ mile}} \cdot \frac{0.305 \text{ m}}{1 \text{ ft}} = \boxed{14493.6 \text{ m}}$$

14. 15 555 in

$$15\,555 \text{ in} \cdot \frac{1 \text{ ft}}{12 \text{ in}} \cdot \frac{0.305 \text{ m}}{1 \text{ ft}} = \frac{15\,555 \cdot 0.305}{12} = \boxed{395.4 \text{ m}}$$

15. 38.76 yds

$$38.76 \text{ yds} \cdot \frac{3 \text{ ft}}{1 \text{ yd}} \cdot \frac{0.305 \text{ m}}{1 \text{ ft}} = 38.76 \cdot 3 \cdot 0.305 = \boxed{35.5 \text{ m}}$$

16. Come up with three of your own questions, of varying level of difficulty. Solve them, these will be used in class at a later date.

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Section 2.3 – Practice Problems

Perform the following MASS conversions.

1. Convert 2.3T to Ounces

$$2.3T \cdot \frac{2000\text{lbs}}{1T} \cdot \frac{16\text{oz}}{1\text{lb}} = 2.3 \cdot 2000 \cdot 16 = \boxed{73600\text{oz}}$$

2. Convert 23.5lbs to milligrams

$$23.5\text{lbs} \cdot \frac{16\text{oz}}{1\text{lb}} \cdot \frac{1\text{g}}{0.03527\text{oz}} \cdot \frac{1000\text{mg}}{1\text{g}} = 10660618\text{mg}$$

$$= \boxed{10660000\text{mg}}$$

3. Convert 13.4kg to pounds

$$13.4\text{kg} \cdot \frac{2.2046\text{lb}}{1\text{kg}} = \boxed{29.54\text{lbs}}$$

4. Convert 13465oz to tonnes (Metric)

$$13465\text{oz} \cdot \frac{1\text{g}}{0.03527\text{oz}} \cdot \frac{1\text{kg}}{1000\text{g}} \cdot \frac{1\text{t}}{1000\text{kg}} = \boxed{0.3817\text{t}}$$

5. Convert 3.4T to milligrams

$$3.4T \cdot \frac{2000\text{lbs}}{1T} \cdot \frac{16\text{oz}}{1\text{lb}} \cdot \frac{1\text{g}}{0.03527\text{oz}} \cdot \frac{1000\text{mg}}{1\text{g}} = 3084774596\text{mg}$$

$$= \boxed{3085000000\text{mg}}$$

Perform the following TIME conversions.

6. How many seconds are in 3 days?

$$3\text{days} \cdot \frac{24\text{hrs}}{1\text{day}} \cdot \frac{60\text{min}}{1\text{hr}} \cdot \frac{60\text{secs}}{1\text{min}} = \boxed{259200\text{seconds}}$$

7. How many weeks are in 3 and a half years?

$$3.5 \text{ years} \cdot \frac{52 \text{ weeks}}{1 \text{ yr}} = \boxed{182 \text{ weeks}}$$

8. How many minutes in the months of July and August?

July and August have 31 days each

$$62 \text{ days} \cdot \frac{24 \text{ hr}}{1 \text{ day}} \cdot \frac{60 \text{ min}}{1 \text{ hr}} = \boxed{89280 \text{ mins}}$$

9. How many seconds are in the first 6 months of the year?

Jan: 31
Feb: 28
Mar: 31
Apr: 30
May: 31
Jun: 30

$$181 \text{ days} \cdot \frac{24 \text{ hr}}{1 \text{ day}} \cdot \frac{60 \text{ min}}{1 \text{ hr}} \cdot \frac{60 \text{ sec}}{1 \text{ min}} = \boxed{15638400 \text{ secs}}$$

Perform the following TEMPERATURE conversions

10. How hot is 112°F in °C?

$$C = \frac{5}{9}(F - 32)$$

$$C = \frac{5}{9}(112 - 32)$$

$$C = \frac{5}{9}(80)$$

$$\boxed{C = 44.4^\circ\text{C}}$$

11. What is 7°C in °F?

$$F = \frac{9}{5}C + 32$$

$$F = \frac{9}{5}(7) + 32 \rightarrow \frac{63}{5} + 32$$

$$\boxed{F = 44.6^\circ\text{F}}$$

Prove where Celsius and Fahrenheit are the same.

12. $C = \frac{5}{9}(F - 32)$ $F = \frac{9}{5}C + 32$

• Since we want them equal we can say $C = F$ and sub either one into either equation.

$$5 \cdot F = \frac{5}{9} \cdot \frac{9}{5}F + 32 \cdot 5 \text{ or } C = \frac{5}{9}(C - 32)$$

$$5F = 9F + 160$$

$$-4F = 160$$

$$F = -40^\circ$$

$$9C = 5(C - 32)$$

$$9C = 5C - 160$$

$$4C = -160$$

$$C = -40^\circ$$

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$$\boxed{\text{SO } F = C \text{ at } -40^\circ}$$

Perform the following conversions of MULTIPLE UNITS.

13. If I can run at 8 km/hr how fast am I going in m/s ?

$$\frac{8\text{ km}}{1\text{ hr}} \cdot \frac{1000\text{ m}}{1\text{ km}} \cdot \frac{1\text{ hr}}{60\text{ mins}} \cdot \frac{1\text{ min}}{60\text{ secs}} = \frac{8000\text{ m}}{3600\text{ secs}} = \boxed{\frac{2.2\text{ m}}{\text{Sec}}}$$

14. You watch an ant move 8 cm in 3 seconds , how fast is it travelling in km/hr ?

$$\frac{8\text{ cm}}{3\text{ sec}} \cdot \frac{1\text{ m}}{100\text{ cm}} \cdot \frac{1\text{ km}}{1000\text{ m}} \cdot \frac{60\text{ mins}}{1\text{ min}} \cdot \frac{60\text{ mins}}{1\text{ hr}} = \frac{8 \cdot 60 \cdot 60}{3 \cdot 100 \cdot 1000}$$

$$= \frac{28800}{300000} = \boxed{\frac{0.096\text{ km}}{1\text{ hr}}}$$

15. How long, in minutes, does it take light to travel 12 million km?

Speed of light is: $299\,792\,458\text{ m/sec}$ I want km/min

$$\frac{299\,792\,458\text{ m}}{1\text{ sec}} \cdot \frac{1\text{ km}}{1000\text{ m}} \cdot \frac{60\text{ secs}}{1\text{ min}} = 17987547.48 \frac{\text{km}}{\text{min}} \cdot \text{Need mins so:}$$

$$12\,000\,000\text{ km} \cdot \frac{1\text{ min}}{17987547.48\text{ km}} = \boxed{0.67\text{ mins}}$$

16. If you are strong enough to push an object, with constant speed of 2 meters/sec , how far can you push it in 2 weeks?

$$\frac{2\text{ m}}{1\text{ sec}} \cdot \frac{60\text{ secs}}{1\text{ min}} \cdot \frac{60\text{ mins}}{1\text{ hr}} \cdot \frac{24\text{ hr}}{1\text{ day}} \cdot \frac{7\text{ days}}{1\text{ week}} \cdot 2\text{ weeks}$$

$$\boxed{2\,419\,200\text{ m}}$$