Chapter 7

Metric						
Kilo	Hecto	Deka		Deci	Centi	mili
k	h	da		d	c	m
kg	hg	dag	g	dg	cg	mg
km	hm	dam	m	dm	cm	mm
kL	hL	daL	L	dL	cL	mL

g-----grams, unit measure of weight
m----meters, unit measure of length
l---liters, unit measure of volume

0 cm   1   2   3   4   5   6   7   8   9   10   11   12   13   14   15

12   11   10   9   8   7
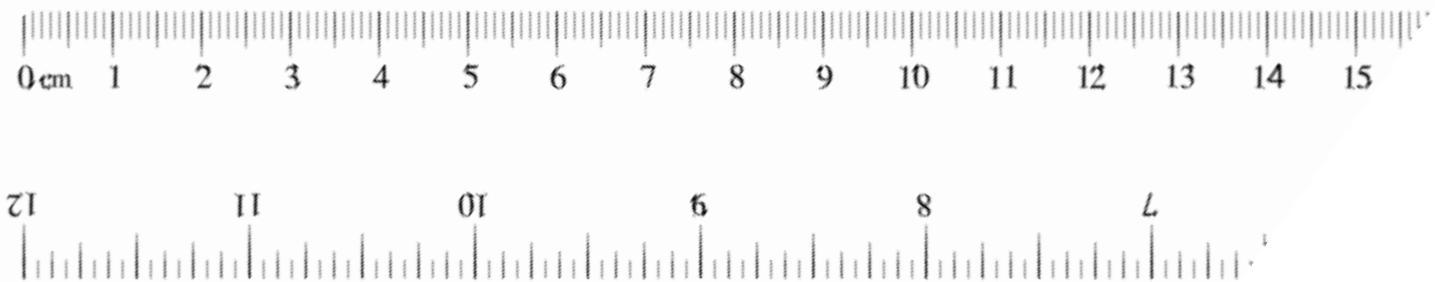
1) find 3 cm, 2 cm, 35mm, 60mm, 105mm, 1dm, 1.1dm, 2.5cm, 0.5cm

One liter of coke. The amount of liquid the bottle holds has a volume of 1 liter.

One gram is about the weight of a paperclip.

1) What is the approximate weight of 5 paperclips?
2) What is the volume of a barrel that can hold the contents of 7 of the above coke bottles.
3) A person that is 6 feet tall is about how many meters tall?
4) What unit of measure would you use to determine the weight of an object?
5) What unit of measure would you use to determine the length of an object?
6) What unit of measure would you use to determine the amount of volume an object displaces?

Change 300 dm to km

$$300$$

In fraction form=

Change 0.4 hl to cl

$$0.4$$

Change 7g to cg

$$7$$

Convert the following to centi.

1) 0.3 m

2) 1.3 kl

3) 65.78 dag

4) 3 mm

Convert the following to the base unit grams, meters or liters

1) 4.5 cm

2) 6.45 mm

3) 7hm

4) 4000kg

Convert the following to kilo.

1) 456 m

2) 73 hg

3) 54.444 ml

4) 500mg

Convert the following to deka.

1) 5 g

2) 5,000 mm

3) 2 L

4) 523m

Ratio----- Is the quotient of two quantities that have the **same units.**

For example.   5 ounces to 10 ounces as a ratio would be:

$$\frac{5 \; ounces}{10 \; ounces} = \frac{5}{10} \boxed{= \frac{1}{2}},$$ which is a $\boxed{\text{1 to 2 ratio}}$ or $\boxed{1 : 2 \; \text{ratio}}$

- -

Write as a ratio:

1. 3 to 5   2. 14 :21   3. 0.9 to 0.6   4. 8 ounces to 1 pound

5. 3 inches to 15 inches   6. 3 inches to 4 feet   7. 4 hours to 2 days.

8. Monthly income=$2,500   Monthly cost of gas= $300 Monthly cost of food= $456
a) Write the ratio of the monthly cost of gas to the monthly income.

b) Write the ratio of the monthly cost of food to the monthly income.

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Rate---Is the quotient to two quantities with **different units**.

For example.   5 people to 10 horses as a rate would be:

$$\frac{5 \; people}{10 \; horses} = \boxed{\frac{1 \; person}{2 \; horses}}$$

- -

Write as a rate:

1. 15 applications for 18 openings. 2. 75 days on 20 gallons of water.   3. Three squished ants for every step .

Unit Rate—Is the rate per one unit. Denominator =1

For example.   5 people to 10 horses as a rate would be:

$$\frac{5\ people}{10\ horses} = \boxed{0.5\ people\ per\ horse\quad 0r\quad 0.5\ ^{people}\!/_{horse}}$$

- -

Write as a unit rate:

1. 40 miles in 2 hours   2. 60 revolutions in 5 minutes   3. 108 occurrences in 12-month

What are other examples of UNIT RATE?

- -

Unit cost—Cost per unit-- $\dfrac{\cos t}{unit}$

For example. You buy 4.5 lbs of flank steak for $10.23. What is the unit cost.

$$\frac{\cos t}{unit} = \frac{\$10.23}{4.5lbs} = \$2.27\ per\ lb$$

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Find the unit cost:

1. 150 barrels cost $4,950.   2. 17cents for 3 minutes   3. $4 billion over 5 months.

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1. Which is a better buy for cold medication 20 tablets for $4.29 or 50 tablets for $9.59?

2. A car travels 345 miles in 6 hours, and a truck travels 376 miles in 6.2 hours. Which vehicle is going faster?

3. Richy Rich worked 27 hours and earned $4,206.23. What is his hourly rate of pay (pay per hour)?

4. In one community the electric bill was 575 kilowatt-hours of electricity for $38.81. In a second community, a bill for 831kwh was $58.10. In which community is electricity cheaper

American Units of Measurement

Perform the conversions

1) 4 feet to inches

$$\frac{4\,feet}{1} \bullet \underline{\hspace{2cm}} = \underline{\hspace{3cm}} \text{inches}$$

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2) $2\frac{2}{3}$ feet to inches

$$\frac{8\,feet}{3} \bullet \underline{\hspace{2cm}} = \underline{\hspace{3cm}} \text{inches}$$

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3) 21 feet to yards

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4) 8 pounds to ounces

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5) $4\frac{2}{3}$ yards to feet

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6) 2.5 tons to ounces

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7) 2 quarts to fluid ounces

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8) 3 gal to fluid ounces

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9) 3 days to seconds

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10) 240 minutes to days

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11) $\frac{2}{3}$ day to minutes

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13) 2 miles to yards

American		
1 ft.	=	12 in.
1 yd.	=	3 ft.
1 mi.	=	5,280 ft.
1 lb.	=	16 oz.
1 ton	=	2,000 lb.
1 cup	=	8 fl. Oz.
1 pt.	=	2 cups
1 qt.	=	2 pt.
1 gal.	=	4 qt.
1 min.	=	60 sec.
1 hr.	=	60 min.
1 day	=	24 hr.

US to Metric and visa-versa

1 in	=	2.54 cm		1 cm	=	0.3937 in.
1 ft	=	0.3048 m		1 m	=	3.2808 ft
1 yd.	=	0.9144 m		1 m	=	1.0936 yd
1 mi.	=	1.6093km		1 Km	=	0.6214 mi
1 oz	=	28.35 g		1 g	=	0.035 oz
1 lb	=	0.454 kg		1 kg	=	2.2 lb
1 fl oz	=	0.030 L		1 L	=	33.8 fl oz
1 pt	=	0.473 L		2 L	=	2.1 pt
1 qt	=	0.946 L		3 L	=	1.06 qt
1 gal	=	3.785 L		4 L	=	0.264 gal

1) Convert 100 yds to meters.

2) Convert 40 grams to ounces.

3. Convert 5 qts to liters.

4. Convert 7 miles to Km.

5. Convert 60 mph to kph.

6. Convert 100 Kph to mph.

Proportions/ratio warm up.
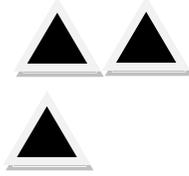
1) What is the ratio of circles to triangles?_____
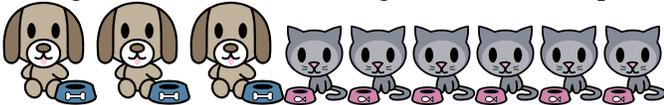
What is the ratio of triangles to circles?_____
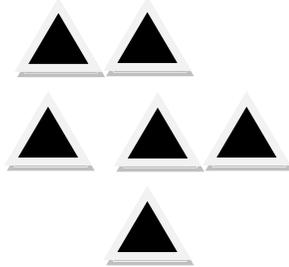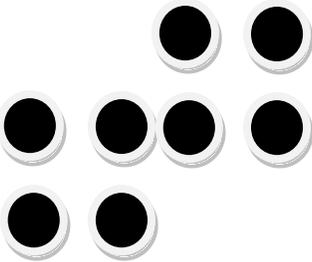
2) What is the ratio of circles to triangles?_____

What is the ratio of triangles to circles?_____

Are the ratios of circles to triangles the same in 1 and 2? Why?

Change the ratio of cats to dogs to two more equivalent ratios.

Fill in the blanks

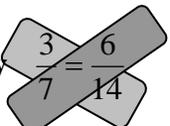a) $\frac{4}{8} = \frac{}{2}$

b) $\frac{15}{7} = \frac{}{14}$

c) $\frac{8}{27} = \frac{16}{}$

It's thinkerin time. If there are 60 cats and dogs all together with the same ratio of cats to dogs as above, then how many cats are there?

7

PROPORTIONS

A Ratio looks like a fraction. $\dfrac{3}{7}$ is a ratio

A proportion is two equal ratios

$\dfrac{3}{7} = \dfrac{6}{14}$ **to test this we cross multiply** $\dfrac{3}{7} = \dfrac{6}{14}$ $\Longrightarrow$ $3 \bullet 14 = 7 \bullet 6$

$42 = 42$

This is a proportion because they are equal 42 = 42.

Which of the following are proportions:

1. $\dfrac{40}{29} = \dfrac{29}{22}$ **2.** $\dfrac{10.4}{3.6} = \dfrac{41.6}{14.4}$ **3.** $\dfrac{2\frac{1}{2}}{\frac{4}{5}} = \dfrac{3\frac{1}{4}}{\frac{9}{10}}$

SOLVING PROPORTIONS
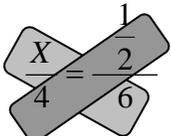
$\dfrac{X}{4} = \dfrac{\frac{1}{2}}{6}$ $\Longrightarrow$ $\dfrac{X}{4} = \dfrac{\frac{1}{2}}{6}$ $\Longrightarrow$ $6 \bullet X = 4 \bullet \dfrac{1}{2}$ $\Longrightarrow$ $6 \bullet X = \dfrac{4}{1} \bullet \dfrac{1}{2}$

Cross Multiply   **Multiply the side without the x**

$6 \bullet X = 2$ $\Longrightarrow$ $\dfrac{6X}{6} = \dfrac{2}{6}$ $\Longrightarrow$ $x = \dfrac{1}{3}$

Divide by the number next to the X

Solve for x:

1. $\dfrac{3}{6} = \dfrac{x}{8}$ 2. $\dfrac{4}{x} = \dfrac{2}{8}$ 3. $\dfrac{x-1}{7} = \dfrac{2}{21}$ 4. $\dfrac{x}{4\frac{1}{10}} = \dfrac{3\frac{3}{4}}{1\frac{7}{8}}$ 5. $\dfrac{x}{7} = \dfrac{2.3}{20}$

WORD PROBLEMS INVOLVING PROPORTIONS

My shadow is 4 feet long and I'm 6 feet tall. How tall is a tree with a shadow of 6 feet?

Your variable is whatever the question is asking for**.**   **X=The height of the tree**.

 Set up two ratios. One involving one comparison, and the other involving the variable. **Like Ian's shadow to Ian's Height** and The **Trees shadow to the Trees Height**. In this case the first sentence can be made into the first ratio and the question can be made into the second ratio.

tree

me
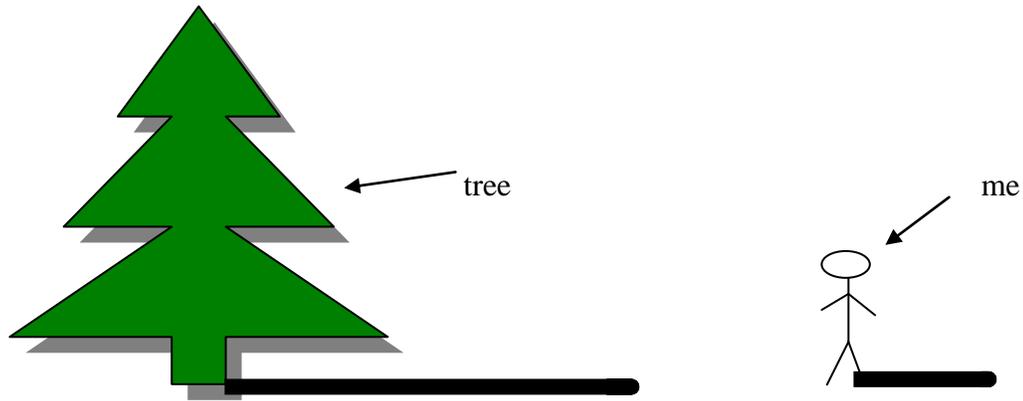
$$\frac{Ian's\ Shadow}{Ian's\ Height} = \frac{Trees\ Shadow}{Trees\ Height} \quad \Longrightarrow \quad \frac{4\ feet}{6\ feet} = \frac{6\ feet}{x}$$

$\dfrac{4}{6} = \dfrac{6}{X}$ then solve (as above) this to find the answer.

Set up a proportion and solve.

1. As part of a spring clearance, a men's store put dress shirts on sale , 2 for $25.98. How much will a business man pay if he buys five shirts?

2. A recipe for spaghetti sauce requires four 16-ounce bottles of ketchup to make 2 gallons of sauce. How many bottles of ketchup are needed to make 10 gallons of sauce?

3. Jim can run 4 miles in 1.5 hours. How many miles can he run in 35 minutes?

1. If three apples cost 45 cents, how much would five apples cost?

2. 4:9 = 1:?

3. Simplify the ratio 45:20

4. Sam is 16 years old. His sister is 24 years old. What's the ratio of Sam's age to his sister's age? Give your answer in its simplest form.

5. A map scale is 1:20000. A distance on the map is measured to be 5.6cm. What's the actual distance in real life? Give your answer in metres.

m

6. A recipe for vegetable curry needs 300 grams of rice, and it feeds 4 people. How much rice would be needed for 7 people?

g

7. $60 is to be divided between Brian and Kate in the ratio 2:3. How much does Kate get?

£

Questions 8-10 refer to a necklace like this which is being made using white and black beads, as shown:

8. What's the ratio of white beads to black beads, in its simplest form?

9. How many white beads would be needed to go with 24 black beads?

10. The necklace uses 75 beads altogether. How many of these are black?

If you needed 35 minutes to travel to school at a rate of 45 mph, then how much time did you need if you were traveling at a rate of 60mph?

If a baboon gained 5 pounds after eating 10 bananas, then how much would he gain after eating 2 bananas?

If the bmal is 40 when the gar is 5, then what is the bmal when the gar is 2?