

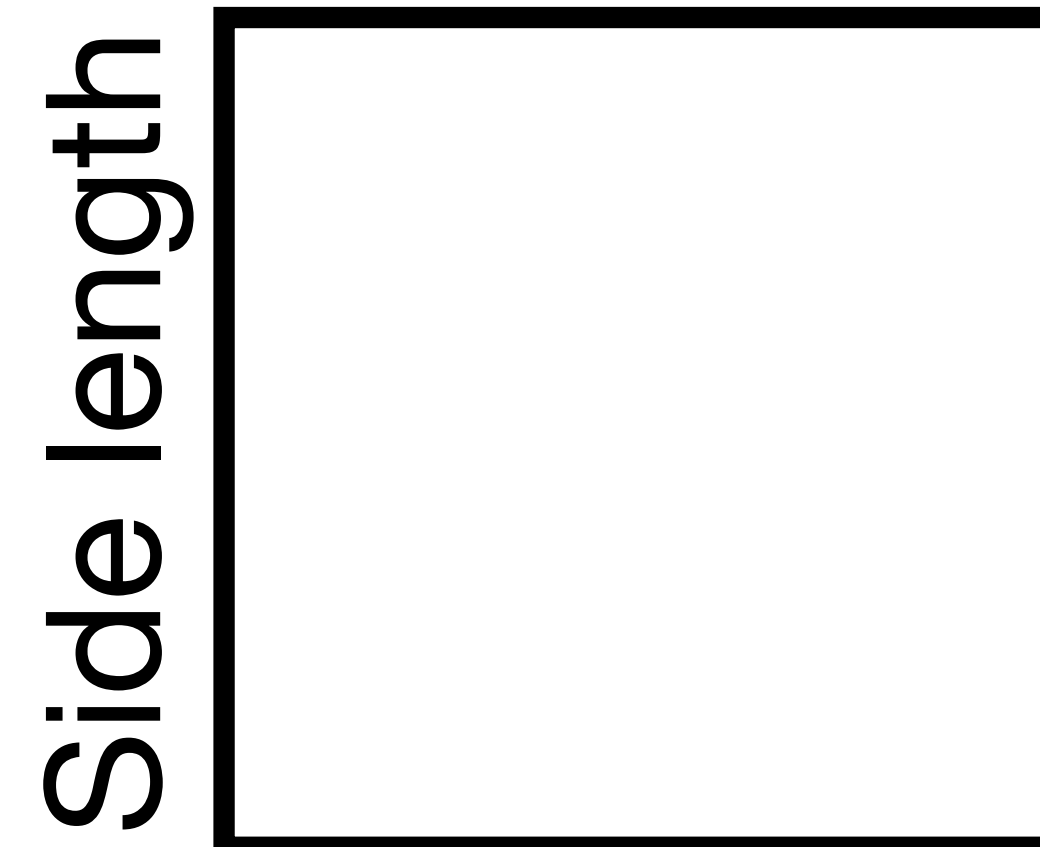
Need to know formula



Areas of 2D Shapes

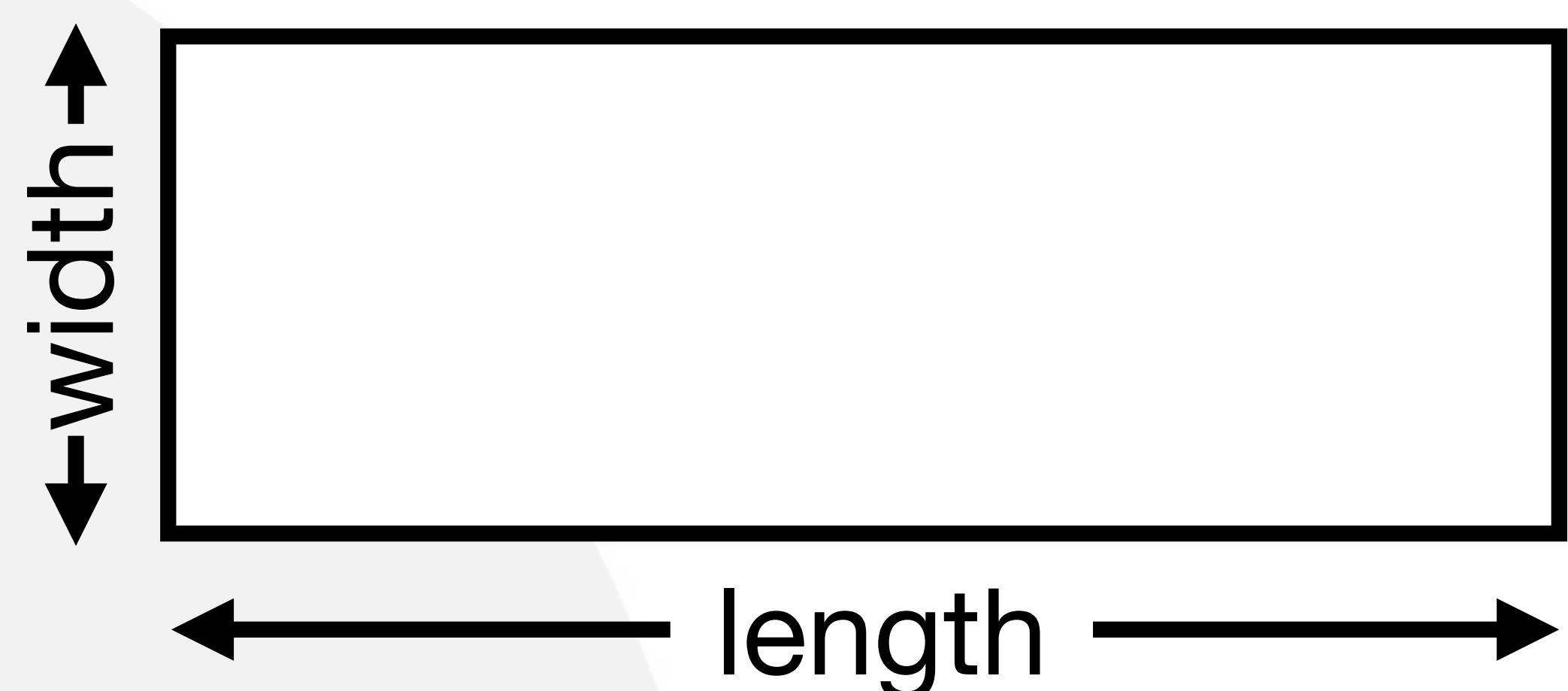
Area of Square

side length x side length



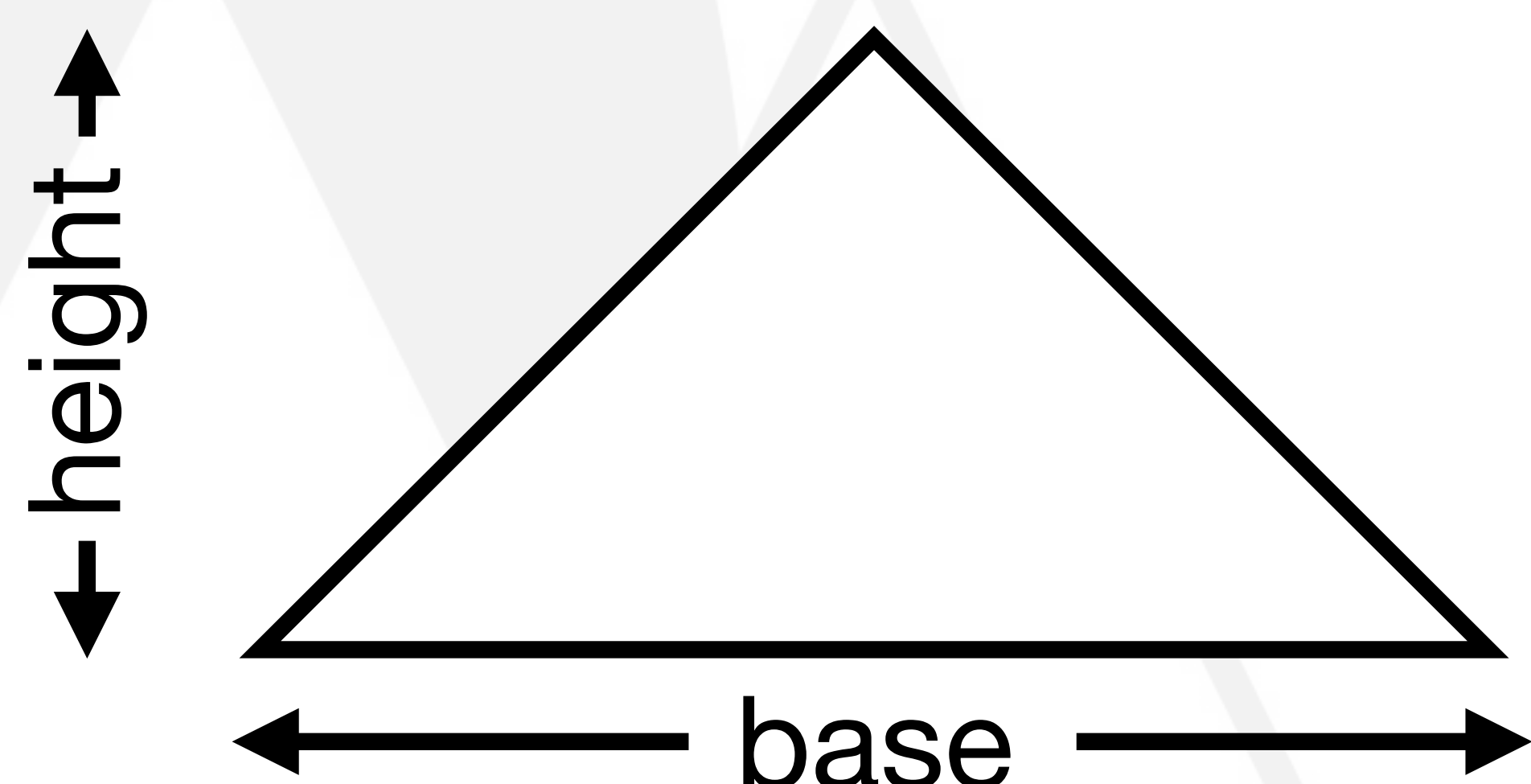
Area of Rectangle

length x width



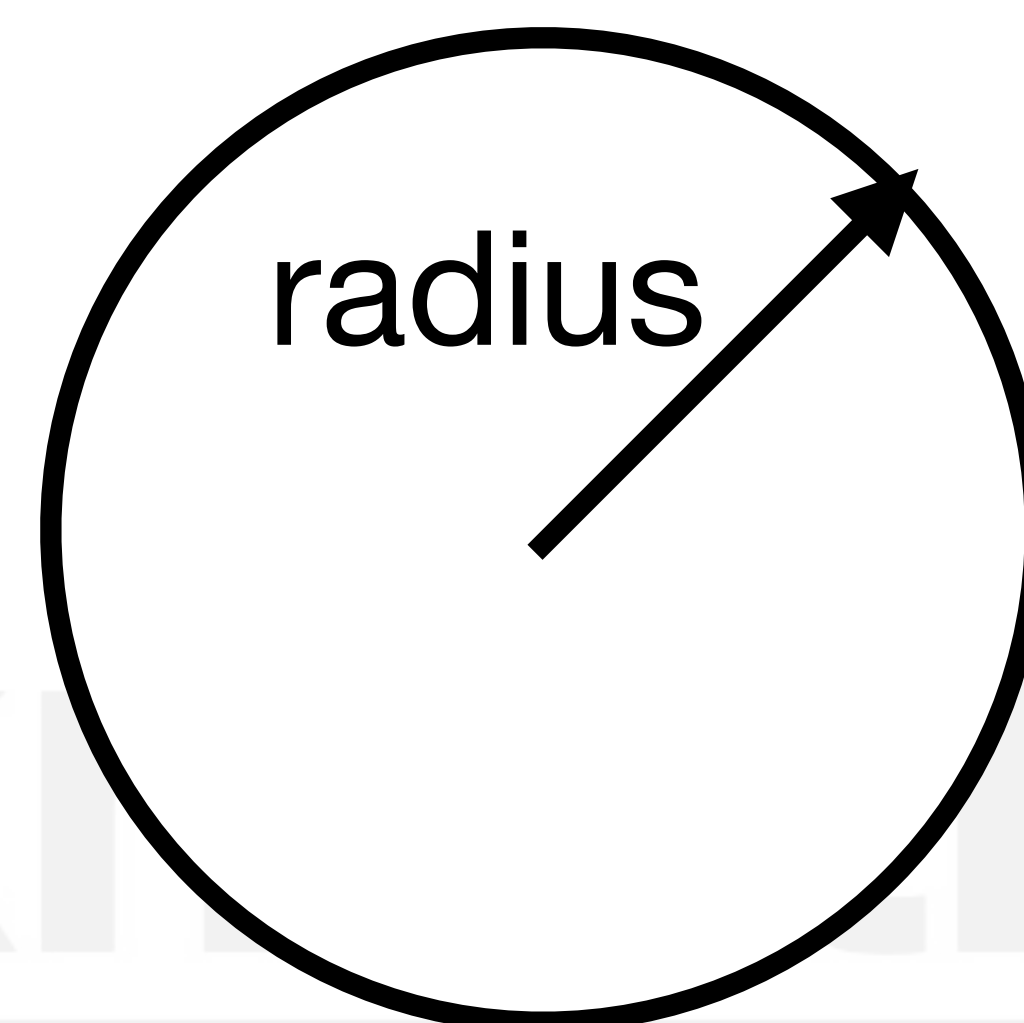
Area of Triangle

base x height \div 2



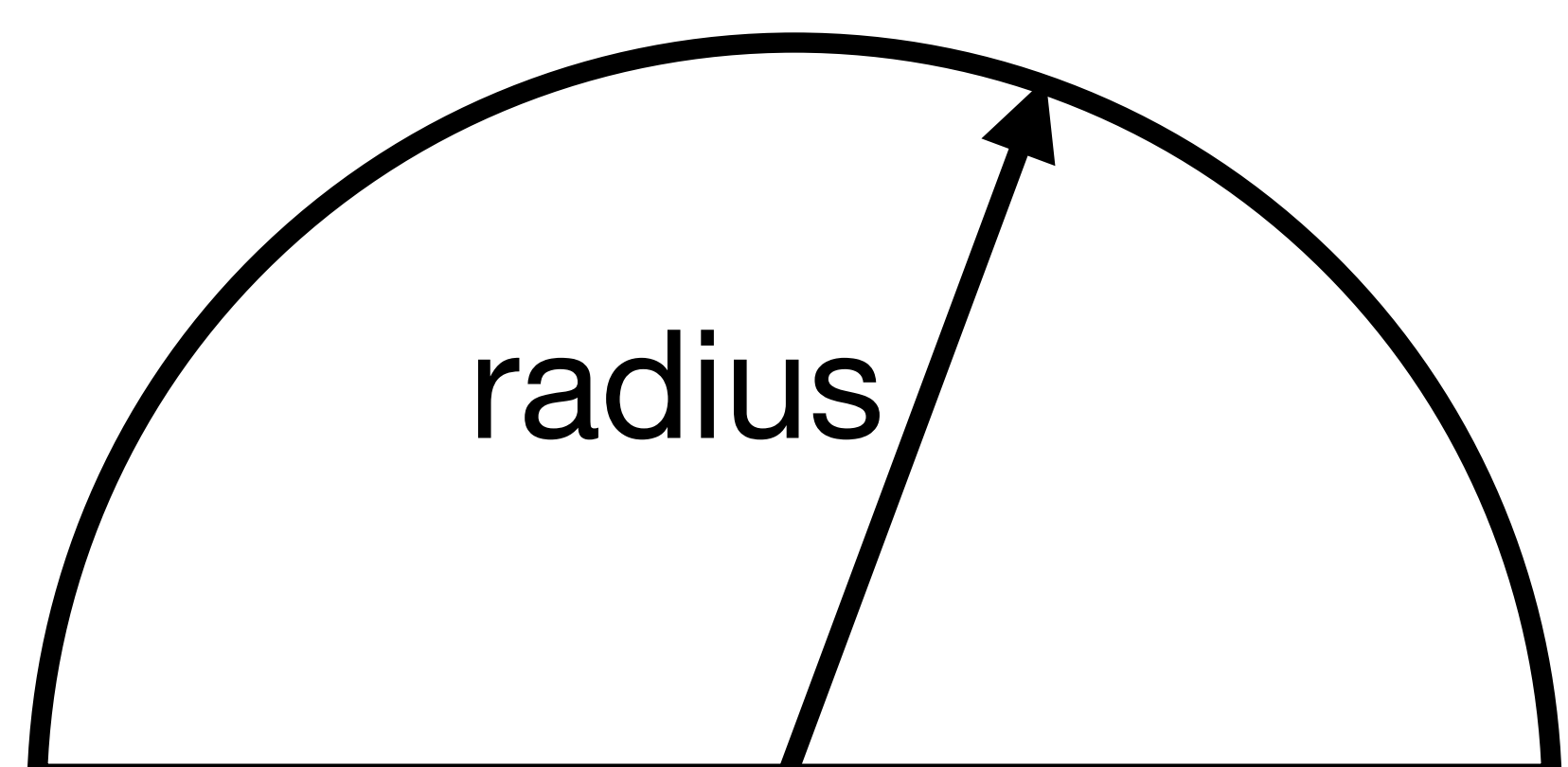
Area of Circle

$\pi \times \text{radius}^2$
(3.14 x radius x radius)



Area of Semi-Circle

$\pi \times \text{radius}^2 \div 2$
(3.14 x radius x radius) \div 2



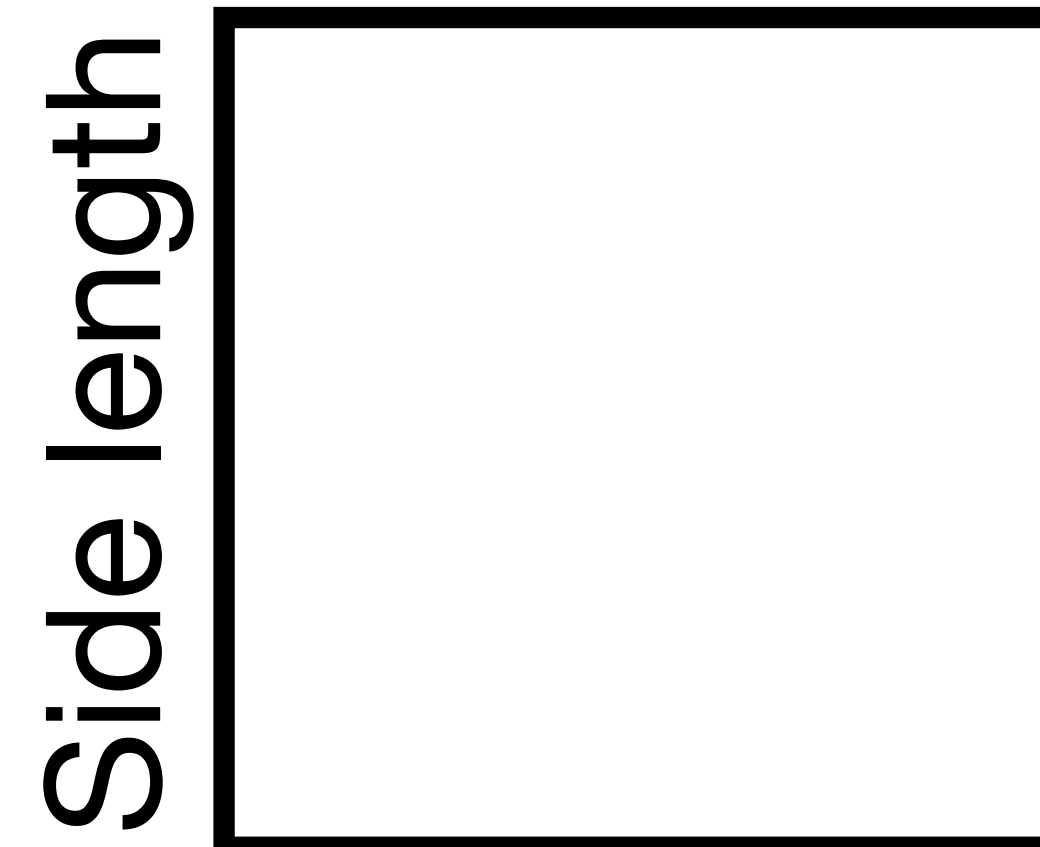
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Perimeters of 2D Shapes

Perimeter of Square

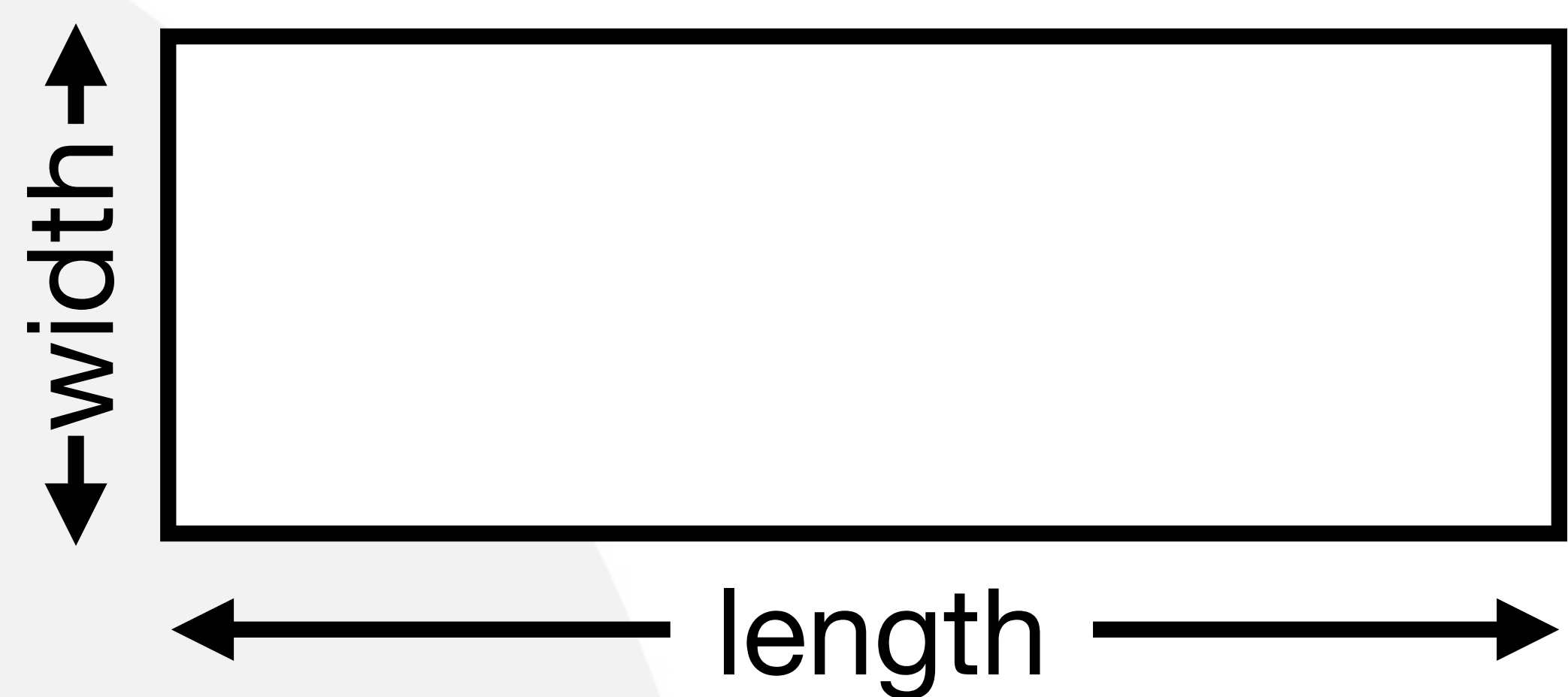
$4 \times \text{side length}$



Perimeter of Rectangle

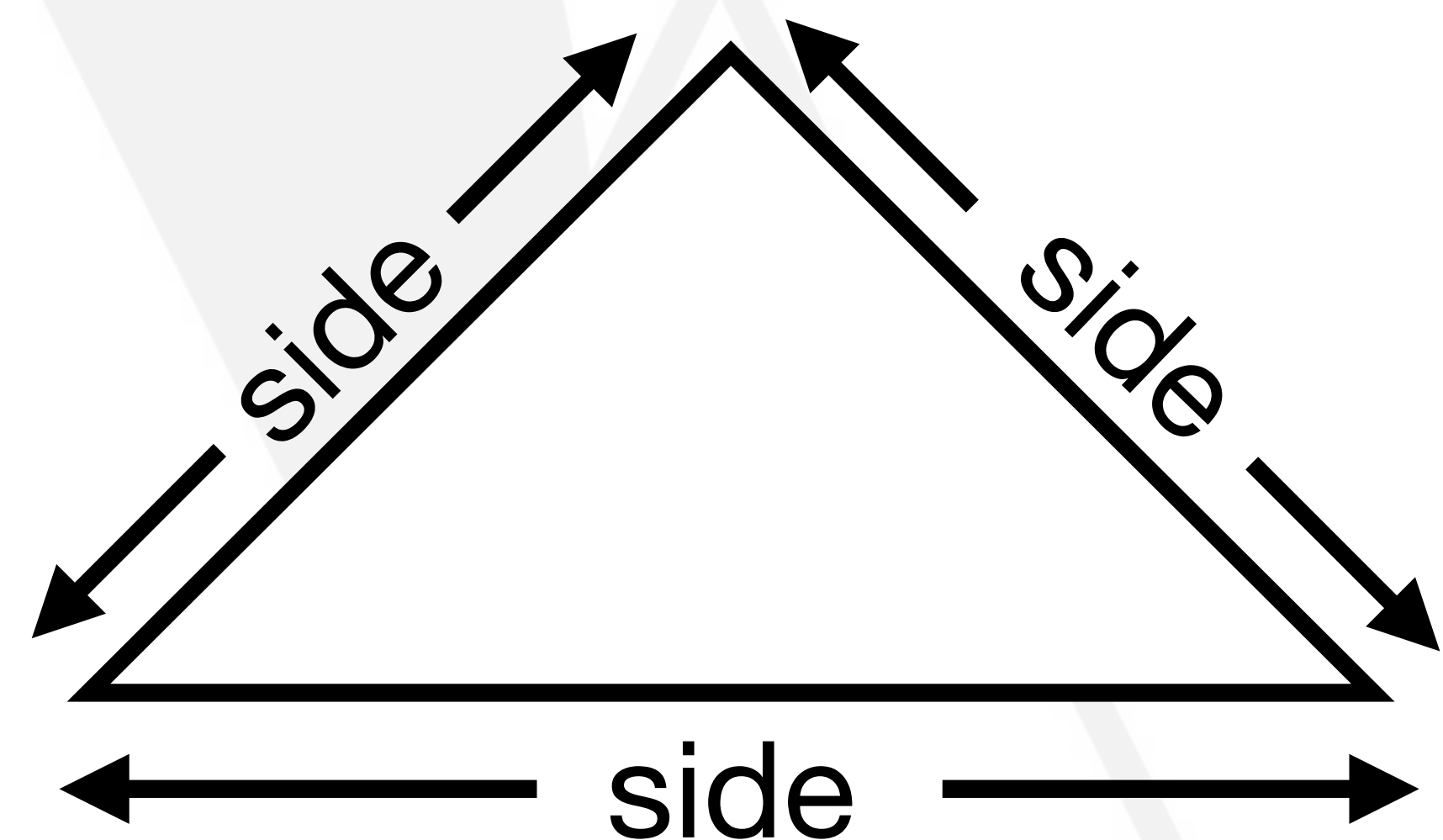
$2 \times (\text{length} + \text{width})$

$\text{width} + \text{width} + \text{length} + \text{length}$



Perimeter of Triangle

$\text{side} + \text{side} + \text{side}$

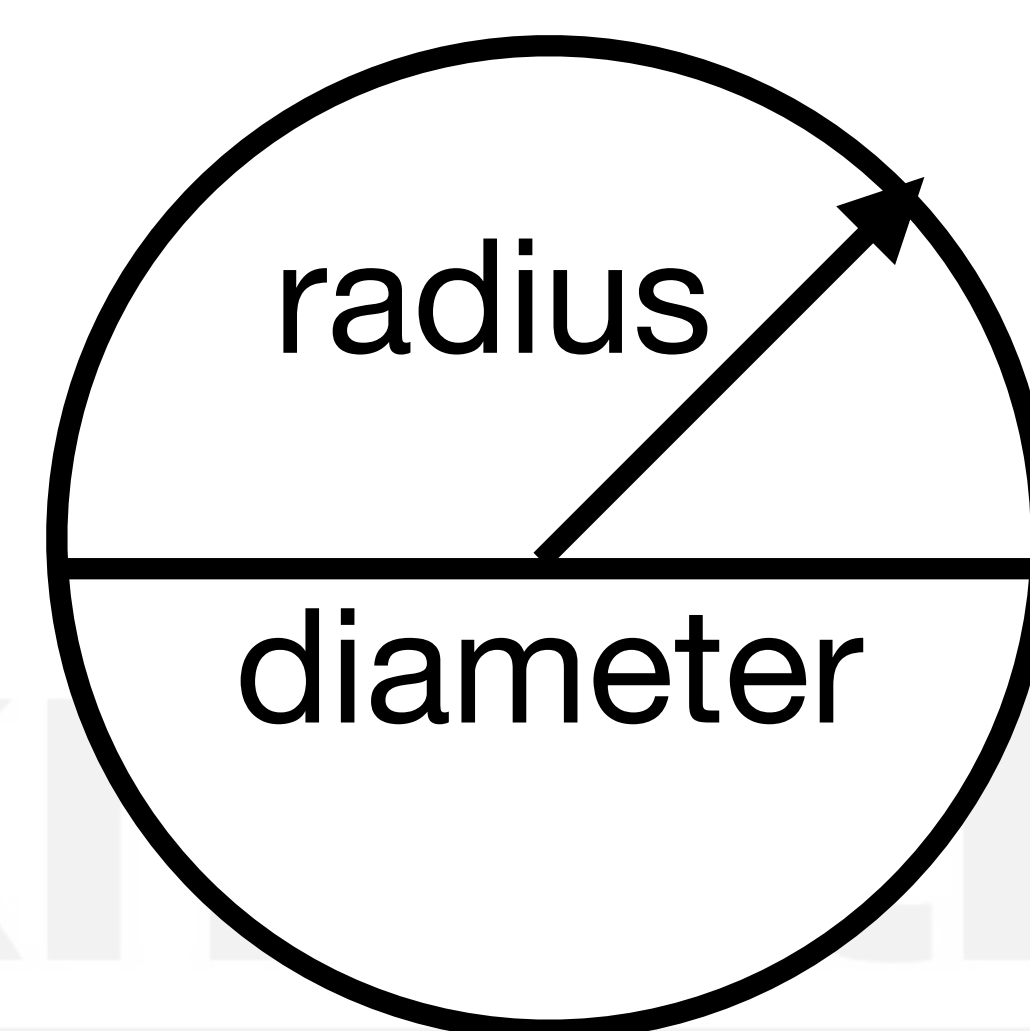


Circumference of Circle

$\pi \times \text{diameter}$

$\pi \times \text{radius} \times 2$

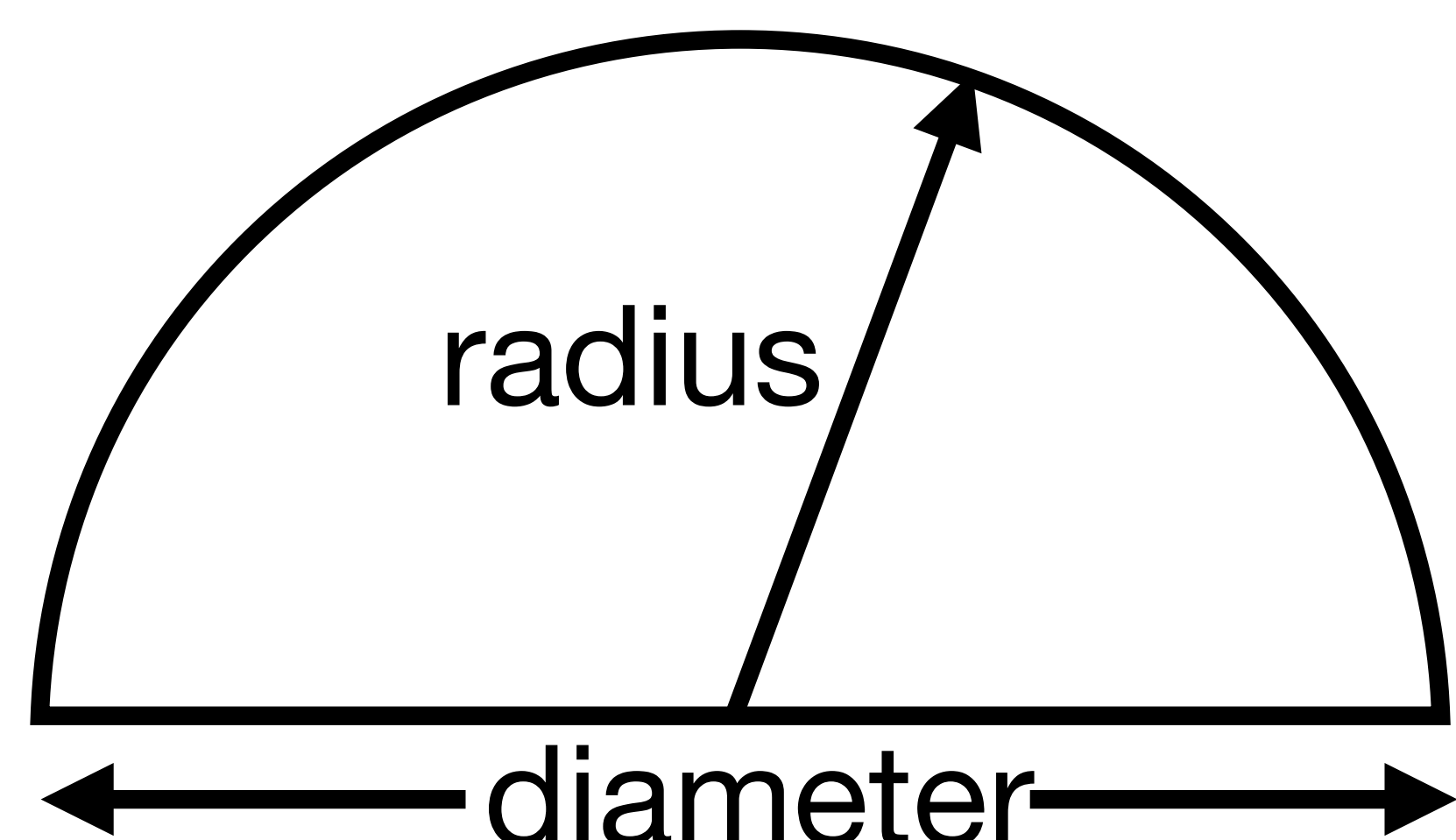
$(\pi = 3.14)$



Perimeter of Semi-Circle

$(\pi \times \text{diameter} \div 2) + \text{diameter}$

$(3.14 \times \text{diameter} \div 2) + \text{diameter}$



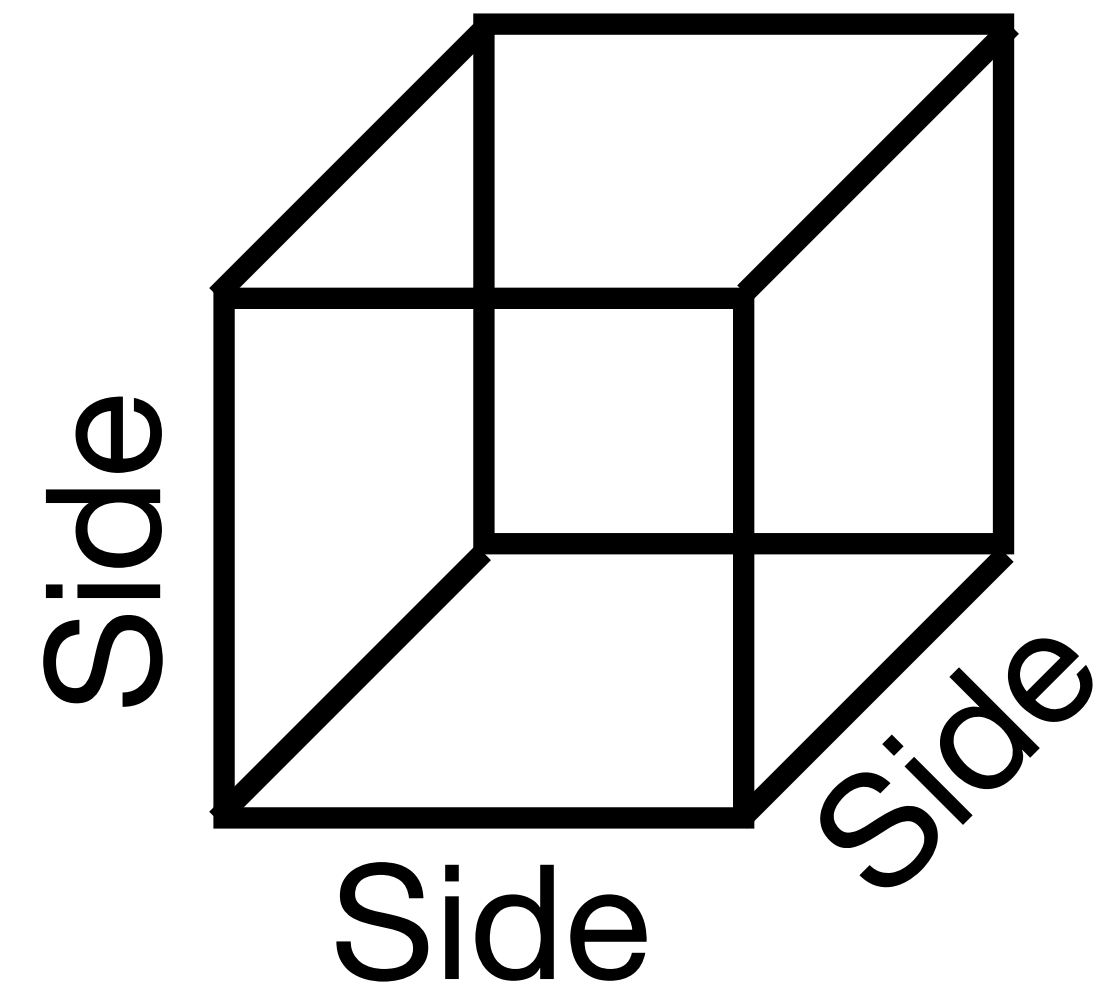
Need to know formula



Surface Area of 3D shapes

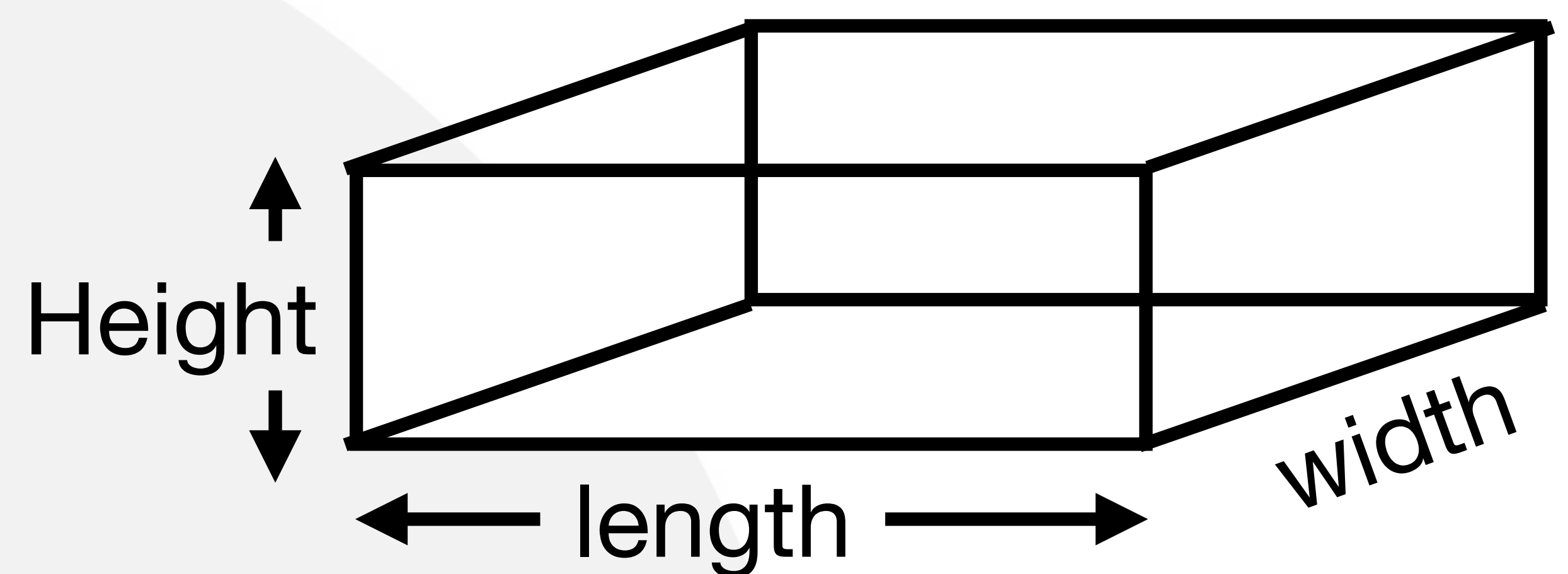
Surface Area of Cube

side x side x 6



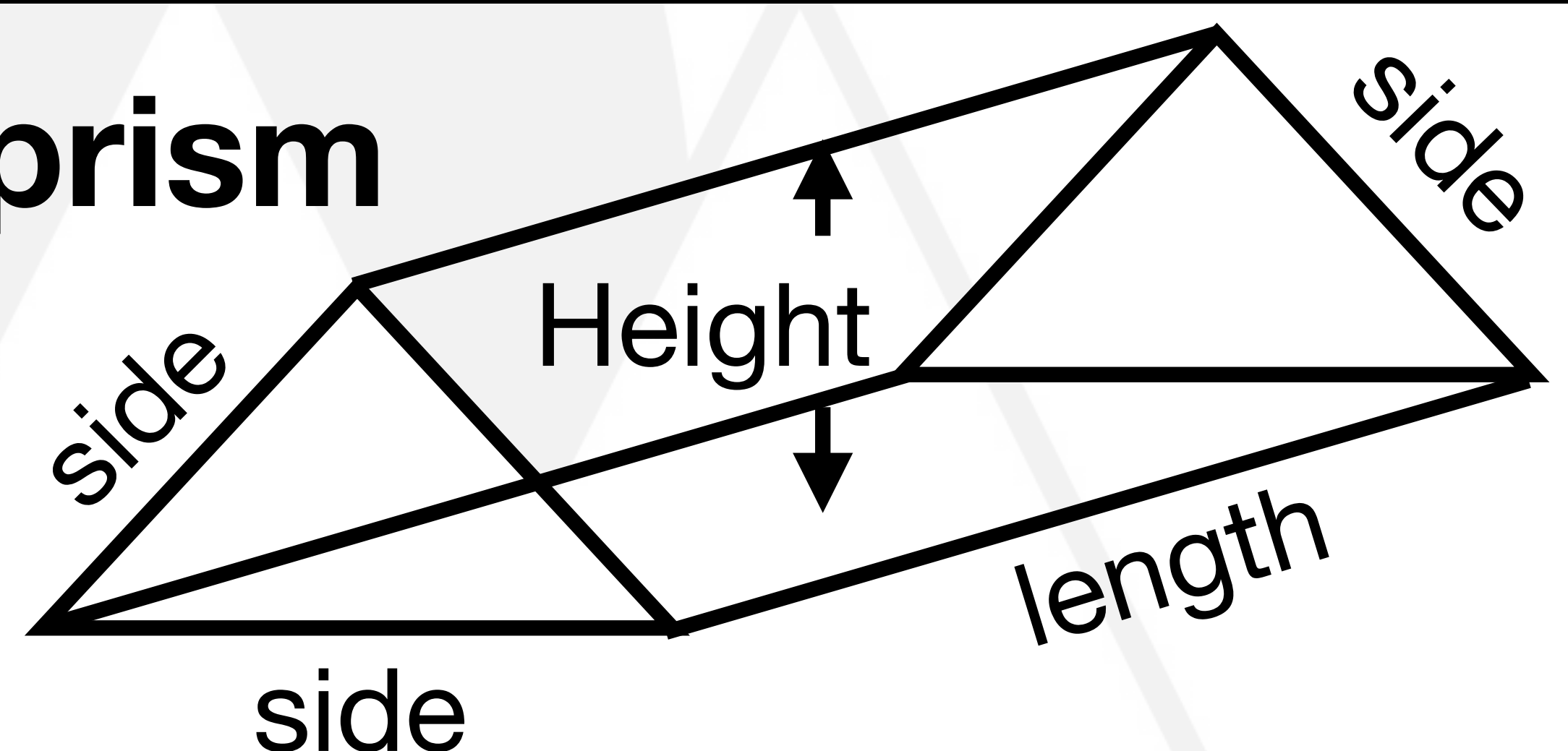
Surface Area of Cuboid

height x length x 2 +
length x width x 2 +
width x height x 2



Surface Area of Triangular prism

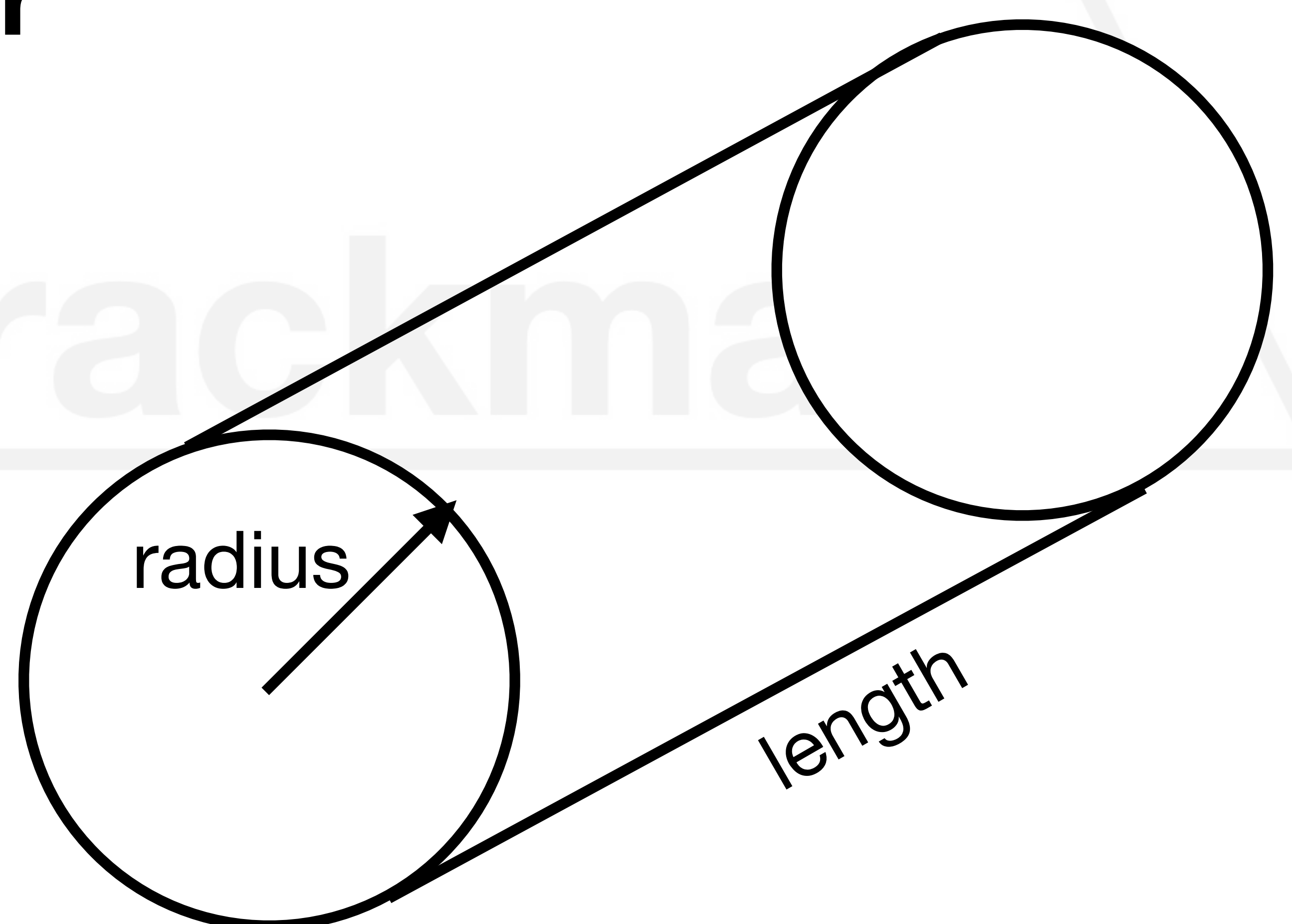
(base x height \div 2) x 2
side 1 x length + side 2 x length
+ side 3 x length



Surface Area of Cylinder

a) 2 circles: $\pi \times \text{radius}^2$

b) curved surface area:
 $\pi \times \text{radius} \times 2 \times \text{length}$



Surface area: $2 \times (\pi \times \text{radius}^2) + (\pi \times \text{radius} \times 2) \times \text{length}$

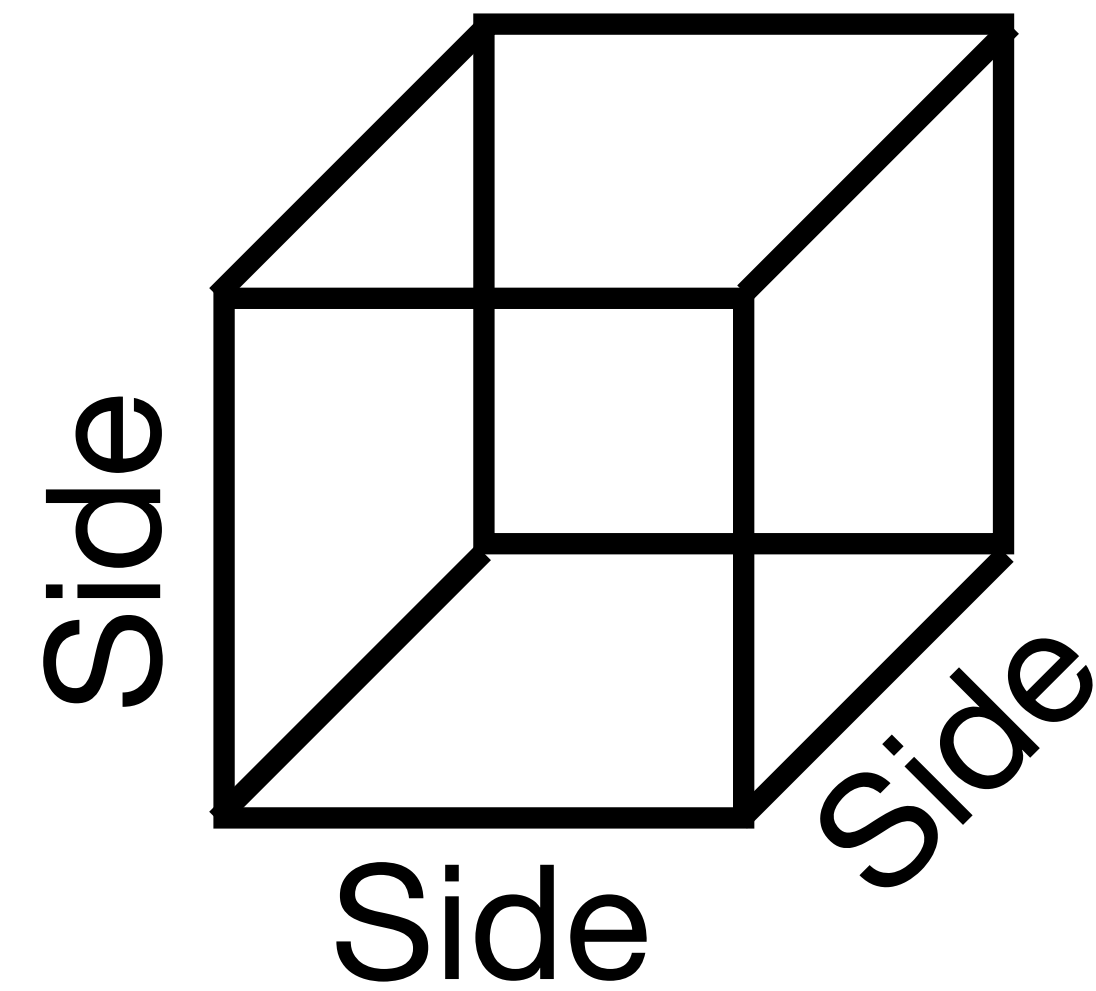
Need to know formula



Volume of 3D shapes

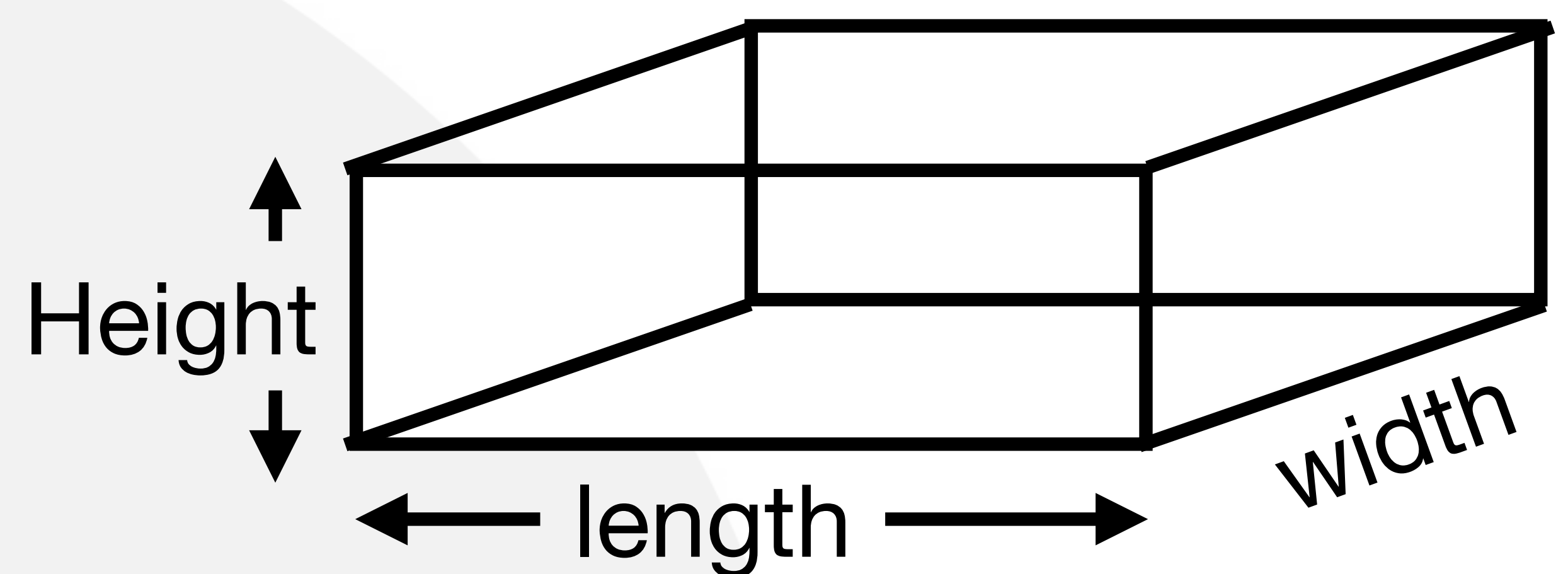
Volume of Cube

side x side x side



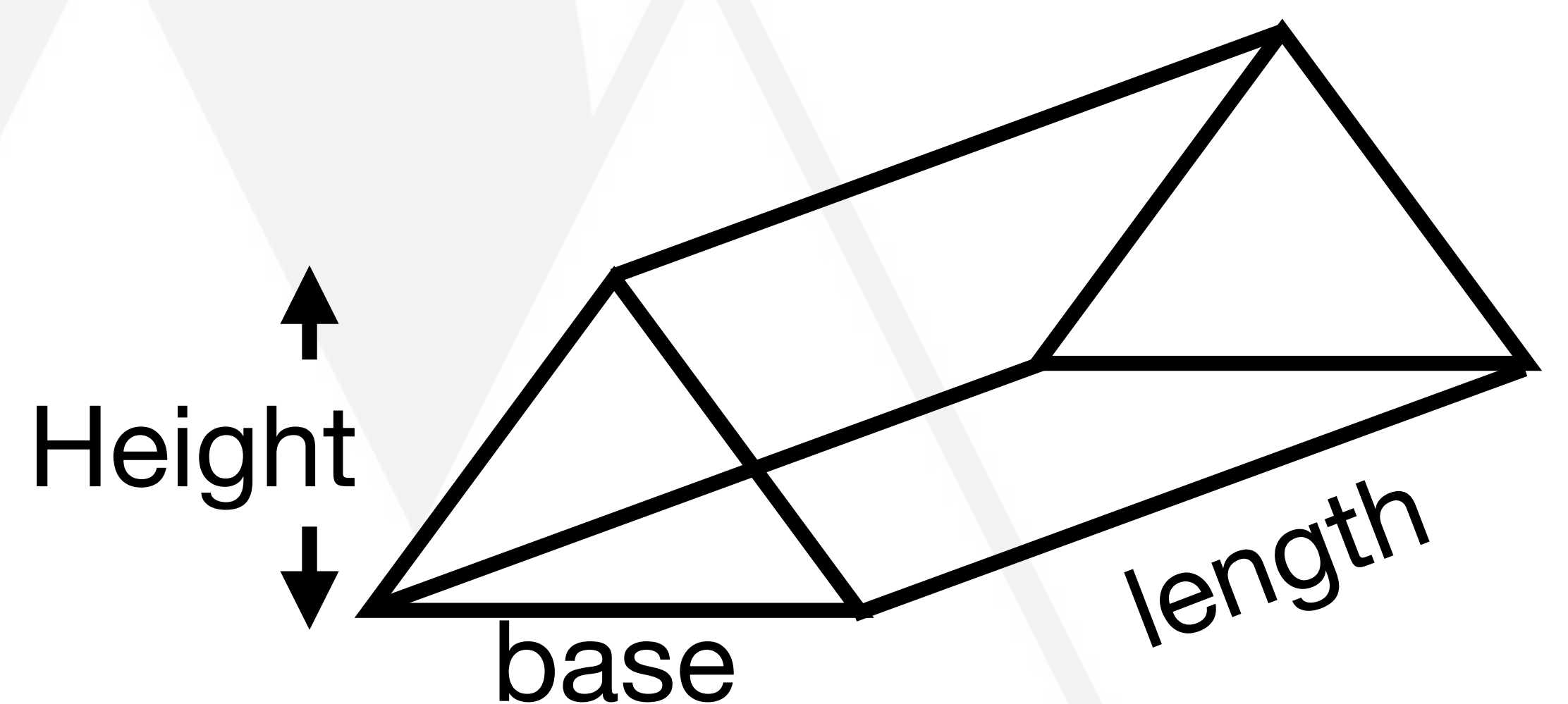
Volume of Cuboid

length x width x height



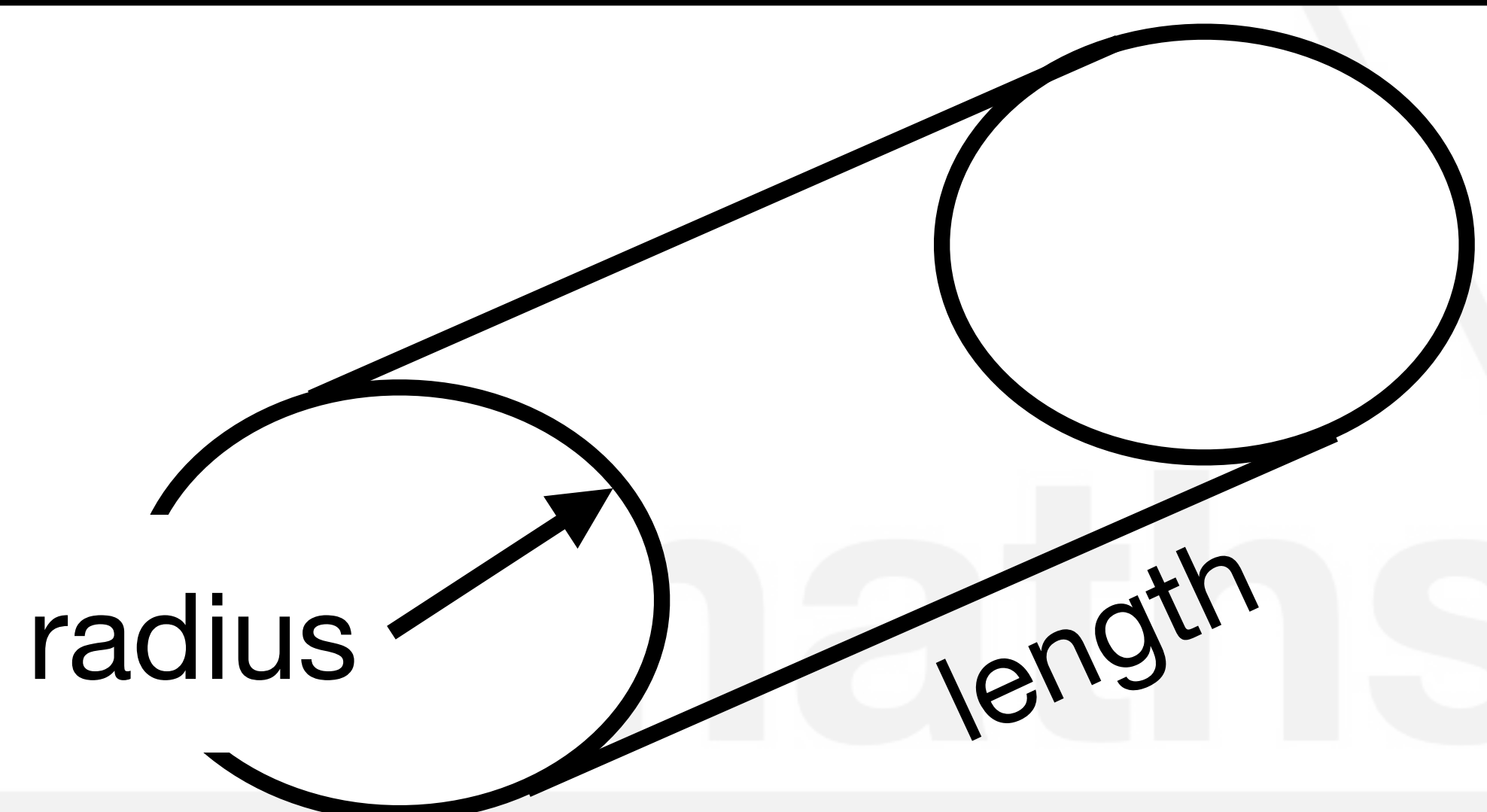
Volume of Triangular prism

Base x height \div 2 x length



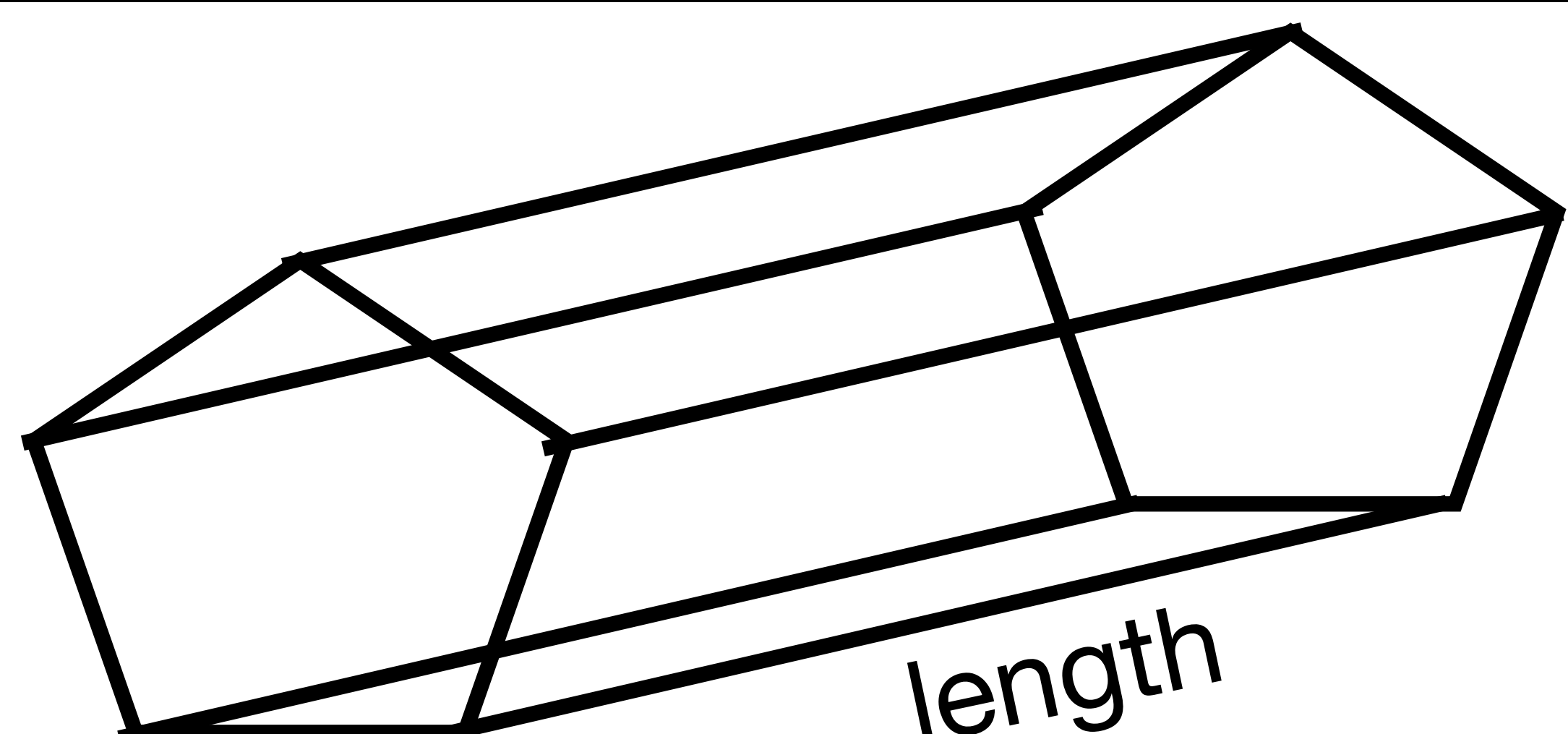
Volume of Cylinder

π x radius² x length



Volume of Any Prism

Area of face x length



Need to know formula



Compound Measures

Speed = Distance ÷ Time

the clue is in the units:

- m/s (meters ÷ seconds)
- mph (miles per hour: miles ÷ hours)

Density = Mass ÷ Volume

the clue is in the units

- g/cm³ (grams ÷ cm³)
- kg/m³ (kilograms ÷ cubic meters)

Hourly Pay = Total Income ÷ Hours Worked

Total Income = Hourly Pay x Hours Worked

Hours Worked = Total Income ÷ Hourly Pay

Units

Length	Area	Volume
cm	cm ²	cm ³
meter	m ²	m ³
foot	square foot	cubic foot
mile	square mile	mile ³
kilometer	km ²	km ³

Need to know formula



Compound Measures

Conversions for length

$10\text{mm} = 1\text{cm}$
 $100\text{cm} = 1\text{meter}$
 $1000\text{m} = 1\text{km}$

$2.54\text{cm} = 1\text{ inch}$
 $12\text{ inch} = 1\text{ foot}$
 $3\text{ foot} = 1\text{ yard}$

Conversions for Volume

$1\text{cm}^3 = 1\text{ml}$
 $1000\text{ml} = 1\text{litre}$
 $4.5\text{l} = 1\text{gallon}$

$568\text{ml} = 1\text{ pint}$
 $8\text{pints} = 1\text{gallon}$

Conversion for Mass

$1000\text{grams} = 1\text{kg}$
 $1\text{lb} = 16\text{ounces}$

$1000\text{kg} = 1\text{ tonne}$
 $2.2\text{ lb} = 1\text{kg}$

Time

$60\text{ seconds} = 1\text{ minute}$
 $60\text{ minutes} = 1\text{ hour}$

$24\text{ hours} = 1\text{ day}$
 $7\text{ days} = 1\text{ week}$

Decimal Time

$0.5\text{ hours} = 30\text{ minutes}$
 $0.75\text{ hours} = 45\text{ minutes}$

$0.1\text{ hours} = 6\text{ minutes}$

$0.25\text{ hours} = 15\text{ minutes}$

Need to know formula



Fraction - Decimal - Percentage: Equivalence

$$1/10 = 0.1 = 10\%$$

$$3/10 = 0.3 = 30\%$$

$$1/5 = 0.2 = 20\%$$

$$2/5 = 0.4 = 40\%$$

$$1/4 = 0.25 = 25\%$$

$$2/4 = 0.5 = 50\%$$

$$1/2 = 0.5 = 50\%$$

$$3/2 = 1.5 = 150\%$$

$$1/100 = 0.01 = 1\%$$

$$9/100 = 0.09 = 9\%$$

$$1/3 = 0.3333 = 33.3\%$$

$$2/3 = 0.6666 = 66.7\%$$

Fraction to Decimal: top \div bottom

Decimal to Percentage: decimal \times 100

Percentage to decimal: percentage \div 100

Percentage to Fraction: put over 100 then simplify

Need to know formula



Fractions

Multiplying

$$\frac{2}{3} \times \frac{5}{9} = \frac{10}{27}$$

top x top
bottom x bottom

Dividing

$$\frac{1}{3} \div \frac{2}{4} = \frac{4}{6}$$

top x bottom
bottom x top

Adding

$$\frac{2}{5} + \frac{3}{4} = \frac{8}{20} + \frac{15}{20} = \frac{23}{20}$$

1. Convert to equivalent fractions with same bottom
2. Add the new top numbers and keep the bottom number

Subtracting

$$\frac{6}{7} - \frac{2}{3} = \frac{18}{21} - \frac{14}{21} = \frac{4}{21}$$

1. Convert to equivalent fractions with same bottom
2. Add the new top numbers and keep the bottom number

Simplifying

$$\frac{80}{120} = \frac{8}{12} = \frac{4}{6} = \frac{2}{3}$$

1. Look for a number you can divide the top and bottom by
2. Keep going until there is nothing you can divide by

Mixed to Improper

$$2 \frac{3}{4} = \frac{8}{4} + \frac{3}{4} = \frac{11}{4}$$

1. Multiply whole part of the mixed number by the bottom part of the fraction
2. Add the fractions

Need to know formula



Data - Averages

Mode

The most common number from a list

The result with the highest frequency from a table

Median

The middle value when numbers are placed in size order. (If there are two middle values, add them and divide the result by 2)

Range

The difference between the smallest result and largest result.

(Calculated by largest - smallest)

Mean

Add all the values together and divide by the number of values. (The total of the values equals mean x number of values)

Comparing means, modes, medians and ranges

For mean, mode and median state highest. (e.g.

Group A has higher mean, group B has high mode.)

A lower range means the data is more consistent.

Need to know formula



Data - Estimate Mean from frequency table

Heights	Frequency
$20 < x \leq 30$	3
$30 < x \leq 40$	5
$40 < x \leq 50$	10

Find the midpoints of the intervals

Midpoint = (lower interval + upper interval) \div 2

$$(20 + 30) \div 2 = 25$$

lower interval $\rightarrow 20 < x \leq 30 \leftarrow$ upper interval

Multiply midpoints by frequencies

Heights	Frequency
$20 < x \leq 30$	3
$30 < x \leq 40$	5

$$25 \times 3 = 75$$

$$35 \times 5 = 175$$

Total the (midpoint x frequencies)

$$(25 \times 3) + (35 \times 5) + (45 \times 10) = 700$$

Find the total frequency

$$3 + 5 + 10 = 18$$

(Total midpoint x frequency) \div (Total frequency)

(this is all values added together \div number of values)

$$\text{Estimated Mean} = 700 \div 18 = 38.9 \text{ (to 1 dp)}$$