

YEAR 10 SAMPLE QUESTIONS

Alternative Education Equivalency Scheme (AEES)

ENGLISH

The following examples show the types of items in the test, but do not necessarily indicate the full range of items or test difficulty. See the Answer Key for answers to these sample questions.

English Comprehension

Some questions in the multiple-choice test are based on passages or pieces of writing and you will be required to answer questions on recognising the meaning of words, identifying details of content, sequencing events in logical order, making inferences, and so on.

Read the following and then answer example questions 1 and 2.

When something dies, microbes start to use the dead material as food for their own growth. The process is called decay. It is the way dead things disappear from our world, so that new things can grow. By breaking down dead material into simple substances that return to the air and soil, microbes make it possible for all other forms of life to exist.

Adapted from “Childcraft – Holidays and Customs Volume 9”

Example 1 What do microbes use as food?

- A. Soil
- B. Living substances
- C. Air
- D. Dead material

Example 2 “Decay” is a process in which...

- A. air and soil are absorbed.
- B. dead material is broken down.
- C. microbes are set free.
- D. soil mixes with air.

Study the following letter and answer example questions 3 to 5.

Dear Fiona,

My problem is a serious one. My family is not close. We all fight a lot amongst ourselves (especially Mum and Dad). We have tried counselling, but it only helps for a few days and then we are back to our normal selves.

Peter (aged 14)

Example 3 The situation in Peter's family is **not**...

- A. delightful.
- B. disruptive.
- C. disheartening.
- D. disturbing.

Example 4 Which sentence would **best** serve as a conclusion to Peter's letter?

- A. I'm not kidding, I need new parents!
- B. I am pleased with the situation.
- C. Do you think Mum and Dad are normal?
- D. I really need your help and advice.

Example 5 Which would be the **least positive** reply to this letter?

- A. Dealing with this problem now can help you overcome other obstacles in your life.
- B. Lots and lots of teenagers have had bad family experiences – you need to work on your immature attitude.
- C. Use this bad experience as a springboard to success rather than as an obstacle in your life.
- D. It's empowering to know that if your family will not change themselves, you can change yourself.

Example 6 Which word is spelt **correctly**?

- A. syrinje
- B. sirinje
- C. syringe
- D. surringe

Example 7 Which word or phrase **best** starts the following sentence?
...going to the post office.

- A. Were...
- B. Sam and I are...
- C. Sam and me are...
- D. Me and Sam are...

Example 8 Which word or phrase has the same meaning as the underlined phrase?
Restaurants must strictly follow health and hygiene standards.

- A. abide by
- B. think about
- C. agree with
- D. clarify

Example 9 Select the word that is closest in meaning to the word **allow**.

- A. succeed
- B. reveal
- C. enable
- D. disclose

Example 10 The underlined part of the following sentence is incorrect. Which of the following phrases would **best** complete the sentence?

Jane would like to do that new course if finding the time.

- A. having she had the time.
- B. when having the time.
- C. if she could find the time.
- D. being that the time is found.

Example 11 Which part of the following sentence is **incorrect**?
Lim and me are going to the city to do some shopping.

- A. Lim and me
- B. the city
- C. are going
- D. to do

Example 12 Select the word or phrase that **best** completes the following sentence.
The plumber was qualified and well mannered ... she didn't do a good job.

- A. therefore
- B. besides
- C. also
- D. but

Example 13 What is the relationship between the following two sentences?
Voula purchased new shoes. The heels of her old shoes were worn.

- A. The second sentence contradicts the first.
- B. The second sentence makes a judgment about Voula.
- C. The second sentence states the cause of the first.
- D. The first sentence states the cause of the second.

Example 14 Where should an apostrophe be in the following sentence?
Sarahs cats loved the treats they were given.

- A. Sarah's
- B. cat's
- C. treat's
- D. we're

Example 15 Which of the following group of words should be capitalised?

- A. melbourne, shopping, venue
- B. brisbane, street, place
- C. perth, computer, scissors
- D. sydney, europe, elizabeth

GENERAL MATHEMATICS

The following examples show the types of items in the test, but do not necessarily indicate the full range of items or test difficulty. For the General Mathematics test, you may use a **silent, battery-operated, non-programmable scientific calculator** (not CAS/graphics calculator). See the Answer Key for answers to these sample questions.

Formulae

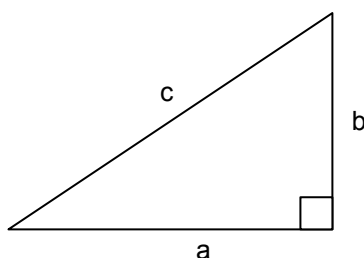
The following formulae may be used in your calculations:

Area and volume

- Area of rectangle = *length x width*
- Area of triangle = $\frac{1}{2}$ *base x height*
- Volume of a prism = *area of base x height*

Theorem of Pythagoras

- In any right-angled triangle: $c^2 = a^2 + b^2$

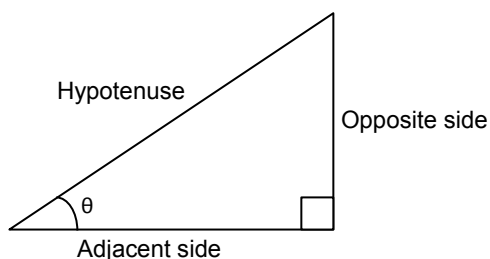


Temperature conversion formula

Degrees Celsius to degrees Fahrenheit:

- $^{\circ}F = (^{\circ}C \times 1.8) + 32$

Trigonometry



In any right-angled triangle:

$$\sin \theta = \frac{\textit{opposite}}{\textit{hypotenuse}}$$

$$\cos \theta = \frac{\textit{adjacent}}{\textit{hypotenuse}}$$

$$\tan \theta = \frac{\textit{opposite}}{\textit{adjacent}}$$

Growth and decay formulae

- Simple growth or decay: $A = P(1 \pm ni)$
- Compound growth or decay: $A = P(1 \pm i)^n$

Where:

A = amount at the end of n years

P = principal

n = number of years

i = interest rate per year, $r\% = \frac{r}{100}$

Number

Example 1 $0.3 \times 0.2 =$

- A. 0.5
- B. 0.05
- C. 0.6
- D. 0.06
- E. 0.09

Example 2 Which of the following fractions represents the **largest** portion?

- A. $\frac{1}{8}$
- B. $\frac{3}{9}$
- C. $\frac{3}{16}$
- D. $\frac{11}{36}$
- E. $\frac{15}{64}$

Example 3 Green and brown paint are to be mixed in the ratio 5:3. If the total amount of paint is to be 4 litres, how many litres of green paint will be needed?

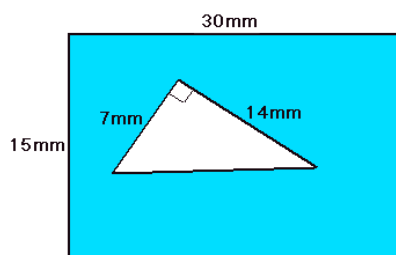
- A. 0.5
- B. 1.0
- C. 1.5
- D. 2.0
- E. 2.5

Example 4 $6^3 =$

- A. 216
- B. 128
- C. 64
- D. 36
- E. 18

Space

Example 5 What is the area of the shaded region?



- A. 450 mm^2
- B. 352 mm^2
- C. 401 mm^2
- D. 98 mm^2
- E. 49 mm^2

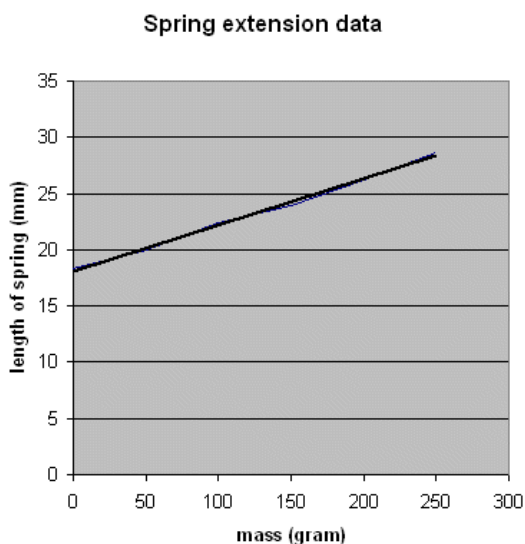
Measurement

Example 6 How long will it take a person to cover a distance of 240 km by car at a constant speed of 100 km/h?

- A. 2 hr 15 min
- B. 2 hr 24 min
- C. 2 hr 36 min
- D. 2 hr 40 min
- E. 2 hr 42 min

Chance and Data

Example 7 A series of weights were hung from a coil spring. The data collected are shown in the graph below.



The spring length for a weight of 300 g is **most likely** to be closest to:

- A. 18 mm
- B. 28 mm
- C. 30 mm
- D. 32 mm
- E. 35 mm

Algebra

Example 8 If x and y are positive whole numbers, what is the smallest value of $x + y$ such that $2x + 5y$ is divisible by 16?

- A. 1
- B. 3
- C. 5
- D. 7
- E. 9

Example 9 What is the hundredth number in the following sequence?
3, 7, 11, 15, 19, ...

- A. 395
- B. 399
- C. 403
- D. 407
- E. 411

Reasoning and Strategies

Example 10 The mass of a jar filled with jam is 1.125 kg. The same jar half-filled with jam has a mass of 0.875 kg. Determine the mass of the empty jar in kilograms.

- A. 0.625
- B. 0.500
- C. 0.375
- D. 0.250
- E. 0.125

ADVANCED MATHEMATICS

The following examples show the types of items in the test, but do not necessarily indicate the full range of items or test difficulty. For the Advanced Mathematics test, you may use a **silent, battery-operated, non-programmable scientific calculator** (not CAS/graphics calculator). See the Answer Key for answers to these sample questions.

Formulae

The following formulae may be used in your calculations:

Measurement

- Area of rectangle = *length x width*
- Area of triangle = $\frac{1}{2} \text{ base } \times \text{ height} = \frac{1}{2} ab \sin C$ (where *C* is the included angle)
- Area of a circle = $\pi \times \text{radius}^2$
- Circumference of a circle = $2\pi \times \text{radius}$
- Volume of a sphere = $\frac{4}{3}\pi \times \text{radius}^3$
- Surface area of a sphere = $4\pi \times \text{radius}^2$
- Volume of any regular prism = *area of base x height*
- Volume of any right pyramid = $\frac{1}{3} \text{ area of base } \times \text{ height}$
- Volume of cylinder = $\pi r^2 \times h$ where *r* = radius, *h* = height
- Total surface area of cylinder = $2\pi r^2 + 2\pi rh$ where *r* = radius, *h* = height
- Volume of a cone = $\frac{1}{3}\pi r^2 h$

Units

- 100 cm = 1 metre
- 1000 m = 1 kilometre
- 1000 cm³ = 1000 ml = 1 Litre

Temperature conversion formula

- Degrees Celsius to degrees Fahrenheit: $^{\circ}F = (^{\circ}C \times 1.8) + 32$

Equation of a Circle Centre

- Equation of a circle centre (0,0)
 $x^2 + y^2 = \text{radius}^2$

Pi

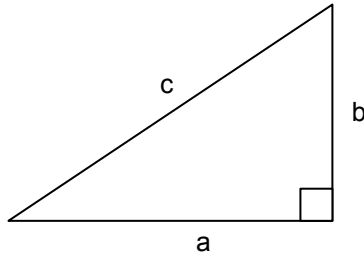
- pi = 3.14

Average daily rainfall (in a given month)

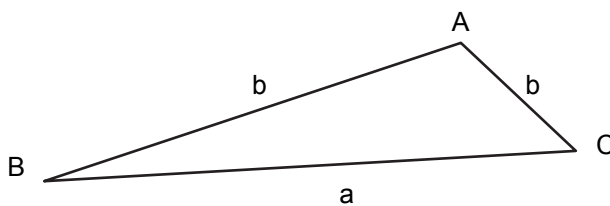
$$\bar{x} = \frac{\text{total rainfall for } t \text{ months}}{\text{number of days in } t \text{ months}}$$

Theorem of Pythagoras

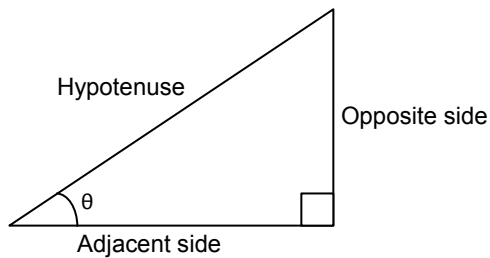
- In any right-angled triangle: $c^2 = a^2 + b^2$



- In any triangle: $c^2 = a^2 + b^2 - 2ab\sin C$



Trigonometry



In any right-angled triangle:

$$\sin \theta = \frac{\textit{opposite}}{\textit{hypotenuse}}$$

$$\cos \theta = \frac{\textit{adjacent}}{\textit{hypotenuse}}$$

$$\tan \theta = \frac{\textit{opposite}}{\textit{adjacent}}$$

Sine Rule: where **a**, **b**, and **c** are the lengths of the sides opposite angles at A, B and C, respectively.

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

Simple Interest formula

- $I = PRT$

Where:

P = principal

R = interest rate per year

T = number of years

Growth and decay formulae

- Simple growth or decay: $A = P(1 \pm ni)$
- Compound growth or decay: $A = P(1 \pm i)^n$

Where:

A = amount at the end of n years

P = principal

n = number of years

i = interest rate per year, $r\% = \frac{r}{100}$

Linear Relationships

- Distance between 2 points $d = \sqrt{(y_2 - y_1)^2 + (x_2 - x_1)^2}$
- Coordinates of midpoint $(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2})$
- Gradient of a line = $\frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$

Factor Theorem

- The factor theorem states that a polynomial $f(x)$ has a factor $(x - k)$ if and only if $f(k) = 0$.

Remainder Theorem

- The remainder when $P(x)$ is divided by $(x-a)$ is equal to $P(a)$.

Working with numbers

Example 1 A TV cost \$9,999 including GST of 10%. How much would the TV have cost before the GST was added?

- A. \$9,090
- B. \$8,999
- C. \$9,000
- D. \$9,900
- E. \$9,009

Example 2 $2^8 \times 2^{-2} =$

- A. 2^{-16}
- B. 2^6
- C. 12
- D. 2^{-4}
- E. -4

Ratio & Proportion

Example 3 Of 1350 military personnel, the proportion of males to females is 7:2. What is the number of females?

- A. 270
- B. 1050
- C. 160
- D. 300
- E. 350

Money & Financial Mathematics

Example 4 A sale advertised “Buy 2 shirts and get the 2nd shirt (of equal or lesser value) at 50% off.” Thomas bought 2 shirts originally priced at \$90 and \$120. How much did he pay in total?

- A. \$220
- B. \$150
- C. \$105
- D. \$210
- E. \$165

Example 5 Andrew borrows \$12,000 to buy a second hand car. The fixed simple interest rate is 11% pa and the loan is to be repaid over 5 years. The total amount Andrew will pay to the bank is

- A. \$13,320
- B. \$18,000
- C. \$18,600
- D. \$16,500
- E. \$12,000

Real Numbers

Example 6 Simplify $3x^0 (4y^3)^2$

- A. $48y^6$
- B. $24xy^6$
- C. $48y^5$
- D. $12xy^5$
- E. $24xy^5$

Example 7 The Richter Scale measuring earthquake strength is related to the logarithmic scale. An earthquake measuring '2' on the Richter scale represents $\log_{10} 100$ earthquake measuring '4' on the Richter scale would be

- A. Twice as strong
- B. Four times as strong
- C. 10 times as strong
- D. 100 times as strong
- E. 1000 times as strong

Patterns & Algebra

Example 8 The factorised form of $4xy^2 + 2y$ is:

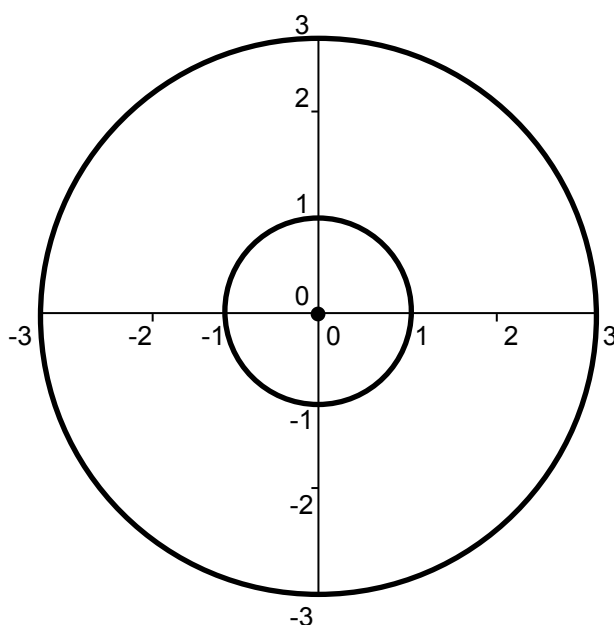
- A. $2xy(y + 1)$
- B. $4xy(y + 1)$
- C. $2y(2xy + 1)$
- D. $2xy(2y + 1)$
- E. $2xy(y + 2)$

Example 9 The expression $(y + 3)^2$ can be expanded as:

- A. $y^2 + 6$
- B. $y^2 + 3y + 6$
- C. $y^2 + 9$
- D. $y^2 + 6y + 6$
- E. $y^2 + 6y + 9$

Linear and Non-linear Relationships

Example 10 The circle shown with radius 1 unit has equation $x^2 + y^2 = 1$



This circle is dilated by a factor of 3. Its new equation would be:

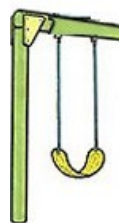
- A. $x^2 + y^2 = 3$
- B. $x^2 + y^2 = 9$
- C. $x^2 + y^2 = 6$
- D. $3x^2 + 3y^2 = 1$
- E. $x^2 + y^2 = \sqrt{3}$

Example 11 The parabola with equation $y = x^2$ is reflected in the x axis. Its new equation is

- A. $y = 1 - x^2$
- B. $y = x^2 - 1$
- C. $y = -x^2$
- D. $y = x^2 + 1$
- E. $y = -x^2 - 1$

Example 12 The shape of the curved seat of a swing is modelled by the equation $h = 2(x - 1)^2 + 0.5$ where h metres is the height of the swing above the ground and x is the horizontal distance in metres from the left hand post of the frame. What is the lowest height of the seat above the ground?

- A. 0.5
- B. 1.0
- C. 1.5
- D. 2.0
- E. 2.5



Using Units of Measurement

Example 13 The formula $C = \frac{5}{9}(F - 32)$ converts degrees Fahrenheit ($^{\circ}F$) into degrees Celsius ($^{\circ}C$). If the temperature is 100° Fahrenheit, what would this be in degrees Celsius?

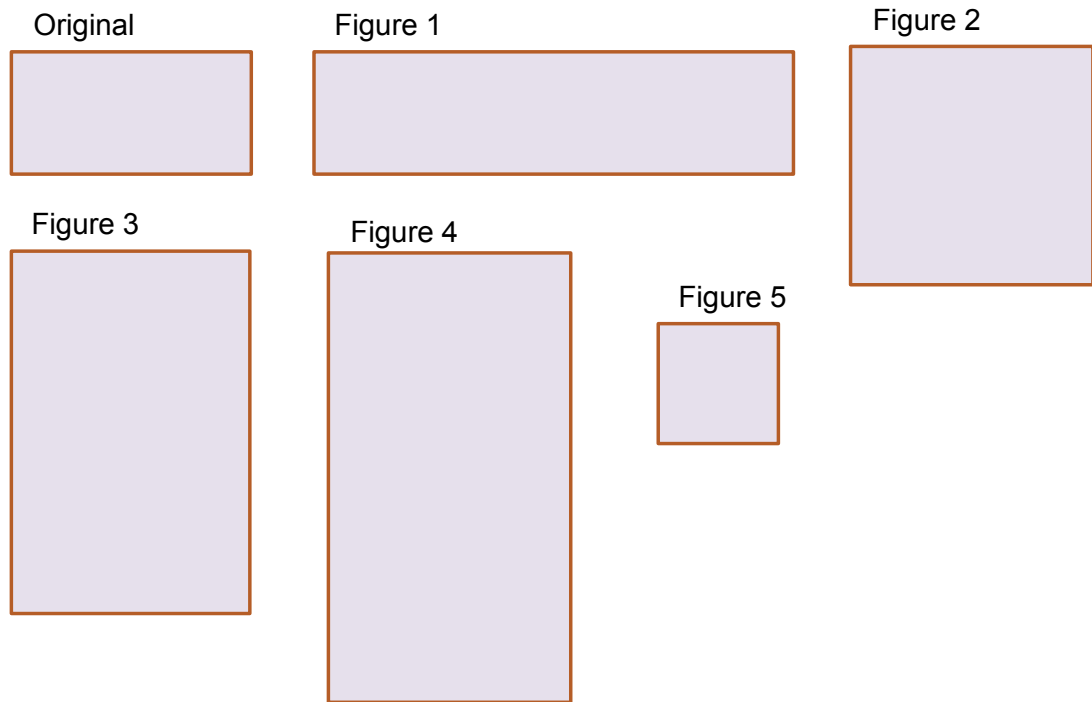
- A. 68.0°
- B. 23.6°
- C. 212.0°
- D. 43.4°
- E. 37.8°

Example 14 A cylinder has a volume of 900 cm^3 . If the radius of the base is 5 cm what is the length of the cylinder?

- A. 36.00 cm
- B. 11.46 cm
- C. 16.93 cm
- D. 57.30 cm
- E. 42.25 cm

Geometric Reasoning

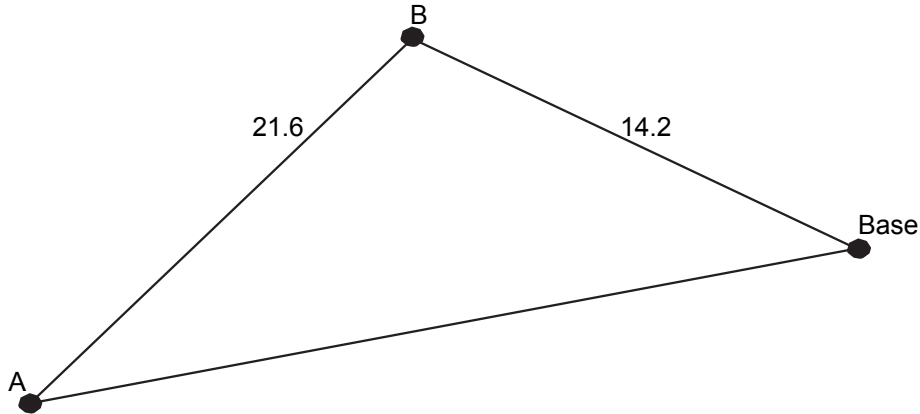
Example 15 When the object marked ORIGINAL has both its length and width doubled, the enlargement is



- A. Figure 1
- B. Figure 2
- C. Figure 3
- D. Figure 4
- E. Figure 5

Pythagoras and Trigonometry

Example 16 Soldiers at points A and B know that the distance from A to B is 21.6 km and from B to the Base is 14.2 km. They have also taken bearings which show the angle at B is 81.5° .



Due to a lake being in the way, they will have to rely on calculations for the distance from A to the Base. This direct distance from A to the BASE is

- A. 22.8 km
- B. 26.3 km
- C. 24.0 km
- D. 31.1 km
- E. 25.6 km

Example 17 Given $\sin 60^\circ = \frac{\sqrt{3}}{2}$, the exact value of $\sin 300^\circ$ is

- A. $\frac{2}{\sqrt{3}}$
- B. $\frac{\sqrt{3}}{2}$
- C. $\frac{1}{2}$
- D. $-\frac{2}{\sqrt{3}}$
- E. 2

Example 18 A wooden 'roof truss' consists of a symmetrical triangle and a vertical support to the apex as shown below. The angle of slope is 22° and the vertical height of the truss is 1.5 metres. Ignoring joins, approximately how much wood is required?

- A. 26.6 metres
- B. 16.9 metres
- C. 8.9 metres
- D. 15.4 metres
- E. 18.6 metres



Chance

Example 19 There are 2.5 kg, 5 kg, 10 kg and 20 kg weights available at the gym. Amos randomly chooses **2 weights** to fit onto the rowing machine. What is the probability that the total weight he puts on the machine is 20 kg or more? Completing the lattice diagram may assist you.

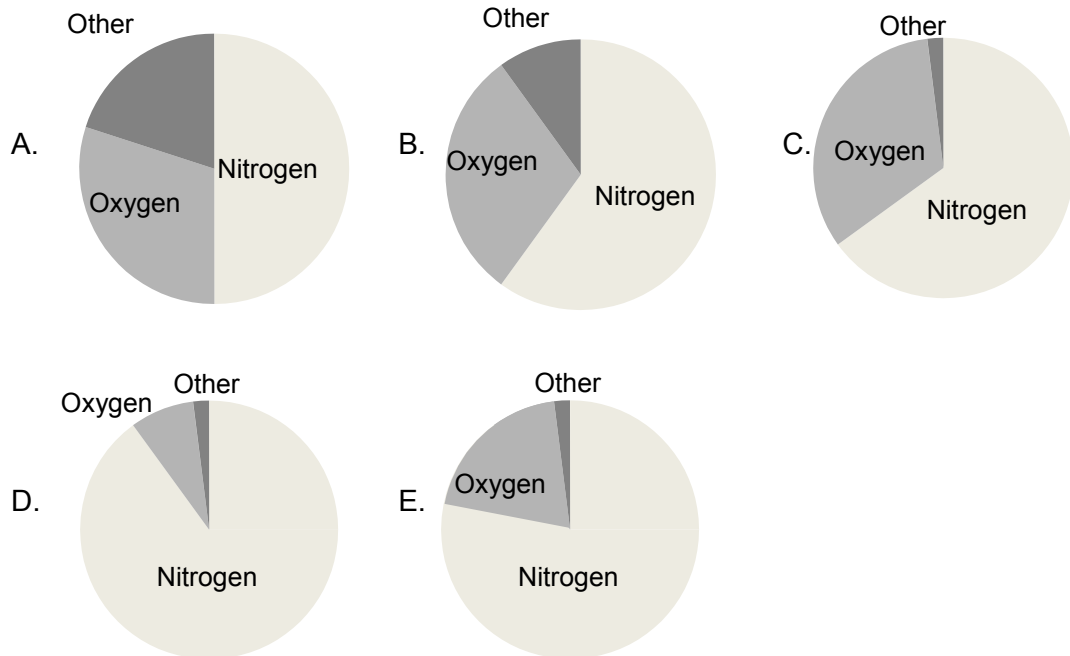
First weight selected

		2.5 Kg	5 Kg	10 Kg	20 Kg
Second weight selected	2.5 Kg	2.5 + 2.5			
	5 Kg				
	10 Kg				
	20 Kg				
	20 Kg				

- A. $\frac{1}{2}$
- B. $\frac{1}{4}$
- C. $\frac{5}{16}$
- D. $\frac{3}{8}$
- E. $\frac{1}{8}$

Data Representation and Interpretation

Example 20 The composition of the atmosphere by volume is approximately Nitrogen 78%, Oxygen 20.6% and other Gases 1.4%. Which of the pie charts shown below best represents this?



SCIENCE

The following examples show the types of items in the test, but do not necessarily indicate the full range of items or test difficulty. For the Science test, you may use a **silent, battery-operated, non-programmable scientific calculator** (not CAS/graphics calculator). See the Answer Key for answers to these sample questions.

Read the following information about ‘relative velocity’ and answer example questions 1 and 2.

Velocity brings together the two notions of speed and direction. Velocities can be added and subtracted. When a car is driving along the road, the direction in which the car is travelling may be considered as positive. A positive velocity is then assigned to cars travelling in the same direction and a negative velocity is assigned to cars travelling in the opposite direction.



Example 1 A car is driving at 90 km/h in a northerly direction and passes another car driving at 60 km/h in a northerly direction. What is the first car’s velocity relative to the second car?

- A. 150 km/h
- B. 90 km/h
- C. 60 km/h
- D. 30 km/h

Example 2 A car is driving east at 100 km/h and passes another car driving west at 80 km/h. What is the first car’s velocity relative to the second car?

- A. 180 km/h
- B. 100 km/h
- C. 80 km/h
- D. 20 km/h

Read the following information about 'sky diving' and answer example questions 3 and 4.

When a person jumps from a plane to sky dive, they experience the effects of air resistance pushing against their body. Air resistance occurs because air molecules collide with the person's body. The following measurements were taken during the first 20 seconds of a sky dive. The parachute was not opened in the first 20 seconds of the dive – the person was falling freely.

Sky Diving Results: first 20 seconds of jump

Time elapsed (s)	Distance fallen (m)	Velocity (m/s)	Acceleration (m/s^2)	Air resistance (N)
0	0	0	9.8	0
1	6	12	9.1	205
5	37	34	5.9	320
10	54	52	1.7	685
15	62	59	0.35	755
20	64	61	0	776

The units used in the table are:

s = seconds

m = metres

N = Newton (a measure of force).

Example 3 When five seconds had elapsed, what distance had the sky diver fallen?

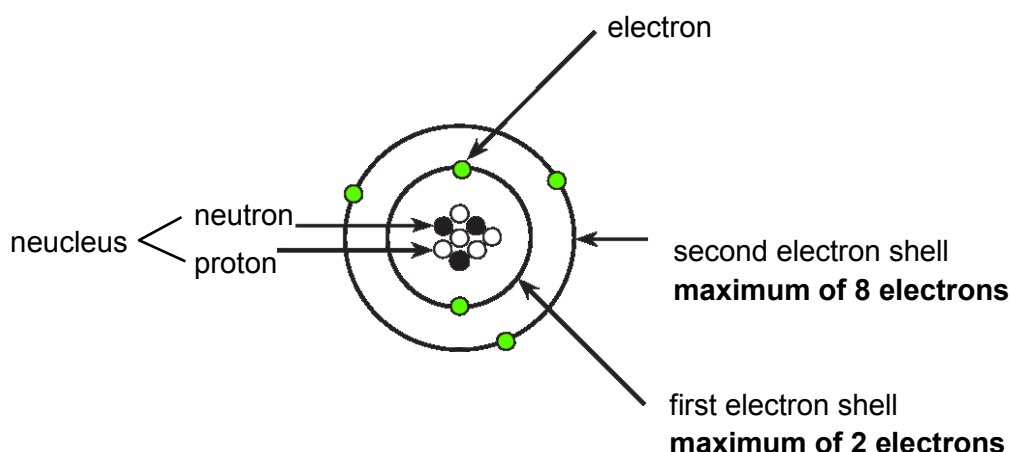
- A. 5.9 metres
- B. 34 metres
- C. 37 metres
- D. 54 metres

Example 4 Which one of these statements is supported by the data?
Over the initial 15 second period since jumping, as air resistance increases...

- A. both acceleration and velocity increase.
- B. both acceleration and velocity decrease.
- C. there is no change to acceleration or velocity.
- D. acceleration decreases while velocity increases.

Read the following information about 'atoms' and answer example questions 5 to 7.

The atomic model of matter states that the basic building blocks of all materials are atoms. Atoms are made up of three components: electrons, protons and neutrons. The protons and neutrons are contained in the centre of the atom and together they form the 'nucleus' of the atom. The electrons circle outside the nucleus in a series of set orbits called 'shells'. These shells are filled from the innermost outwards and each shell must be completely filled before electrons can start filling the next one. The first shell may contain no more than two electrons, and the second no more than eight. Protons have an electrical charge of +1 and electrons have an electrical charge of -1. Neutrons have no electrical charge. Therefore an atom in its neutral state will have an equal number of electrons and protons.



Using this model, scientists have defined a set of approximately 110 different types of atoms called 'elements'. In different combinations these elements make up all the materials that we find in the world, from wood to metal to the air we breathe. The following table lists some of the properties of the first 10 elements.

Element	Symbol	Total number of electrons in neutral state
Hydrogen	H	1
Helium	He	2
Lithium	Li	3
Beryllium	Be	4
Boron	B	5
Carbon	C	6
Nitrogen	N	7
Oxygen	O	8
Fluorine	F	9
Neon	Ne	10

Example 5 For an atom to be electrically 'neutral', i.e. neither positive nor negative in total charge, it will have...

- A. an equal number of protons and neutrons.
- B. an equal number of protons and electrons.
- C. an equal number of neutrons and electrons.
- D. an equal number of protons, neutrons and electrons.

Example 6 How many electrons will a fluorine atom have in its **outer** shell?

- A. 2
- B. 7
- C. 8
- D. 9

Example 7 The atomic number of an atom is the number of protons it has. Using the information and the table above, what is the atomic number of oxygen?

- A. 16
- B. 10
- C. 8
- D. 6

Read the following information about 'resistance' and answer example questions 8 to 10.

An important formula in electrical theory is Ohm's law. This is written as: $V = I.R$

Where:

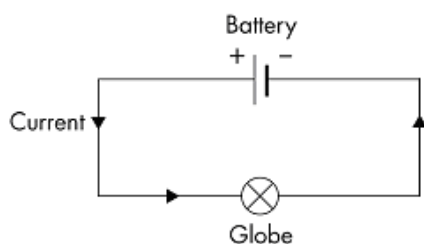
V = voltage (in volts)

I = current (in amperes)

R = resistance (in ohms)

NB: This equation can be rewritten as $I = \frac{V}{R}$ or $R = \frac{V}{I}$

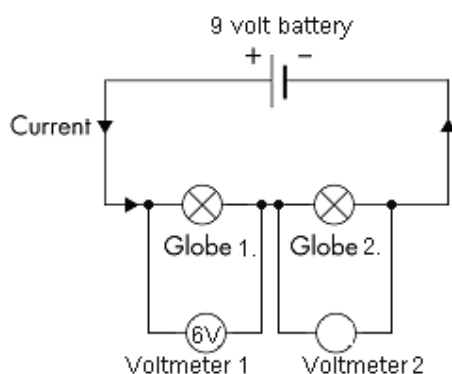
Example 8 Consider the series circuit shown below and answer the following question:



If the battery voltage is 6 volts and the resistance of the globe is 100 ohms, what is the current flowing in this circuit?

- A. 6.0 amperes
- B. 600 amperes
- C. 0.06 amperes
- D. 16.67 amperes

Example 9 Consider the series circuit shown below and answer the following question:

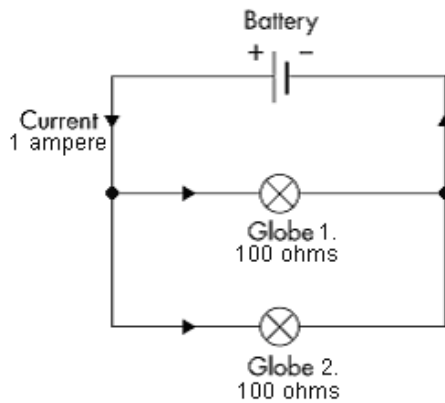


A voltage drop is the voltage across a component in a circuit. In a series circuit, the sum of the voltage drops across all the components in the circuit will equal the supply (e.g. battery) voltage.

In the above circuit assume that the globes are the only resistances. If the battery voltage is 9v and Voltmeter 1 shows 6v, what will Voltmeter 2 show?

- A. 3 volts
- B. 6 volts
- C. 9 volts
- D. 12 volts

Example 10 In a parallel circuit, the total current is the sum of the currents through the individual loops. Consider the parallel circuit shown below and answer the following question.



If the current flowing at the point shown is 1 ampere, what is the current flowing through Globe 1?

- A. 2 ampere
- B. 1 ampere
- C. 0.5 ampere
- D. 0.25 ampere

Year 10 Sample Questions Answer Key

Subject	Question	Answer	Question	Answer
English	Question 1	D	Question 9	C
	Question 2	B	Question 10	C
	Question 3	A	Question 11	A
	Question 4	D	Question 12	D
	Question 5	B	Question 13	C
	Question 6	C	Question 14	A
	Question 7	B	Question 15	D
	Question 8	A		
General Mathematics	Question 1	D	Question 6	B
	Question 2	B	Question 7	C
	Question 3	E	Question 8	C
	Question 4	A	Question 9	B
	Question 5	C	Question 10	A
Advanced Mathematics	Question 1	A	Question 11	C
	Question 2	B	Question 12	A
	Question 3	D	Question 13	E
	Question 4	E	Question 14	B
	Question 5	C	Question 15	D
	Question 6	A	Question 16	C
	Question 7	D	Question 17	B
	Question 8	C	Question 18	B
	Question 9	E	Question 19	A
	Question 10	B	Question 20	E

Subject	Question	Answer	Question	Answer
Science	Question 1	D	Question 6	B
	Question 2	A	Question 7	C
	Question 3	C	Question 8	C
	Question 4	D	Question 9	A
	Question 5	B	Question 10	C



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