

Exercises

1. In the passage above find all the nouns which form their plurals irregularly and those that have only a singular or plural form. (Write their singular and plural forms if possible).

2. Put into the singular form:

- The experiments may confirm the hypotheses.
- The analyses are not exact.
- What criteria do the authors use?
- The articles describe certain features of those phenomena.
- DNA is stored in the nuclei of cells.
- The radii of these wheels are 30 cm.
- Students are writing their theses on black holes.
- Cacti are desert plants with thick stems for storing water and with spines.
- The media focus on politicians' private lives.
- Is the German language on the curricula at British schools?

3. Choose the correct word for each of the following and give the plural form:

(analysis, criterion, memorandum, phenomenon, formula, datum, crisis, medium)

- are facts given.
- are observed events.
- are decisive moments.
- are channels of communication.
- are notes to assist the memory.
- are standards or means of judging.
- are general expressions for solving problems.
- are separations of things into their parts or components.

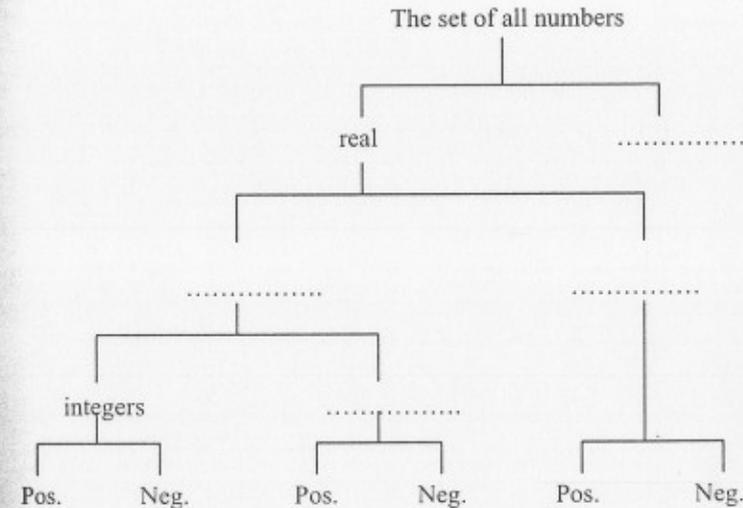
4. Fill in a suitable expression in the correct form:

(radius, formula, datum, criterion, focus, spectrum, crisis, vertex, nucleus, curriculum vitae. They may be used more than once)

- The of a circle is the length of a straight line drawn between the centre and the outside edge.
- We had to learn many chemical at school but I can only remember H₂O for water.
- The was/were collected by various researchers.
- The Health Service should not be judged by financial alone.
- All the line segments extending from the centre of a circle are called
- In physics the point where waves of light or sound which are moving towards each other meet is called a
- A is a short group of letters, numbers or other symbols which represent a scientific or mathematical rule.
- The set of colours into which a beam of light can be separated is called a
- Now the is being transferred from magnetic tape to hard disc.
- The I apply to (= by which I decide about) any problem is "What will make me happiest?"

- I've passed several during my illness, but the fever's started to go down since yesterday.
- How many are there in a triangle?
- Nuclear fission means the dividing of a and nuclear fusion means the joining of the two
- My uncle's written before and after the Velvet revolution differ a lot.

5. Complete the following diagram:



6. Read out the following:

- $45 + 62 = 107$
- $79 - 65 = 14$
- $9 \times 18 = 162$
- $14 \cdot 27 = 378$
- $112 \div 8 = 14$
- $24 : 3 = 8$
- $\frac{1}{13}$

h) $\frac{1}{2} \times \frac{3}{5} = \frac{3}{10}$

i) $2\frac{1}{2} + \frac{9}{10} = 3\frac{2}{5}$

j) 16.9761

k) 13,945,614

l) $72.4 \times 61.5 \approx 4,452.6$

7. Use single words and fill in the blanks in the following sentences:

- The of three and four is twelve.
- The operation that uses the symbol + is called
- Eighteen subtracted twenty equals
- An improper fraction exists when the is greater than the
- The result of a division problem is called
- The product is the result when one quantity is another.

Subjunctive is used in formal style; usually expresses wish, request, necessity, possibility, likelihood, condition, will etc.

- The present subjunctive has the same form as the infinitive (the present subjunctive of *to be* is *be* for all persons, and the present subjunctive for all other verbs is the same as their present tense – “s” is not added for the third person singular). *The king lives here.* (simple present tense)
Long live the king! (subjunctive)
- The past subjunctive has the same form as the simple past tense in all verbs except *to be*, whose past subjunctive is *were* for all persons. The past subjunctive is used in conditional sentences and after certain structures (if/ if only, as if/ though, wish, it's time, etc.).
I wish I were at home.
- *inversion* of the subject and the verb: “... x^2 is a continuous function. So is $1/x$...” (see the explanation of inversion in Unit 6)
- *since* – typical of formal style; meaning *because, as* (čes. protože)
- *also* – used in a formal style; its position in a sentence is the same as that of frequency adverbs (after the simple tenses of *to be* but before the simple tenses of all other verbs; with tenses consisting of more than one verb, they are placed after the first auxiliary). *Too, and as well* have the same meaning, but they are placed at the end of a sentence.

Exercises

1. *What kinds of infinitives can you find in the text above?*
2. *Replace the group of words in italics with an infinitive or an infinitive construction:*
 - a) He got to the top *and was very disappointed when he found* that someone else had reached it first.
 - b) There are a lot of sheets *that need mending*.
 - c) I was surprised *when I heard* that he had left the faculty.
 - d) It is necessary *that everyone should know* the truth.
 - e) There was no place *where we could sit*.
 - f) *It is expected that he will broadcast* a statement tonight. (He is expected ...)
 - g) *It is likely that he will arrive* before six. (He is ...)
 - h) *It is said that he was sitting there all day*. (He is said ...)
 - i) *They believe that he is* one of the best Polish mathematicians. (He ...)
 - j) He was the only one *who understood* the question.
3. *Insert “to” where necessary before infinitives in brackets:*
 - a) He made me (do) it all over again.
 - b) I used (live) in London.
 - c) You needn't (say) anything. Just nod your head and they will (understand).
 - d) I want (see) the college where you live.
 - e) May I (use) your phone?
 - f) He is expected (arrive) in the afternoon.
 - g) Please let me (know) your decision soon.
 - h) Need I (come)? I'd much rather (stay) at home.
 - i) He was made (sign) a paper admitting his guilt.
 - j) I heard the door (open) and saw a shadow (move) across the floor.
4. *Use the perfect infinitive of the verb in italics with the appropriate auxiliary verb:*
 - a) I realized that our department was on fire. – That (be) a terrible moment.
 - b) I saw Einstein last night. – You (not see) Einstein; he died many years ago. You (dream) it.

- c) I've had a headache for two days. – You (go) to the doctor when it started.
- d) As I was standing in the hall I saw Prof. Brown. – It (not be) Prof. Brown; he had left for Spain. It (be) his brother Joseph.
- e) I've brought my own sandwiches. – You (not bring) them. I have enough for two.
- f) The president (unveil) the statue, but he is ill so his wife is doing it instead.
- g) He (not catch) the 7.45 bus because he didn't leave home till 7.35.
- h) He said that censorship of news was absurd and it (abolish) years ago. (passive voice)
- i) People used to work much harder. – They (have) a lot of energy in those days.
- j) We (set) out today, but the weather is so bad that we decided to postpone our start till tomorrow.

5. *Read the following passage and then write the sentences using an appropriate infinitive form (to do, to have done, to be doing, to have been doing):*

SUNKEN TREASURE

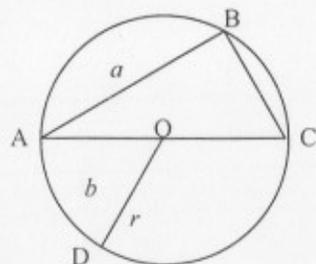
Experts from the British Museum have announced the discovery of a ship which sank in a storm off the Scottish coast over 400 years ago. Divers have found gold bars on the sea bed near the wreck, which the experts believe are only a small part of the ship's precious cargo. According to the British Museum, the ship is in good condition and the cargo is worth millions of pounds.

- a) Divers are reported (find) a Spanish ship.
 - b) Experts are reported (study) objects from it.
 - c) The ship is thought (sink) 400 years ago.
 - d) The ship is thought (return) to Spain.
 - e) The ship is believed (carry) gold bars.
 - f) The ship is believed (lie) on the sea bed.
 - g) The ship is said (be) in good condition.
 - h) The gold is said (be) worth millions of pounds.
6. *Put in the right kind of infinitive:*
 - a) I ought (work) right now.
 - b) Your watch will (repair) by Tuesday.
 - c) I'd like (go) home early today.
 - d) I'd like (see) her face when she opened the letter.
 - e) She must (have) a shower – I can hear the water running.
 - f) It's important (listen) to people.
 - g) She hopes (choose) for the national team.
 - h) Try (not be) back late.
 - i) You should (tell) me you were ill.
 - j) He doesn't like (interrupt) while he's working.
 7. *Read out the following:*
 - a) $a - c = m - y$
 - b) $4a^2b + 8ab^2 = 3c$
 - c) $1 + 2x = y^3 + q^3 = 1$
 - d) $(a + c)d = ca$
 - e) $mh^2 = 3$

- f) $C = \pi d$
 g) $(a \pm b)^2 = a^2 \pm 2ab + b^2$
 h) $\frac{a^2 + 2ab + b^2}{a + b} = a + b$
 i) $3ab - \frac{b}{c} = 11$
 j) $\frac{p}{q} + r = q^2$
 k) $V = \pi r^2 h$
 l) $3(2p - x) < px + 1$

FOCUS B

A CIRCLE



A circle is a plane figure. The distance around a circle is called a *circumference*. A half circle is called a *semi-circle*. All points on the circumference of a circle are *equidistant* from the centre. A line which is drawn from the point of origin to its circumference is called a *radius* (pl. *radii*). All the radii of a circle are equal. A line passing through the centre of a circle is called a *diameter*. A part of a circumference of a circle is called an *arc*. The straight line joining the ends of an arc is called a *chord*. A part of a circle enclosed by two radii and an arc is called a *sector* and a part enclosed by an arc and a chord is called a *segment*.

1. Name the following:

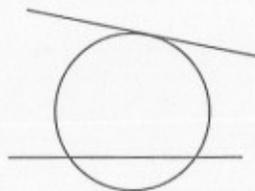
- area a
- area b
- AC
- AO
- O
- AB and BC

2. Say, whether the following statements are true or false. Correct the false statements:

- A chord is a curved line.
- The radius of a circle is half the length of its diameter.
- A closed curve where all points on the curve are equidistant from the centre is called a circumference.
- A sector has three sides, two chords and an arc.

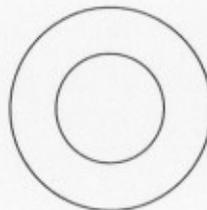
3. Look and read:

a)



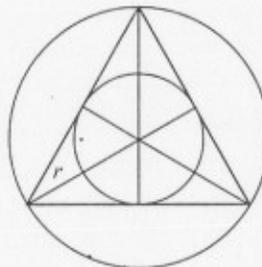
A line meeting the circumference but which does not intersect it is called a *tangent*. A line which intersects the circumference in two places is called a *secant*.

b)



These circles have the same point of origin. They are *concentric*. An *annulus* (pl. *annuli*) is the region between two concentric circles.

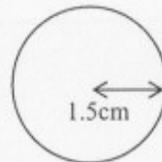
c)



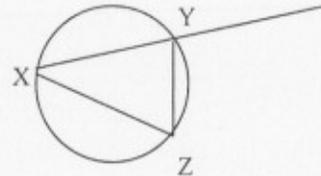
A circle which passes through the vertices of a triangle is called the *circumcircle* of the triangle, and its centre is called its *circumcentre*. The circle is *circumscribed* about (around) the triangle. A circle may also be *inscribed* in the triangle, then each side of the triangle is a tangent to the circle. The centre of an inscribed triangle is called its *incentre*.

4. Give information about the figures:

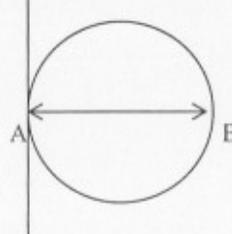
a)



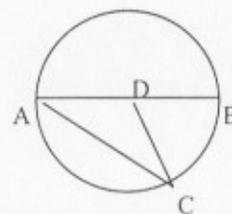
b)



c)



d)



“S”, Σ , or sigma. Then we follow the Σ by X_i and under the Σ we write “ $i = 1$ ” and over it, N . Now we can write

$$\mu = \frac{\sum_{i=1}^N X_i}{N}$$

or

$$\mu = \sum_{i=1}^N X_i / N$$

Now we have a pretty compact expression. But we can go even farther in cases where we are sure no ambiguity can arise by eliminating the designations above and below the sigma, understanding that this means that we add all N of the values. Thus we have

$$\mu = \frac{\sum X}{N} \quad \text{or} \quad \mu = \sum X / N$$

Now we have a very compact expression. Yet, with the aid of our “code book” which we started when we described the meaning of each symbol, we can translate the compact expression directly back to the full directions in English.

Notice:

- *hence* – is often used in a formal style and means “that is the reason or explanation for; therefore”
- irregular comparison of the adjective *far*: *farther* – *farthest* (of distance only);
further – *furthest* (of distance and time)
- the pronunciation and the stress of the word *fatigue* [fə'ti:g]

Exercises

1. In the text above find all the *-ing* forms and say what are their grammatical meanings and positions in sentences (e.g. as a subject, after a preposition, in a construction with “of”, describing a noun, a separate sentence etc.).
2. Put the verbs in brackets into the correct form (*-ing* form or infinitive):
 - a) I am looking forward to (see) you.
 - b) I arranged (meet) them here.
 - c) I wish (see) the professor.
 - d) It's no use (wait).
 - e) I tried (persuade) him (agree) with your proposal.
 - f) Stop (talk); I am trying (finish) a letter.
 - g) Would you mind (lend) me \$ 55. I forgot (cash) a cheque.
 - h) I suggest (telephone) the hospitals before (ask) the police (look) for him.
 - i) After (hear) the conditions I decided (not enter) for the competition.
 - j) He postponed (make) a decision till it was too late (do) anything.
 - k) At first I enjoyed (listen) to him but after a while I got tired of (hear) the same presentation again and again.
 - l) It is usually easier (learn) a subject by (read) books than by (listen) to lectures.

3. Put the verbs in brackets into the correct form (*-ing* form or infinitive):

- a) I'll always remember (meet) you for the first time.
- b) Don't forget (go) to the post office and (send) my letter.
- c) I'll never forget (see) the President.
- d) Please remember (write) a message before you go to bed.
- e) You should stop (smoke). It's dangerous.
- f) I will stop here (find) a hotel.
- g) I regret (tell) him what happened yesterday, during the Department's meeting.
- h) We regret (inform) you that your article would be published later.
- i) What would you like (do) tomorrow?
- j) Students enjoy (solve) these equations.
- k) The boy was ashamed of (tell) a lie.

4. Give synonyms and antonyms to the following verbs included in the text at the beginning of the unit. Can you find any of these synonyms or antonyms in the same text?

to arise (from), to hold, to determine, to involve, to contribute, to reduce, to replace

5. Read out the following:

- a) $1 \leq i \leq m$
- b) $(a + b)^n = a^n + \binom{n}{1} a^{n-1} b + \binom{n}{2} a^{n-2} b^2 + \dots + b^n$
- c) $x \leq \sqrt[3]{\frac{33}{4}} \approx 2.02$
- d) $\frac{10!}{3!2!5!} = 2,520$

6. Rewrite these expressions into mathematical symbols:

- a) Four and seven is eleven _____
- b) Four from eleven leaves seven _____
- c) a minus b is equal to c _____
- d) Eleven diminished by four is equal to seven _____
- e) Once one is one _____
- f) Twice two is four _____
- g) Four times four is sixteen _____
- h) a multiplied by b equals c _____
- i) a plus b over a minus b is equal to c plus d over c minus d _____
- j) one third _____
- k) a half _____
- l) Four and five sevenths _____
- m) 0 point 0 0 two _____
- n) Three squared _____

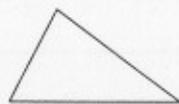
- o) The second power of five _____
- p) Five cubed _____
- q) Five to the power three _____
- r) Eight is the third power of two _____
- s) a to the minus tenth power _____
- t) The square root of four is two _____
- u) The cube root of twenty-seven is three _____
- v) The fifth root out of a to the power seven _____
- w) The ratio of one to two _____
- x) Twenty is to five as sixteen is to four _____
- y) The ratio of a to b is c _____
- z) The product of the sum and difference of two quantities is equal to the difference of their squares _____
- aa) M is equal to R sub one multiplied by x minus P sub one round brackets opened, x minus a sub one round brackets closed, minus P sub two, round brackets opened, x minus a sub two, round brackets closed _____

FOCUS B

MORE 2-DIMENSIONAL FIGURES

1. Look and read:

A triangle is a *polygon* with three sides.
A triangle is a three-sided figure.



(Note: A polygon is a figure with many sides. In a regular polygon all the sides have equal length and the interior angles have equal size; and the vertices lie on a circle.)

Now make similar statements about the other figures:



a quadrilateral



a pentagon



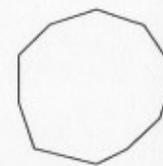
a regular hexagon



a heptagon



an octagon

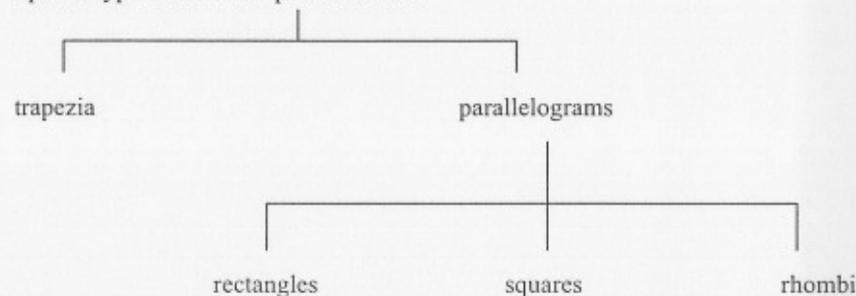


a decagon

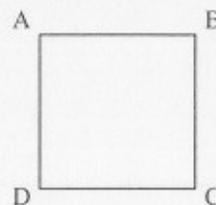
2. Read this:

A figure with four sides is called a *quadrilateral*.

Special types of convex quadrilaterals:

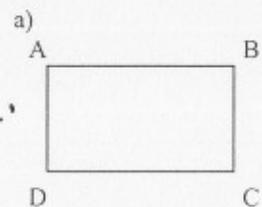


3. Look and read:

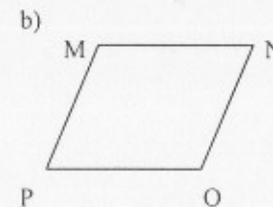


ABCD is a square.
It is a four-sided figure.
All its sides are equal.
All its angles are right angles.
Opposite sides are parallel.
A square is a regular quadrilateral.

Now describe these figures:



a rectangle (oblong)



a rhombus

- g) If I had worked harder at school I would be sitting in a comfortable office now.
 h) If he had committed this crime he might have gone to prison.

3. Rewrite the sentences, beginning with the adverbs in brackets. Make any other changes that are necessary:

- a) The moment she arrived she started to complain. (No sooner)
 b) He both sings and dances. (Not only)
 c) I had never eaten such an awful meal. (Never)
 d) When the match started, fighting broke out. (No sooner)
 e) The moment I got into the bath the phone rang. (Hardly)
 f) It was the most wonderful book I have ever read. (Never)

4. Fill in the missing British equivalents of the American words:

- area code
 billion
 collect call
 cookie
 fall
 flashlight
 math
 resumé
 schedule
 secretary
 stove

5. Match the British words in column A with the American ones in column B:

- | A | B |
|--------------|--------------|
| a) shop | 1) pants |
| b) quote | 2) railroad |
| c) engaged | 3) attorney |
| d) tube | 4) conductor |
| e) trousers | 5) busy |
| f) railway | 6) cite |
| g) guard | 7) subway |
| h) solicitor | 8) store |

6. Read out the following:

- a) $S_p = \frac{a - aq^n}{1 - q} \quad (q \neq 1)$
 b) $0 < \text{ctn}^{-1}x < \pi$
 c) $\lim x_n = a$
 d) $x_n \rightarrow a$
 e) $n > \frac{\log \varepsilon}{\log |q|}$
 f) $0 < 1 - \frac{\sin x}{x} < 1 - \cos x$

g) $1 < \sqrt{1 + \frac{1}{n}} < 1 + \frac{1}{n}$
 h) $\frac{\sqrt{1+x}-1}{x} = \frac{1}{\sqrt{1+x}+1}$

7. Rewrite these expressions into mathematical symbols:

- a) square brackets _____
 b) parentheses, round brackets _____
 c) braces _____
 d) X is an empty set _____
 e) M is the set with the elements 2, 4, 6 _____
 f) Capital I minus I is equal to d _____
 g) The nth root of c to the mth equals c to the power of m over n _____
 h) b to the power of minus n is equal to one over b to the nth _____
 i) The limit of f of x as x tends to x nought is not equal to f of x nought _____
 j) The limit, for delta x tending to zero, of the sum of small f of x sub k delta x taken from x sub k equal to a to x sub equal to b minus delta x equals _____
 the integral from a to b of small f of x d x equals _____
 capital f of x between the limits a and b _____
 k) y equals the negative square root of the difference r squared minus x squared _____

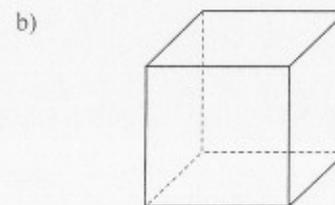
FOCUS B

SOLID FIGURES

1. Look and read:



This is a sphere. It is a locus of all points whose distance from the centre is equal to its radius.



This is a cube. It has six square faces. It has eight vertices and twelve edges.

CURRICULUM VITAE

CURRICULUM VITAE - Robert Humbley

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Directing and organising different courses
Recruitment of teachers
Materials production (including 2 published textbooks)

Relevant skills: Touch typing and word processing
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Language knowledge: Fluent Spanish
Some knowledge of German, Czech and Russian

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Useful advice

1. Do:

- write briefly
- stress relevant skills, education and experience
- be informative (don't be shy)
- present a positive image
- think about presentation
- show knowledge of people and institutions
- check your final version carefully (correct mistakes, missprints etc.)
- divide text into paragraphs

2. Do not:

- write at great length
- give irrelevant information
- include unnecessary copies of documents, letters etc.
- refer to your distant past (parents, elementary school ...)
- use the same CV for each and every application
- make spelling mistakes
- give false information
- give up applying if you are unsuccessful

There is an increasing tendency in modern CVs to not include personal information including age, marital status and children, gender, etc. The reason for this is that anti-discrimination laws are playing a larger role in the hiring practices of today's corporations, and this information cannot be used in their hiring decisions.