ÉRETTSÉGI VIZSGA ● 2012. május 8.

MATEMATIKA ANGOL NYELVEN

EMELT SZINTŰ ÍRÁSBELI ÉRETTSÉGI VIZSGA

JAVÍTÁSI-ÉRTÉKELÉSI ÚTMUTATÓ

NEMZETI ERŐFORRÁS MINISZTÉRIUM

Important Information

Formal requirements:

1. The papers must be assessed in **pen and of different colour** than the one used by the candidates. Errors and flaws should be indicated according to ordinary teaching practice.
2. The maximal score for each questions is printed in the first shaded rectangle next to the question. The **score** given by the examiner should be entered into the other **rectangle**.
3. **In case of correct solutions** it is enough to enter the maximal score into the corresponding rectangle.
4. In case of faulty or incomplete solutions, please indicate the corresponding partial score within the body mof the paper.

Substantial requirements:

1. In case of some problems there are more than one marking schemes given. However, if you happen to come accross with some solution **different** from those outlined here, please identify the parts equivalent to those in the solution provided in this booklet and do your marking accordingly.
2. The scores given in this booklet can be split further. Keep in mind, however, that any partial score can be an integer number only.
3. If the candidate's argument is clearly valid and the answer is correct then the maximal score can be given even if the actual solution is **less detailed** than the one in this booklet.
4. If there is a **calculation error** or any other flaw in the solution, then the score should be deducted for the actual item only where the error has occured. If the candidate is going on correctly working with the faulty intermediate result and the problem has not suffered substantial damage due to the error, then the subsequent partial scores should be awarded.
5. If there is a **fatal error** within an item (these are separated by double lines in this booklet), then no points should be given in this item, even for formally correct steps. If, however, the wrong result obtained by invalid argument is used correctly throughout subsequent steps, maximal scores should be given for the parts remaining, unless the problem has changed essentially due to the error.
6. If an **additional remark** or a **measuring unit** appears in brackets in this booklet then the solution is complete even if it does not appear in the candidate's solution.
7. If there are more than one correct attempts to solve a problem, it is the **one indicated by the candidate that can be marked.**
8. You should **not give any bonus points** (points beyond the maximal score for a solution or for some part of a solution).
9. You **should not reduce the score** for erroneous calculations or steps unless its results are used by the candidate in the actual course of the solution.
10. **There are only 4 questions to be marked out of the 5 in part II. of this examination.** Hopefully, the candidate has entered the number of the question not to be marked int he square area provided for this. Accordingly, this question should not be assessed even if there is some kind of solution contained in the paper. Should there be any ambiguity about the student's request with respect to the question not to be considered, it is the last one in this problem set, by default, that should not be marked.

I.

1. a)

The values of a and b can be computed from the simultaneous system formed by the second and the third equations. Adding thesee two equations yields $2a^2 = 6$ that is $a = \sqrt{3}$ $(a > 0)$.	2 points	*For the value of a.*
$b^2 = 4 - 3 = 1$ that is $b = 1$.	1 point	*For the value of b.*
$c = 2$. (The sides of the triangle are $\sqrt{3}$, 1 and 2 units long, respectively.)	1 point	*For the value of c.*
Total:	**4 points**	

1. b)

Since $1^2 + \sqrt{3}^2 = 2^2$,	1 point	
the triangle is right angled by the converse of Pythagoras' theorem	1 point	
and the right angle is opposite to the longest side.	1 point	
$\sin\beta = \frac{1}{2}$, therefore $\beta = 30^\circ$,	1 point	
and thus $\alpha = 60^\circ$.	1 point	
Total:	**5 points**	
Remark:if the candidate identifies the halved regular triangle by its sides without going into further details then still full score should be given.		

1. c)

The radius of the incircle can be calculated as the ratio of the area and the semiperimeter $r = \frac{a}{\frac{p}{2}}$.	1 point	*This point is due if this idea is clear from the solution.*
The area of the triangle is the half of the product of the two legs: $\frac{1 \cdot \sqrt{3}}{2} = \frac{\sqrt{3}}{2}$.	1 point	
$r = \frac{\frac{\sqrt{3}}{2}}{\frac{1+2+\sqrt{3}}{2}} = \frac{\sqrt{3}}{3+\sqrt{3}} \left(= \frac{\sqrt{3}-1}{2} \right).$	2 points	
Total:	**4 points**	*If the final result is written as an approximating decimal, then at most 3 points may be given.*

2. a)		
Considering the experiment of rolling a fair die twice there are 36 (equally probable) ways to assign the values of *a* and *b*.	1 point	
The actual scores, however, must be from the set $\{1, 2, 3; 4\}$, by condition. (There are 4 possible values of *a* and 3 values only of *b*)	1 point	
therefore, there are $3 \cdot 4 = 12$ numbers of the required property.	1 point	
The probability in question is hence $\frac{12}{36} = \frac{1}{3}$.	1 point	
Total:	**4 points**	

2. b)		
The four sets as the lists of their elements are as follows		
$A = \{ 14; 21; 28; 35; 42; 49; 56; 63; 70; 77; 84; 91; 98 \}$,. $(\lvert A \rvert = 13.)$	1 point	
$B = \{ 29; 58; 87 \}$,	1 point	
$C = \{ 14; 25; 38; 53; 70; 89 \}$,	1 point	
$D = \{ 13; 14; 17; 22; 29; 38; 49; 62; 77; 94 \}$.	1 point	
b1) The cardinality of $A \cup C$ is 17. (There are exactly two common elements of the 6-element set *C* and of the 13-element set *A*.)	1 point	
b2) The set $B \cap D$ has 1 element.(The single common element of the sets *B* and *D* is 29.	1 point	
b3) Below are listed those two digit positive integers which belong to exactly two of the above four sets: 29; 38; 49; 70; 77.	2 points	
Total:	**8 points**	

Remarks:

1. If the answers for questions b1) and b2) are wrong because the candidate has made some errors when listing the elements of the sets A, B, C and/or D but the operations with these faulty sets are performed correctly, then the respective 1-1 points should be given.

2. If the answer for question b3) differs from the correct one by one element only then 1 point still may be given (instead of 2).

3. The score should not be reduced further if the answer for for question b3) is wrong because the candidate has made some errors when listing the elements of the sets A, B, C and/or D.

4. If, instead of listing the elements of the respective sets A-D the candidate proceeds differently then full score may be given for consistent reasoning only. Answers without reasoning may be given at most 3 points (instead of 8).

3.		
There are **2 ways** to put back six pieces *of the same colour*.	1 point	
If both colours are represented: 1 red and 5 blue pieces can be arranged in **1 way** only, (since the five blue ones are inevitably consecutive).	2 points	
2 red ones and 4 blue ones can be arranged in **3 different ways**,	1 point	
since 2 red pieces are either next to each other or they are separated by one or two blue pieces.	2 points	*Stating just 1 or 2 possibilities is worth 1 point.* *Incomplete argument is worth 1 point.*
There are **4 ways** to put back 3 red and 3 blue pieces,	1 point	*This 1 point is due for the correct answer only.*
since the 3 red pieces are either consecutive, (and so are the blue ones then) or they are separated by 1-1 or 2-1 blue pieces, respectively. (There are two ways to do this in the latter case.) *R* / *R R* / *B B* / *B* ; *R* / *B B* / *R R* / *B* *R* / *B R* / *B B* / *R* ; *R* / *B R* / *R B* / *B*	2 points	*Stating just 1 possibility is 0 point, 2 or 3 possibilities are worth 1 point.* *Incomplete argument is worth 1 point.*
There are **3 ways** to put back 4 red and 2 blue pieces just like in the 2 + 4 case.	1 point	*These points may be given if the answer is wrong due to some error when calculating the cases 2+4 and/or 1+5.*
By the same symmetry there is just **1 way** to put back 5 red pieces and 1 blue piece just like in the 1 + 5 case.	1 point	
There are 14 different arrangements of six pieces altogether.	1 point	
Total:	**12 points**	

Remarks:
1. A clear diagram can be accepted as a correct argument.
2. If the candidate correctly enumerates the number of possible arrangements in the cases of 6 red, 5 red – 1 blue, 4 red – 2blue, 3 red – 3 blue, respectively and then arguing by symmetry, multiplies the correct sum by 2, then the 3 red – 3 blue arrangements are counted twice: accordingly, the score should be reduced by 2 points.

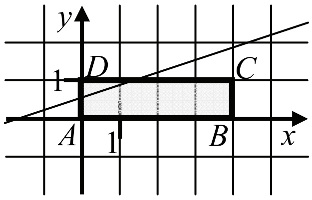
4. a)		
$a_n=\frac{1}{7}\cdot\frac{1}{7^3}\cdot\frac{1}{7^5}\cdot\ldots\cdot\frac{1}{7^{2n-1}}=\frac{1}{7^{1+3+5+\ldots+(2n-1)}}$	1 point	
The exponent of 7 is the sum of the first n terms of an arithmetic progression,	1 point	
whose first term is 1 and common difference is 2.	1 point	
$a_n=\frac{1}{7^{\frac{(1+2n-1)}{2}n}}$	1 point	
$a_n=\frac{1}{7^{n^2}}$	1 point	
Now the inequality $\frac{1}{7^{n^2}}>49^{-50}$ should be solved (in integers). Since $49=7^2$, the task is $\frac{1}{7^{n^2}}>\frac{1}{7^{100}}$.	1 point	
$7^{n^2}<7^{100}$.	1 point	
Since the function $x\mapsto 7^x$ is monotonically increasing	1 point	
$n^2<100$.	1 point	
The highest square number below 100 is 81. The greatest natural number satisfying the conditions is 9.	1 point	
Total:	**10 points**	

4. b) first solution		
The term b_n is the sum of the first n terms of a geometric progression whose first term is $\frac{1}{7}$ and its common ratio is $\frac{1}{7^2}$.	1 point	*These 2 points are due if this idea is clear from the solution.*
The number $\lim_{n\to\infty} b_n$ is the sum (s) of the geometric series whose first term is $b=\frac{1}{7}$ and $r=\frac{1}{7^2}$.	1 point	
Since $\lvert r\rvert<1$, $s=\frac{b}{1-r}=\frac{\frac{1}{7}}{1-\frac{1}{7^2}}\left(=\frac{7}{48}\right)$.	1 point	
The limit in question is $\frac{7}{48}$.	1 point	
Total:	**4 points**	

4. b) **second solution**		
b_n is the sum of the first n terms of a geometric progression whose first term is $\frac{1}{7}$ and its common ratio is $\frac{1}{7^2}$.	1 point	*These 2 points are due if this idea is clear from the solution.*
$b_n = \frac{1}{7} + \frac{1}{7^3} + \frac{1}{7^5} + \ldots + \frac{1}{7^{2n-1}} = \frac{1}{7} \cdot \frac{1 - \frac{1}{49^n}}{1 - \frac{1}{49}}$	1 point	
$b_n = \frac{7}{48} \cdot \left(1 - \frac{1}{49^n}\right)$.	1 point	
$\lim\limits_{n \to \infty} b_n = \frac{7}{48}$	1 point	
Total:	**4 points**	

II.

5. a)



The straight line $y=\frac{1}{3}x+\frac{1}{2}$ cuts the y-axis at the point $\left(0;\frac{1}{2}\right)$,	1 point	
and the same line cuts the $y=1$ line at the point $\left(\frac{3}{2};1\right)$.	1 point	
The favourable outcomes of the question are those points of the rectangle which are lying below the straight line $y=\frac{1}{3}x+\frac{1}{2}$.	1 point	
The area of this region is $A_f=4-\frac{\frac{1}{2}\cdot\frac{3}{2}}{2}=\frac{29}{8}$.	1 point	
(According to the definition of geometric probability) the probability of the given event is $p=\frac{\frac{29}{8}}{4}=\frac{29}{32}(=0.90625)$.	1 point	
Total:	**5 points**	

5. b1) first solution

There are $\binom{200}{4}$ ways Marci could buy his 4 tickets out of the 200 tombola tickets.	1 point	
Out of the 200 tickets there are 10 winning ones and 190 that don't win anything. Marci wins a single prize if and only if there is one among his four tickets from the winning ten and the remaining three are from the not winning 190.	1 point	*This point is due if this idea is clear from the solution.*
There are $\binom{10}{1}\cdot\binom{190}{3}$ ways for this to happen.	2 points	
The probability is: $\frac{\binom{10}{1}\cdot\binom{190}{3}}{\binom{200}{4}}\approx 0.1739$.	1 point	
Total:	**5 points**	

5. b1) **first solution**		
There are $\binom{200}{10}$ ways to draw the 10 winning tickets out of the total of 200.	1 point	
Marci has 4 of the 200 tickets and and he has none of the remaining 196 ones. Therefore, Marci wins a single prize if and only if he has exactly one out of the 10 winning tickets and the remaining 9 winning tickets are all among the remaining 196 tickets non of which is owned by Marci.	1 point	*This point is due if this idea is clear from the solution.*
Therefore, there are $\binom{4}{1}\cdot\binom{196}{9}$ favourable outcomes.	2 points	
The probability is $\frac{\binom{4}{1}\cdot\binom{196}{9}}{\binom{200}{10}}\approx 0.1739$.	1 point	
Total:	**5 points**	

5. b2) **first solution**		
The probability of the complementary event is calculated. In our case this is the event that Marci did not win anything on the tombola.	1 point	*These 2 points are due if this idea is clear from the solution.*
This can happen only if each of his 4 tickets are among the 190 not winning ones.	1 point	
There are $\binom{200}{4}$ equally probable outcomes,	1 point	
out of which there are $\binom{190}{4}$ favourable ones.	1 point	
The probability that Marci did not win on the tombola is hence $\frac{\binom{190}{4}}{\binom{200}{4}}\left(\approx 0.8132\right)$.	1 point	
Therefore, the probabilty that Marci has won something on the tombola is $1-\frac{\binom{190}{4}}{\binom{200}{4}}\approx 0.1868$.	1 point	
Total:	**6 points**	

5. b2) second solution		
The given event occurs if and only if Marci wins 1, 2, 3 or 4 out of the 10 prizes.	1 point	*This point is due if this idea is clear from the solution.*
The probability that he has one winning ticket is $\frac{\binom{10}{1}\cdot\binom{190}{3}}{\binom{200}{4}} \approx 0.1739.$	1 point	
The probability that he has two winning tickets is $\frac{\binom{10}{2}\cdot\binom{190}{2}}{\binom{200}{4}} \approx 0.0125.$	1 point	
The probability that he has three winning tickets is $\frac{\binom{10}{3}\cdot\binom{190}{1}}{\binom{200}{4}} \approx 0.0004.$	1 point	
The probability that each of his 4 tickets are among the winning ones is $\frac{\binom{10}{4}\cdot\binom{190}{0}}{\binom{200}{4}} \approx 0{,}0000.$	1 point	
Therefore the probability that Marci has won some prizes on the tombola is the sum of the four probabilities just computed and it is 0.1868.	1 point	
Total:	**6 points**	
If the candidate is working in the event space of the second solution of question b1 by investigating if Marci owns 1, 2, 3 or 4 out of the 10 winning tickets then the probability of the question is computed as: $\frac{\binom{4}{1}\cdot\binom{196}{9}+\binom{4}{2}\cdot\binom{196}{8}+\binom{4}{3}\cdot\binom{196}{7}+\binom{4}{4}\cdot\binom{196}{6}}{\binom{200}{10}}.$		

6. a) **first solution**		
Given is the vertex, the equation of the graph of the function *f* is $y = a(x-4)^2 + 2$.	2 points	
P is also lying on the graph, therefore $4a + 2 = 0$,	1 point	
yielding $a = -\frac{1}{2}$.	1 point	
Hence $f(x) = -\frac{1}{2}(x-4)^2 + 2 = -\frac{1}{2}x^2 + 4x - 6$,	1 point	
and thus $b = 4$, $c = -6$.	1 point	
Total:	**6 points**	

6. a) **second solution**		
The graph of *f* is a parabola, its equation can be written as $y = ax^2 + bx + c$. Substituting the coordinates of the vertex $V(4;2)$ (1) $16a + 4b + c = 2$.	1 point	
Substituting the coordinates of the given point $P(2;0)$ (2) $4a + 2b + c = 0$.	1 point	
The line $x = 4$ is the axis of symmetry of the parabola, therefore the mirror image $R(6;0)$ of the given point *P* through this line is also lying on the graph. Therefore, (3) $36a + 6b + c = 0$.	1 point	
Solving the symultaneous system (1)-(2)-(3) yields $a = -\frac{1}{2}$; $b = 4$; $c = -6$.	3 points	
Total:	**6 points**	

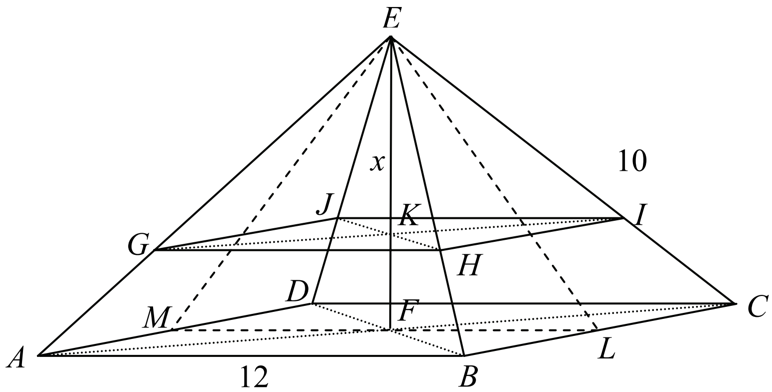
6. b)		
The slope of the corresponding tangent is the value of the derivative of f at $x = 3$.	1 point	*This point is due if this idea is clear from the solution.*
$f'(x) = -x + 4$ yielding $m = f'(3) = 1$.	1 point	
The straight line $y = x + d$ is passing through the point of the graph of *f* whose abscissa is 3, therefore its second coordinate is $f(3) = \frac{3}{2}$.	1 point	
This implies $d = -\frac{3}{2}$.	1 point	
The equation of the tangent is $y = x - \frac{3}{2}$.	1 point	
Total:	**5 points**	

6. c)		
The zeros of *f* are 2 and 6,	1 point	
therefore the area is equal to $A = \int_2^6 f(x)dx = \int_2^6 \left(-\frac{1}{2}x^2 + 4x - 6\right)dx =$	1 point	
$= \left[-\frac{1}{6}x^3 + 2x^2 - 6x\right]_2^6 =$	1 point	
$= (-36 + 72 - 36) - \left(-\frac{4}{3} + 8 - 12\right)$.	1 point	
$A = \frac{16}{3}$.	1 point	
Total:	**5 points**	

7.		
$x>0$ by the definition of common logarithm.	1 point	*This point should be given if the candidate is checking the solutions by substituting int he given equation.*
$\left(3^{\log_3 x}\right)^{\log_3 x}=x^{\log_3 x}$	1 point	
$\left(x^2\right)^{\log_3 x}=\left(x^{\log_3 x}\right)^2$	1 point	
Let $y=x^{\log_3 x}$ (, where $y>0$).	1 point	
The equation becomes $6y=y^2-6075$, that is $y^2-6y-6075=0$.	1 point	
One of the solutions is $y_1=-75$, which does not yield any solution of the original equation.	1 point	
The other solution is $y_2=81$,	1 point	
yielding $x^{\log_3 x}=81$,	1 point	
and hence $\log_3\left(x^{\log_3 x}\right)=\log_3 81=4$.	2 points	
(By the corresponding law of common logarithms) $\left(\log_3 x\right)^2=4$.	1 point	
If $\log_3 x=2$,	1 point	
then $x_1=3^2=9$.	1 point	
If $\log_3 x=-2$,	1 point	
then $x_2=3^{-2}=\frac{1}{9}$.	1 point	
Both values satisfy the original equation.	1 point	
Total:	**16 points**	

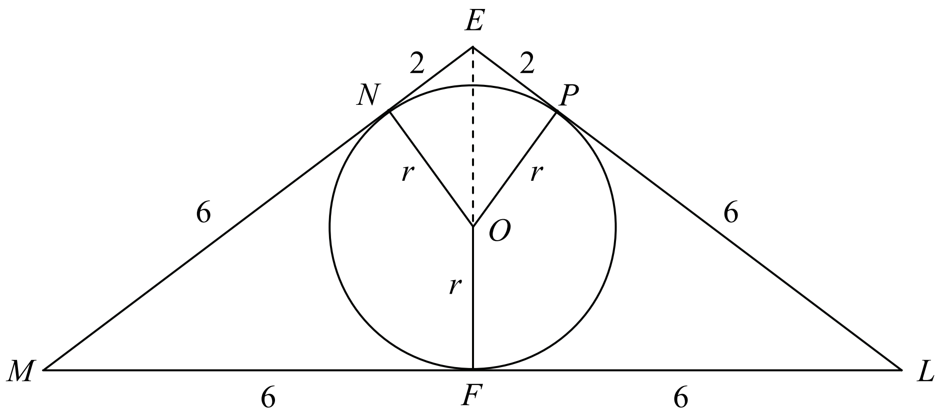
8.		
Let the sizes of the branches from Kőszeg, Tata, and Füred be *k, t* and *f,* respectively, and denote the sum of the ages of the members of the corresponding branches by S_k, S_t and S_f, respectively.	2 points	*These 2 points are due if this idea is clear from the solution.*
Using the given data one can write down the following equations: $S_k = 37k$;	1 point	
$S_t = 23t$;	1 point	
$S_f = 41f$;	1 point	
$S_k + S_t = 29(k+t)$;	1 point	*Two of these relations are sufficient to solve the problem, therefore 3 points should be given for any two of them.*
$S_k + S_f = 39.5(k+f)$;	1 point	
$S_t + S_f = 33(t+f)$.	1 point	
Substituting the first three relations into the following three equations, respectively $37k + 23t = 29(k+t)$, that is $t = \frac{4}{3}k$.	1 point	*Two of these relations are sufficient to solve the problem, therefore 3 points should be given for any two of them.*
$37k + 41f = 39.5(k+f)$, that is $f = \frac{5}{3}k$.	1 point	
$23t + 41f = 33(t+f)$, that is $t = \frac{4}{5}f$.	1 point	
The mean age of the total group of employees is $\frac{S_k + S_t + S_f}{k+t+f}$ years.	1 point	*If the candidate is solving the simultaneous system of three unknowns by introducing an auxiliary triple for the respective sizes of the groups and gets the correct result but he does not show that the answer does not depend on actual choice of these auxiliary numbers then 2 points should be deducted.*
Isolating *t* and *f* in terms of *k* yields the following expression for the mean age of the total $\frac{37k + 23\cdot\frac{4}{3}k + 41\cdot\frac{5}{3}k}{k + \frac{4}{3}k + \frac{5}{3}k} = \frac{37 + \frac{92}{3} + \frac{205}{3}}{4} =$	2 points	
$= \frac{37+99}{4} = \frac{136}{4} = 34$.	1 point	
The mean age of the total group of employees is 34 years.	1 point	
Total:	**16 points**	

9. a)



Using the notations of the diagram the pyramids *GHIJE* and *ABCDE* are similar.	1 point	
$\frac{V_{ABCDE}}{V_{GHIJE}}=2$, therefore the ratio of the corresponding segments (e. g. $\frac{AB}{GH}=\frac{FE}{KE}=\sqrt[3]{2}$.	2 points	
$GH=\frac{AB}{\sqrt[3]{2}}=\frac{12}{\sqrt[3]{2}}(\approx 9.524)$. $4\cdot GH=\frac{48}{\sqrt[3]{2}}(\approx 38.10)$. The total length of the coloured band is 38.10 m.	1 point	
By Pythagoras' theorem in the right triangle *ABD* one gets $BD=12\sqrt{2}$ and $FB=6\sqrt{2}$	1 point	
By Pythagoras' theorem in the right triangle *FBE* one gets $(FE)^2=10^2-(6\sqrt{2})^2$.	1 point	
$FE=\sqrt{28}\ (=2\sqrt{7}\approx 5.29)$	1 point	
$KE=\frac{\sqrt{28}}{\sqrt[3]{2}}\left(=\frac{2\sqrt{7}}{\sqrt[3]{2}}\approx 4.2\right)$	1 point	
$FK=FE-KE=\sqrt{28}-\frac{\sqrt{28}}{\sqrt[3]{2}}\left(=\sqrt{28}\cdot\frac{\sqrt[3]{2}-1}{\sqrt[3]{2}}\approx 1.09\right)$ The halving plane is 1.09 m high above the ground level.	1 point	
Total:	**9 points**	

9. b) first solution



The microphone should be put into the centre *O* of the inscribed sphere of the pyramid.	1 point	
The segments EL and EM on the diagram are the altitudes of the respective lateral faces. By Pithagoras' theorem in the right triangle *ELC* $(EL)^2 = 10^2 - 6^2$, yielding $EL = 8$.	1 point	
Since the lenghts of the tangents to a circle (sphere) from an external point are all equal, $MF = MN = 6$, $NE = 2$.	1 point	
By Pithagoras' theorem in the right triangle *OEN* $(OE)^2 = (ON)^2 + E^2$.	1 point	
$\left(\sqrt{28} - r\right)^2 = r^2 + 2^2$	1 point	
$r = \frac{6}{\sqrt{7}}$ (≈ 2.27)	1 point	
The distance of the microphone from the apex *E* is $EO = EF - OF \approx 5.29 - 2.27 = 3.02$ meters.	1 point	
Total:	**7 points**	

9. b) seecond solution		
The microphone should be put at the point *O*. Denote its distance from the faces of the pyramid by x (meters). Using the notations of the diagram *EL* is the altitude of the lateral face *EBC*. Connecting the vertices of the pyramid *ABCDE* with *O* it is divided into five pyramids. Write down the volume of the pyramid *ABCDE* as the sum of the respective volumes of these five pyramids.	1 point	
The pyramids *ABEO*, *BCEO*, *DCEO* and *ADEO* are congruent, therefore their volumes are equal. (1) $V_{ABCDE} = V_{ABCDO} + 4 \cdot V_{BCEO}$	1 point	
$V_{ABCDE} = \frac{AB^2 \cdot EF}{3} = \frac{144 \cdot \sqrt{28}}{3} = 48 \cdot \sqrt{28}$. $V_{ABCDO} = \frac{AB^2 \cdot x}{3} = \frac{144 \cdot x}{3} = 48x$.	1 point	
$V_{BCEO} = \frac{T_{BCE} \cdot x}{3}$. The length of the altitude of the triangle *BCE* perpendicular to the side *BC* can be computed in the right triangle *BEL* as $EL = \sqrt{10^2 - 6^2} = 8$.	1 point	
$A_{BCE} = \frac{BC \cdot EL}{2} = \frac{12 \cdot 8}{2} = 48.$ Hence $V_{BCEO} = \frac{T_{BCE} \cdot x}{3} = \frac{48 \cdot x}{3} = 16x$.	1 point	
Plugging the respective expressions obtained for the volume into equation (1) yields $48 \cdot \sqrt{28} = 48x + 4 \cdot 16x = 112x$, yielding $x = \frac{6\sqrt{7}}{7} \approx 2.27$ (m).	1 point	
The distance of the microphone from the apex *E* is $EO = EF - OF \approx 5.29 - 2.27 = 3.02$ meters.	1 point	
Total:	**7 points**	