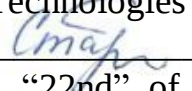


Документ подписан простой электронной подписью
Информация о владельце:
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Должность: И.о. ректора
Дата подписания: 18.09.2026 19:01:16
Уникальный программный ключ:
d59234ba928aea5c04c54eb9013e367220bcb2a

Federal State Budget Educational Institution
of Higher Education
Pacific State Medical University
of the Ministry of Health of the Russian Federation

APPROVED BY

Director of the Institute of
Fundamentals and Information
Technologies in Medicine
 / Startseva M.S./
“22nd” of April 2026

COLLECTION OF ASSESSMENT TOOLS

B1.O.05 Mathematics in dentistry of the basic educational program of Higher Education

Specialty	31.05.03 Dentistry for foreign students (English-language program) (code, name)
Degree	Specialist's degree
Profile	02 "Healthcare" (in the field of providing health care in patients with dental pathology)
Mode of study	Full-time
Period of mastering the BEP	5 years (nominal length of study)
Institute	of Fundamentals and Information Technologies in Medicine

Vladivostok, 2026

1. INTRODUCTION

1.1. Collection of Assessment Tools is a document that regulates the format, content, and types of assessment tools for continuous assessment, interim examination and final (state final) examination, and graded criteria for each type of assessment tools.

1.2. Assessment tools allows to evaluate the development of universal, general professional, and professional competencies (UCs, GPCs and PCs respectively) outlined in Federal State Educational Standard of Higher Education and defined in the basic educational program of higher education for the specialty 31.05.03 Dentistry for foreign students (English-language program), profile 02 "Healthcare" (in the field of providing health care in patients with dental pathology).

([BEP HE for the 31.05.03 Dentistry for foreign students \(English-language program\)](#) specialty, section 3 Learning Outcomes Requirements of the Basic Educational Program of Higher Education)

2. DOCUMENT BODY

2.1. Types of Assessment, Formats of Assessment Tools

No.	Types of assessment	Assessment Tools Format
1	Continuous assessment	Tests
		Practice problems
2	Interim assessment	Tests
		Checklists

3. The contents of assessment tools for continuous and interim examination are prepared by the teacher of the course

Tests for continuous assessment

	Code	Competence description / name of labor function / name of work activity / text
S	31.05.03	Dentistry for foreign students (English-language program)
C	GPC-8	Able to use basic physical, chemical, mathematical and natural science concepts and methods dealing with professional problems
C	GPC-13	Able to solve professional tasks using information, bibliographic resources as well as medical and biological terminology, information and communication technologies complying with the information security requirements
F	A/06.7	Organizational and administrative activities
I		ANSWER TEST QUESTIONS
		1. Coordinates of the vector $\vec{b}$ produced by subtraction of Vector 2 $\cdot (2; -1; 3)$ - Vector 3 $\cdot (1; 4; -5)$ are a) $(4; 2; -5)$ b) $(1; -14; 21)$ c) $(2; -3; -1)$ d) $(1; -4; -9)$
		2. Cross product of vectors $(3; -1; 2)$ and $(-2; 5; 3)$ is a) $(-13; -13; 13)$ b) $(-6; 5; 6)$

	c) -6 d) (7; -5; 16) 3. The angle between the vector $\vec{a} = (-2; 4; 1)$ and Z-axis is a) $\gamma = 0$ b) $\gamma = \pi/2$ c) $0 < \gamma < \pi/2$ d) $\pi/2 < \gamma < \pi$ 4. If $A(-2; 5; -2)$, $B(4; -3; 2)$, $C(-4; 5; 2)$, then the area of the ABC triangle equals: _____. 5. Square of the length of vector $\vec{a} = -5\vec{i} + 3\vec{k}$ equals: _____. 6. Slope ratio of the $3x+2y+5=0$ line is a) $\frac{3}{2}$ b) $-\frac{3}{2}$ c) 3 d) -3 7. Area of the triangle bounded by the line $5x-2y+20=0$, X-axis, and Y-axis is a) 40 b) 20 c) 10 d) 5 8. Equation of line that passes through M (2,-1) point and has a y-intercept of b=5 is a) $2x-y+5=0$ b) $x-3y-5=0$ c) $3x+y-5=0$ d) $3x-y+5=0$ 9. Among the lines 1) $3x-y-1=0$, 2) $x-3y+5=0$, 3) $5x+y-2=0$, 4) $6x+2y-1=0$, _____ are parallel a) 1) and 2) b) 1) and 3) c) 2) and 4) d) 3) and 4) 10. Among the lines 1) $3x-y-1=0$, 2) $x-3y+5=0$, 3) $5x+y-2=0$, 4) $6x+2y-1=0$, _____ are perpendicular a) 1) and 2) b) 2) and 3) c) 1) and 4) d) 2) and 4)
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Assessment criteria

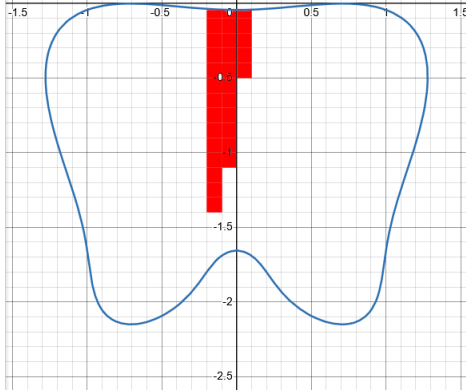
"Pass" – over 75% correct answers

"Fail" – 74 and less % correct answers

Standardized practice problems and checklists for the **B1.C.05 Mathematics in dentistry** course

Practice problem No.1

	Code	Competence description / name of labor function / name of work activity / text
S	31.05.03	Dentistry for foreign students (English-language program)
C	GPC-8	Able to use basic physical, chemical, mathematical and natural science concepts and methods dealing with professional problems
C	GPC-13	Able to solve professional tasks using information, bibliographic resources as well as medical and biological terminology, information and communication technologies complying with the information security requirements
F	A/06.7	Organizational and administrative activities
I		- Given vectors $\vec{a} = (-3; 4; -1)$, $\vec{b} = (-1; 2; 3)$, $\vec{c} = (-4; -2; 1)$, find $4\vec{a} + 3\vec{b} - 2\vec{c}$, $-5\vec{a} + 4\vec{b} + \vec{c}$. - Find the scalar multiplication for vectors a and b if $a = (2, -2, 4)$, $b = 3$ and the angle between them is $\alpha = \pi/4$ - Are the following three vectors coplanar? $a = \{1; 2; 3\}$, $b = \{1; 1; 1\}$, $c = \{1; 2; 1\}$. - Given vectors $a = \{3, 4\}$, $b = \{-1, 2\}$, $c = \{5, -2\}$, find and draw vector $d = 2a + 3b - 5c$. - Find the directional cosines of the following vectors $\vec{a}(-1; 3)$, $\vec{b} = 2\vec{i} - 3\vec{k}$, - From the given points $M_1(3, 2, -1)$, $M_2(-1, -3, 2)$ and vector $\vec{a} \{2, 2, 5\}$ find the projection of $\vec{a}$ into $\overline{M_1M_2}$: ($\text{Prj}_{\overline{M_1M_2}}$) - Find the value α, for which vector: $\vec{v} = \begin{pmatrix} 2 \\ 3 \\ \alpha \end{pmatrix}$ has half the length of vector $\vec{b} = \begin{pmatrix} 5 \\ 0 \\ -3 \end{pmatrix}$ ($\vec{v} = \frac{1}{2} \vec{b}$): - Find the module (length) of the following vectors: $\vec{a} = 2\vec{i} - \vec{j} + 3\vec{k} + \frac{\vec{i} - 2\vec{j} + 4\vec{k}}{2}$ $\vec{b} = 3\vec{i} + 4\vec{j} - 2\vec{k} + \frac{3\vec{i} - 6\vec{j} + 9\vec{k}}{3}$ $\vec{c} = 8\vec{i} + 2\vec{j} + 7\vec{k} + \frac{3\vec{i} + 8\vec{j} - 6\vec{k}}{2}$ - An automatic drill starting at position $(x, y) = (0, 0)$, can receive one of the following commands each time frame (tick): Move(x,y): moves the drill relative from the current position to the vector (x,y) final coordinates (if not obstructed); Rest(): it rests for one time frame;

	Drill(x,y): will move and drill-out material from current position to the vector, it can remove 6 squares of material either vertically or horizontally (if not obstructed) after which the command cannot be used for a time frame needing a Rest(); Define a list of commands to remove the affected zone of the tooth with the minimum number of rests possible To remove the following zone: 
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4. Assessment criteria for learning outcomes

"**Pass**" is given to a student who has shown a sufficiently strong knowledge of the basic concepts of the subject; is able to complete specific practical tasks outlined in the program with no outside help, use recommended reference material, and correctly evaluate the results.

"**Fail**" is given to a student who has significant gaps in knowledge of the basic concepts of the subject, is not able reach the correct solution to a specific practical task outlined in the curriculum even with outside help.

Practical Skills Assessment Checklist

Practical Skill Name: Determination of the type of equation of a line at given vertices of a triangle

C	GPC-8	Able to use basic physical, chemical, mathematical and natural science concepts and methods dealing with professional problems	
C	GPC-13	Able to solve professional tasks using information, bibliographic resources as well as medical and biological terminology, information and communication technologies complying with the information security requirements	
F	A/06.7	Organizational and administrative activities	
WA	Work activities as part of the function: medical aid quality control (assessment)		
	Action	Performed	Not Performed
1.	Finding the equation of a triangle's median	2 points	-2 points
2.	Finding the equation of the height of a triangle	2 points	-2 points
3.	Finding the distance between the point and the line	1 point	-1 point
	Total	5 points	

Final grade:

"Pass" - at least 75% of required actions performed

"Fail" - 74% of required actions or less performed