

Basic trigonometric identities

Homework

№1. Find the value of the expressions:

1. $\frac{\sin \alpha - \cos \alpha}{\sin \alpha + \cos \alpha}, \quad \text{if } \tan \alpha = \frac{1}{3};$
2. $\frac{2 \cos^2 \alpha - 7 \sin^2 \alpha}{3 \cos^2 \alpha + 4 \sin \alpha \cos \alpha}, \quad \text{if } \cot \alpha = -2;$
3. $\frac{8 \sin \alpha - 3 \cos \alpha}{\sin^3 \alpha + 5 \sin^2 \alpha \cos \alpha - 8 \cos 63\alpha}, \quad \text{if } \tan \alpha = -3.$

№2. Simplify:

1. $\sqrt{\cos^2 \beta (1 + \tan \beta) + \sin^2 \beta (1 + \cot \beta)}, \quad \text{if } \pi < \beta < \frac{3\pi}{2};$
2. $\frac{\sqrt{1 - \sin^2 \alpha - \cos^2 \alpha \cos^2 \beta}}{\tan \beta \cot \alpha}, \quad \text{if } \pi < \alpha < \frac{3\pi}{2}, \quad \frac{\pi}{2} < \beta < \pi;$
3. $\sqrt{\frac{1 + \sin \alpha}{1 - \sin \alpha}} - \sqrt{\frac{1 - \sin \alpha}{1 + \sin \alpha}}, \quad \text{if } 0^\circ < \beta < 180^\circ;$
4. $\sqrt{2 - 2 \cos^2 \beta} + \sqrt{2 \sin^2 \beta - 2\sqrt{2} \sin \beta + 1}, \quad \text{if } \frac{3\pi}{4} < \beta < \pi.$

№3. Find the minimum and maximum values of the function:

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| 1. $y = 2 \cos^2 \alpha - 3 \sin \alpha;$ | 3. $y = 1 - \sqrt{\cos^2 \alpha} - 2 \sin^2 \alpha;$ |
| 2. $y = \tan^2 \alpha + \frac{1}{\cos \alpha};$ | 4. $y = 3 \cos^2 \alpha - \tan \alpha \cot \alpha.$ |