Контрольная работа

10 кл.

№1

1) $\sin 150^\circ = \sin(180^\circ - 30^\circ) = \sin 30^\circ = \frac{1}{2}$

2) $\cos \frac{5\pi}{3} = \cos\left(2\pi - \frac{\pi}{3}\right) = \cos \frac{\pi}{3} = \frac{1}{2}$

3) $\operatorname{tg} \frac{3\pi}{4} = \operatorname{tg}\left(\pi - \frac{\pi}{4}\right) = -\operatorname{tg} \frac{\pi}{4} = -1$

4) $\cos 780^\circ = \cos(2 \cdot 360 + 60^\circ) = \cos 60^\circ = \frac{1}{2}$

№2 $\sin\alpha = \frac{5}{13}$ $\frac{\pi}{2} < \alpha < \pi$ $\cos\alpha$, $\sin 2\alpha$ — ?

1) $\cos^2\alpha + \sin^2\alpha = 1$ $\cos^2\alpha = 1 - \sin^2\alpha$

$\cos^2\alpha = 1 - \left(\frac{5}{13}\right)^2 = 1 - \frac{25}{169} = \frac{144}{169}$ $\alpha \in II$ г. $\Rightarrow \cos\alpha < 0$.

$\cos\alpha = -\sqrt{\frac{144}{169}} = -\frac{12}{13}$

2) $\operatorname{tg}\alpha = \frac{\sin\alpha}{\cos\alpha}$ $\operatorname{tg}\alpha = \frac{5}{13} : \left(-\frac{12}{13}\right) = -\frac{5 \cdot 13}{13 \cdot 12} = -\frac{5}{12}$

3) $\sin 2\alpha = 2\sin\alpha \cdot \cos\alpha$

$\sin 2\alpha = 2 \cdot \frac{5}{13} \cdot \left(-\frac{5}{12}\right) = -\frac{120}{169}$

№3 1) $\frac{\sin(\alpha - \beta) + \sin\beta\cos\alpha}{\operatorname{tg}\alpha} = \frac{\sin\alpha \cdot \cos\beta - \sin\beta \cdot \cos\alpha + \sin\beta\cos\alpha}{\operatorname{tg}\alpha} =$

$= \frac{\sin\alpha \cdot \cos\beta}{\frac{\sin\alpha}{\cos\alpha}} = \frac{\sin\alpha\cos\beta\cos\alpha}{\sin\alpha} = \cos\beta\cos\alpha$

2) $\frac{\sin 2\alpha}{1 + \cos 2\alpha} = \frac{2\sin\alpha \cdot \cos\alpha}{\sin^2\alpha + \cos^2\alpha + \cos^2\alpha - \sin^2\alpha} = \frac{2\sin\alpha\cos\alpha}{2\cos^2\alpha} = \frac{\sin\alpha}{\cos\alpha}$

$= \operatorname{tg}\alpha$

№4 $\frac{\sin 70^\circ + \sin 20^\circ}{\cos 20.5^\circ} = \frac{2\sin\frac{90^\circ}{2} \cdot \cos\frac{50^\circ}{2}}{\cos(180^\circ + 25^\circ)} = \frac{2\sin 45^\circ \cdot \cos 25^\circ}{-\cos 25^\circ} =$

$= -2\sin 45^\circ = -\frac{2\sqrt{2}}{2} = -\sqrt{2}$

№5 $\frac{\sin^2(\pi - \alpha) + \cos 2\alpha + \sin\left(\frac{\pi}{2} - \alpha\right)}{\sin 2\alpha - 2\cos\left(\frac{2\pi}{2} - \alpha\right)} = \frac{1}{2}\operatorname{ctg}\alpha$

$\frac{\sin^2\alpha + \cos 2\alpha + \cos\alpha}{2\sin\alpha \cdot \cos\alpha + 2\sin\alpha} = \frac{\sin^2\alpha + \cos^2\alpha - \sin^2\alpha + \cos\alpha}{2\sin\alpha(\cos\alpha + 1)} =$

$= \frac{\cos^2\alpha + \cos\alpha}{2\sin\alpha(\cos\alpha + 1)} = \frac{\cos\alpha(\cos\alpha + 1)}{2\sin\alpha(\cos\alpha + 1)} =$

$= \frac{\cos\alpha}{2\sin\alpha} = \frac{1}{2}\operatorname{ctg}\alpha$