

## Сумма синусов:

$$\sin(s+t) + \sin(s-t);$$

$$\sin(s+t) = \sin s \cos t + \cos s \sin t;$$

$$\sin(s-t) = \sin s \cos t - \cos s \sin t;$$

$$\sin(s+t) + \sin(s-t) = (\sin s \cos t + \cos s \sin t) + (\sin s \cos t - \cos s \sin t);$$

$$\sin(s+t) + \sin(s-t) = \sin s \cos t + \cos s \sin t + \sin s \cos t - \cos s \sin t;$$

$$\sin(s+t) + \sin(s-t) = 2 \sin s \cos t;$$

$$x = s + t; \quad y = s - t;$$

$$x + y = s + t + s - t;$$

$$x - y = s + t - (s - t);$$

$$x + y = 2s;$$

$$x - y = s + t - s + t;$$

$$s = \frac{x+y}{2};$$

$$x - y = 2t;$$

$$s = \frac{x+y}{2};$$

$$s = \frac{x+y}{2};$$

$$\sin(x+y) = \sin x \cos y + \cos x \sin y;$$

$$\sin(x-y) = \sin x \cos y - \cos x \sin y;$$

$$s = \frac{x + y}{2}; \quad s = \frac{x + y}{2}; \quad s = \frac{x + y}{2};$$

## Разность синусов:

$$\sin x - \sin y = \sin x + \sin(-y);$$

$$s = \frac{x + y}{2};$$

$$s = \frac{x + y}{2};$$

$$s = \frac{x + y}{2};$$

$$-\sin y = \sin(-y);$$

**Пример.** Упростить выражение  $\sin 77^\circ - \sin 17^\circ$ .

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**Решение.**

$$s = \frac{x + y}{2}; \quad s = \frac{x + y}{2}; \quad s = \frac{x + y}{2};$$

$$s = \frac{x + y}{2}; \blacksquare$$

## Сумма косинусов:

$$\cos(s+t) + \cos(s-t);$$

$$\cos(s+t) + \cos(s-t) = \cos s \cos t - \sin s \sin t + \cos s \cos t + \sin s \sin t;$$

$$\cos(s+t) + \cos(s-t) = 2 \cos s \cos t;$$

$$x = s+t; \quad y = s-t;$$

$$s = \frac{x+y}{2}; \quad s = \frac{x+y}{2};$$

$$s = \frac{x+y}{2};$$

$$\cos(x+y) = \cos x \cos y - \sin x \sin y;$$

$$\cos(x-y) = \cos x \cos y + \sin x \sin y;$$

**Пример.** Упростить выражение  $\cos(x + 2y) + \cos(3x - 2y)$ .

**Решение.**

$$\cos(-t) = \cos t;$$

$$\cos(x + 2y) + \cos(3x - 2y) = s = \frac{x + y}{2};$$

$$s = \frac{x + y}{2}; \quad 2 \cos 2x \cos(-(x - 2y)) = 2\cos 2x \cos(x - 2y);$$

**Ответ:**  $\cos(x + 2y) + \cos(3x - 2y) = 2\cos 2x \cos(x - 2y)$ . ■

## Разность косинусов:

$$\cos(s+t) - \cos(s-t);$$

$$\cos(s+t) - \cos(s-t) = \cos s \cos t - \sin s \sin t - \cos s \cos t - \sin s \sin t;$$

$$\cos(s+t) - \cos(s-t) = -2\sin s \sin t;$$

$$x = s + t; \quad y = s - t;$$

$$s = \frac{x+y}{2}; \quad s = \frac{x+y}{2};$$

$$\cos(x+y) = \cos x \cos y - \sin x \sin y;$$

$$\cos(x-y) = \cos x \cos y + \sin x \sin y;$$

$$s = \frac{x+y}{2};$$

$$s = \frac{x + y}{2};$$

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Решение.

$$s = \frac{x + y}{2}; \quad s = \frac{x + y}{2}; \quad s = \frac{x + y}{2}; \quad s = \frac{x + y}{2};$$

$$s = \frac{x + y}{2};$$

$$s = \frac{x + y}{2};$$

