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Test 1 Crash Course

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Trig Substitution

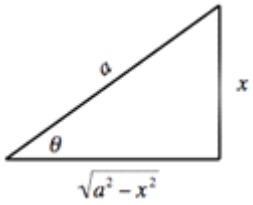
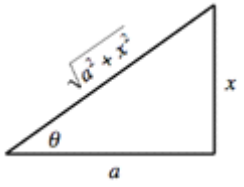
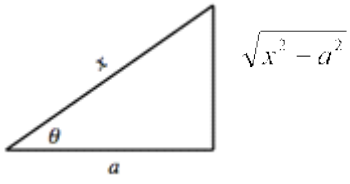
Important Trig Identities

$sin^2\theta + cos^2\theta = 1$

$sec^2\theta - tan^2\theta = 1$

$\csc^2\theta - \cot^2\theta = 1$

Trig Substitutions

Expression	Substitution	Identity	Triangle
$\sqrt{a^2 - x^2}$	$x = a\sin\theta$ $-\frac{\pi}{2} \le \theta \le \frac{\pi}{2}$ $dx = a\cos\theta d\theta$ $\sqrt{a^2 - x^2} = acos\theta$	$1 - \sin^2\theta = \cos^2\theta$	
$\sqrt{a^2 + x^2}$	$x = a\tan\theta$ $-\frac{\pi}{2} < \theta < \frac{\pi}{2}$ $dx = a\sec^2\theta d\theta$ $\sqrt{a^2 + x^2} = asec\theta$	$1 + \tan^2\theta = \sec^2\theta$	
$\sqrt{x^2 - a^2}$	$x = a\sec\theta$ $0 \le \theta < \frac{\pi}{2}$ or $\pi \le \theta < \frac{3\pi}{2}$ $dx = a\sec\theta\tan\theta\, d\theta$ $\sqrt{x^2 - a^2} = a\tan\theta$	$\sec^2\theta - 1 = \tan^2\theta$	

Example

$$\int \frac{dx}{\sqrt{4-x^2}}$$

$$\int_0^1 \frac{dx}{\sqrt{4-x^2}}$$

Example

$$\int \frac{1}{x^2\sqrt{x^2+4}}\,dx$$

Example

$$\int \frac{x^5}{\sqrt{1-x^2}}dx$$

Example

$$\int \frac{x^2}{\sqrt{4-x^2}}dx$$

Example

$\int \sqrt{4-9x^2}$

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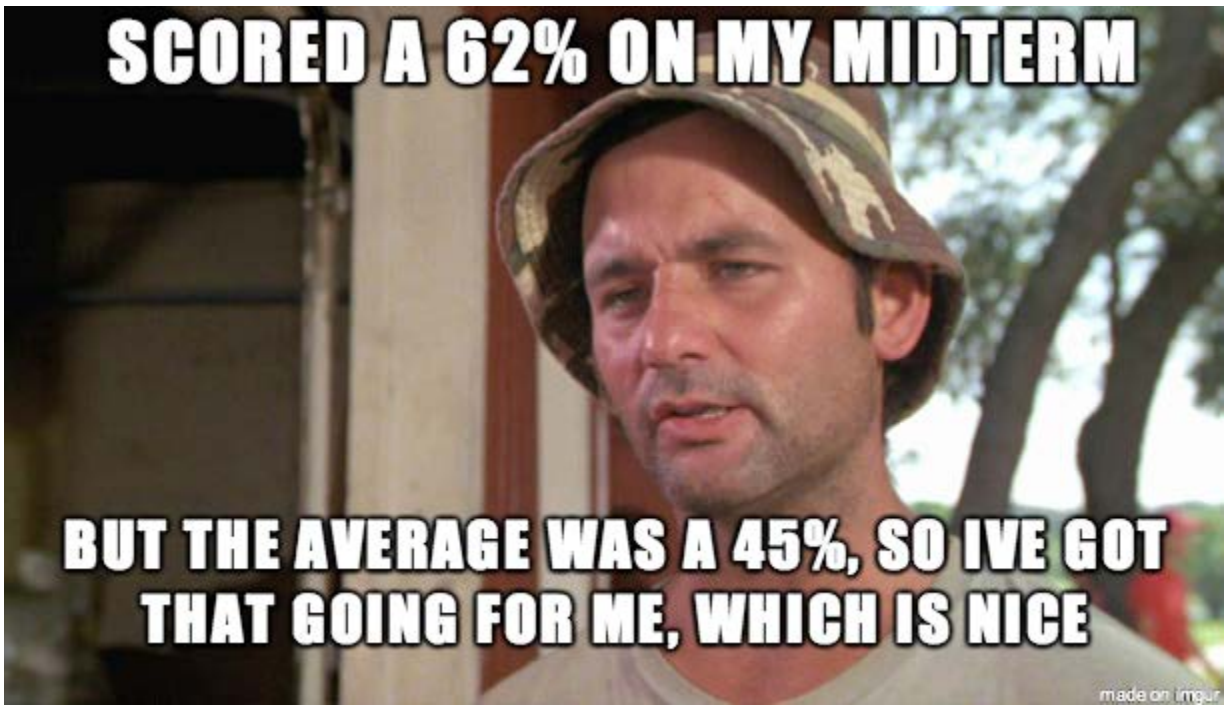

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