

Closing Today: HW\_5C (7.3)  
 Closing Wed: HW\_6A (7.4)  
 Closing Fri: HW\_6B, 6C (7.5,7.7)  
 Office Hours Today: 1:15-3:15pm (Tho 335)  
 Math Study Center: 9:30am – 9:30pm (Com B-014)  
 CLUE Tutors: 7:00pm – midnight (Mary Gates Hall)

### Entry Task

If you encounter a 'middle term'

$$\sqrt{ax^2 + bx + c}.$$

Complete the square:

1.  $x^2 + 10x =$

2.  $2x^2 - 12x + 22 =$

3.  $14 - 8x - x^2 =$

### 7.3 Trigonometric Substitution Summary

CASE	SUBSTITUTION
$\sqrt{a^2 - x^2}$	$x = a \sin(\theta), dx = a \cos(\theta)d\theta$ $\sqrt{a^2 - a^2 \sin^2(\theta)} = a \cos(\theta)$
$\sqrt{a^2 + x^2}$	$x = a \tan(\theta), dx = a \sec(\theta)d\theta$ $\sqrt{a^2 + a^2 \tan^2(\theta)} = a \sec(\theta)$
$\sqrt{x^2 - a^2}$	$x = a \sec(\theta), dx = a \sec(\theta)\tan(\theta)d\theta$ $\sqrt{a^2 \sec^2(\theta) - a^2} = a \tan(\theta)$

1. Trig Sub
2. Trig Integral (use 7.2 methods)
3. Triangle Trick

*Full Example:*

$$\int \frac{x}{\sqrt{34 - 6x + x^2}} dx$$

1. Complete the square.
2. Do a trig sub problem.

## 7.4 Partial Fractions

*Goal:* Learn a general method to integrate rational functions (a polynomial over a polynomial).

This is also an important algebraic method for simplifying fractions which you will use in many other math courses.