Honor's Geometry
7.2 Converse of the Pythagorean Theorem

Name: Key
Date: _____ Period: ____

1. The sides of a triangle have lengths $x, x+3, 15$. If the length of the longest side is 15, what values of x make the triangle obtuse?

$x^2 + (x+3)^2 < 15^2$

$x^2 + x^2 + 6x + 9 < 225$

$2x^2 + 6x - 216 < 0$

$x^2 + 3x - 108 < 0$

$(x+12)(x-9) < 0$

$x = -12 \quad x = 9$

no neg. sides

$6 < x < 9$

9, 12, 15
8, 11, 15
7, 10, 15
6, 9, 15
~~5, 8, 15~~ $5+8 \neq 15$
→ Not a △

2. The sides of a triangle have lengths $x+2, x+3, 29$. If the length of the longest side is 29, what values of x make the triangle acute?

$(x+2)^2 + (x+3)^2 > 29^2$

$x^2 + 4x + 4 + x^2 + 6x + 9 > 841$

$2x^2 + 10x - 828 > 0$

$x^2 + 5x - 414 > 0$

$(x+23)(x-18)$

$x = -23 \quad x = 18$

no neg. sides

$18 < x < 27$

414
2 207
3 69
3 23

3. The sides of a triangle have lengths $x, x+7, \sqrt{245}$. If the length of the longest side is $\sqrt{245}$, what values of x make the triangle obtuse?

$7\sqrt{5}$

$x^2 + (x+7)^2 < (7\sqrt{5})^2$

$x^2 + x^2 + 14x + 49 < 245$

$2x^2 + 14x - 196 < 0$

$x^2 + 7x - 98 < 0$

$(x-7)(x+14) < 0$

$x = 7 \quad x = -14$

no neg. sides

$5 < x < 7$

$7, 14, 7\sqrt{5}$
$6, 13, 7\sqrt{5}$
$5, 12, 7\sqrt{5}$
~~$4, 11, 7\sqrt{5}$~~
$4+11 \neq 7\sqrt{5}$