7. Find two consecutive even integers such that the square of the smaller is 10 more than the larger.

$2x$ | x
$2x+2$ | $x+2$

$x^2-10=x+2$
$x^2-x-12=0$
$(x-4)(x+3)=0$
$x=4, -3$

$(2x)^2-10=2x+2$
$4x^2-10=2x+2$
$4x^2-2x-12=0$
± 2 6, 8
$x-48$
$4x^2-8x+6x-12$
$4x(x-2)+6(x-2)=0$
$(x-2)(4x+6)=0$
$2, -6/4$

$x=2$

$2x$	4
$2x+2$	6

x	4
$x+2$	6

8. The product of two consecutive even integers is 6 more than three times their sum. Find the integers.

x
$x+2$

#'s

$x(x+2)=3(x+x+2)+6$
$x^2+2x=3(2x+2)+6$
$x^2+2x=6x+6+6$
$x^2-4x-12=0$
$(x-6)(x+2)=0$
$x=6, -2$

Numbers are.

x	6	or	-2
$x+2$	8		0

9. Find three consecutive integers such that four times the sum of all three is 2 times the product of the larger two.

x
$x+1$
$x+2$

$x=4$

4
5
6

$x=-1$

-1
0
1

sum of all three

$4(x+x+1+x+2)=2(x+1)(x+2)$
$4(3x+3)=2(x^2+2x+x+2)$
$12x+12=2(x^2+3x+2)$
$12x+12=2x^2+6x+4$
$0=2x^2-6x-8$
$0=2(x^2-3x-4)$
$2(x-4)(x+1)$
$x=4, -1$

10. Find three consecutive integers such that three times the sum of all three equals the product of the larger two.

x, $x+1$, $x+2$ #15

$3(x+x+1+x+2) = (x+1)(x+2)$

$3(3x+3) = x^2+2x+x+2$

$9x+9 = x^2+3x+2$

$0 = x^2-6x-7$

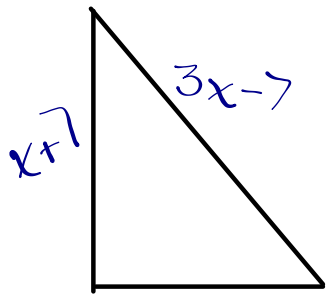
$0 = (x-7)(x+1)$

$x = +7, -1$

Numbers Are

x	7	or	-1
$x+1$	8		0
$x+2$	9		1

11. The medium side of a right triangle is 7 more than the shortest side. The longest side is 7 less than 3 times the shortest side. Find the length of the shortest side of the triangle.



8, 15, 17

$(3x-7)^2 = (x+7)^2 + x^2$

$(3x-7)(3x-7) = (x+7)(x+7) + x^2$

$9x^2-21x-21x+49 = x^2+7x+7x+49+x^2$

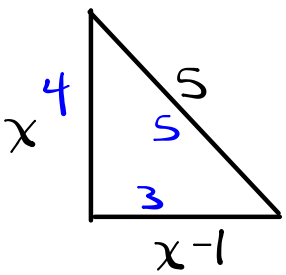
$9x^2-42x+49 = 2x^2+14x+49$

$7x^2-56x = 0$

$7x(x-8) = 0$

$x = 0, \; x = 8$

12. One leg of a right triangle is one cm shorter than the other leg. If the hypotenuse is 5 cm, find the length of the shorter leg.



4, 3, 5

$5^2 = x^2 + (x-1)^2$

$25 = x^2 + (x-1)(x-1)$

$25 = x^2 + x^2 - 2x + 1$

$25 = 2x^2 - 2x + 1$

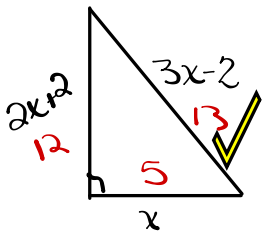
$0 = 2x^2 - 2x - 24$

$0 = 2(x^2 - x - 12)$

$0 = 2(x-4)(x+3)$

$x = 4, -3$ side can't be −

13. The longer leg of a right triangle is two inches more than twice the length of the shorter leg. The hypotenuse is two inches less than three times the length of the shorter leg. Find the length of the *hypotenuse*.



5, 12, 13

$(3x-2)^2 = x^2+(2x+2)^2$

$(3x-2)(3x-2) = x^2+(2x+2)(2x+2)$

$9x^2-12x+4 = x^2+4x^2+8x+4$

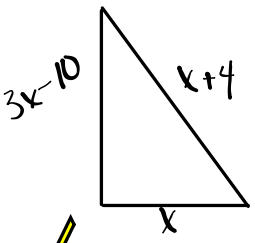
$9x^2-12x+4 = 5x^2+8x+4$

$4x^2-20x=0$

$4x(x-5)=0$

$x=0,5$

14. The longer leg of a right triangle is ten less than three times the shorter leg. The hypotenuse is 4 more than the shorter leg. Find the length of the shorter leg.



6, 8, 10

OR

~~14/9, -16/3,~~ 50/9

$(x+4)^2 = x^2+(3x-10)^2$

$(x+4)(x+4) = x^2+(3x-10)(3x-10)$

$x^2+8x+16 = x^2+9x^2-60x+100$

$x^2+8x+16 = 10x^2-60x+100$

$0 = 9x^2-68x+84$

add -68 x 756 14, 54

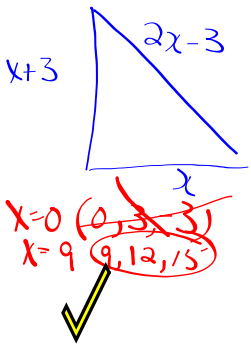
$0 = 9x^2-54x-14x+84$

$0 = 9x(x-6)-14(x-6)$

$(x-6)(9x-14)=0$

$x=6, 14/9$

15. The hypotenuse of a right triangle is 3 less than twice the shorter leg. The length of the other leg is 3 more than the shorter leg. Find the length of the shorter leg



x=0 ~~(0, 3, 3)~~

x=9 (9, 12, 15)

$(x+3)^2+x^2=(2x-3)^2$

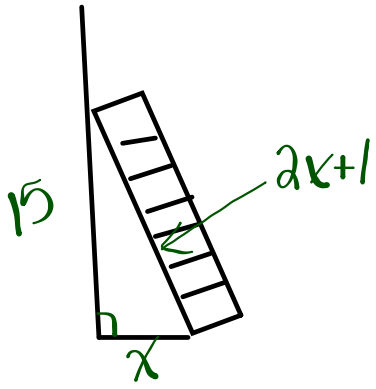
$x^2+6x+9+x^2 = 4x^2-12x+9$

$2x^2+6x+9 = 4x^2-12x+9$

$0 = 2x^2-18x$ $x=0,9$

$0 = 2x(x-9)$

16. A ladder is resting against a wall. The top of the ladder touches the wall at a height of 15 feet. Find the distance from the wall to the bottom of the ladder if the length of the ladder is one foot more than twice its distance from the wall.



$(2x+1)^2 = 15^2 + x^2$

$(2x+1)(2x+1) = 225 + x^2$

$4x^2 + 4x + 1 = 225 + x^2$

$3x^2 + 4x - 224 = 0$

$3x^2 + 28x - 24x - 224 = 0$

$x(3x+28) - 8(3x+28) = 0$

$(3x+28)(x-8) = 0$

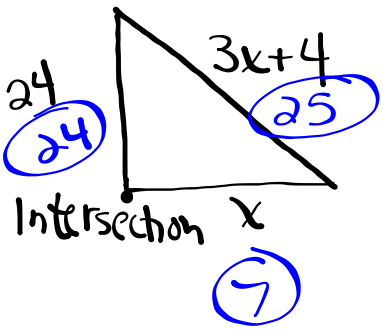
$x = -28/3, 8$

+) 4
x) -6 -24
-28 +24

8, 15, 17

, 15, 2x+1

17. Two cars leave an intersection. One car travels north; the other travels east. When the car traveling north had gone 24 miles, the distance between the cars was four miles more than three times the distance traveled by the car heading east. Find the distance between the cars at that time.



24

25

7

$(3x+4)^2 = x^2 + 24^2$

$(3x+4)(3x+4) = x^2 + 576$

$9x^2 + 24x + 16 = x^2 + 576$

$8x^2 + 24x - 560 = 0$

$8(x^2 + 3x - 70) = 0$

$8(x+10)(x-7) = 0$

$x = -10, 7$

25