Algebra 2/Trig—H Extra Problems 5.2-5.4
Handout 5C

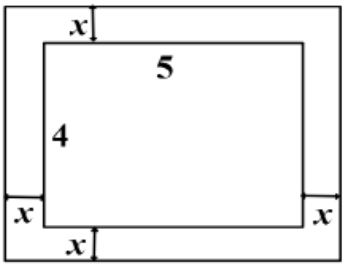
Write and solve equations for #1-5. Do these problems on this paper.

1. The sum of the squares of two consecutive positive odd integers is 202. Find all possible sets of integers.

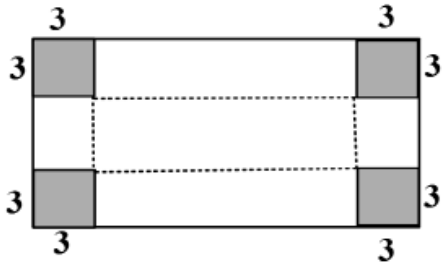
2. In a right triangle, the long leg is 3 more than the short leg, and the hypotenuse is 6 more than the short leg. Find the length of the hypotenuse. (hint: use Pythagorean Theorem)

3. The formula $h = k + vt - 4.9t^2$ gives the approximate height h in meters of an object, t seconds after it is projected upward from a height of k meters at an initial speed of v meters per second (m/s). A ball is thrown upward from the top of a tower 49 meters high at an initial speed of 14.7 m/s. After how many seconds will the ball hit the ground?

4. Grandma made a rectangular quilt that measured 4 feet by 5 feet. She wants to use an additional 10 square feet of fabric to add a decorative border of uniform width. What should the width of the border be?



5. A rectangular sheet of metal is formed into an open-topped box by cutting equal squares from the corners and bending the sides up. Find the dimensions of the metal sheet if it is twice as long as it is wide, and squares 3 cm on a side are cut out to form a box with volume 168 cubic cm.



Do #6-29 on your own paper.

Factor completely over the real numbers.

6. $\left(x^2 + 2x - 5\right)^2 - \left(x^2 + 1\right)^2$

7. $16x^4 - 72x^2 + 81$

8. $x^2 + \frac{3}{5}x - \frac{4}{25}$

9. $16x^{4n} - 100$

10. $2x + 5\sqrt{x} + 2$

11. $49x - 42\sqrt{x} + 9$

Simplify.

12. $\left(6\sqrt{2}\right)^2$

13. $\left(2 - \sqrt{7}\right)^2$

14. $\left(2\sqrt{y} - 1\right)\left(2\sqrt{y} + 1\right)$

15. $\frac{6}{\sqrt{3} + 1}$

16. $\frac{3}{\sqrt{5} - \sqrt{2}}$

17. $\frac{1}{\sqrt{x} - 4}$

18. i^{20}

19. i^{23}

20. $\left(-4i\right)^2$

21. $\left(2i\sqrt{3}\right)^2$

22. $i\sqrt{2} \cdot i\sqrt{10}$

23. $\sqrt{-2} \cdot \sqrt{-48}$

24. $\frac{1}{i} - \frac{1}{2} + \frac{3}{2i}$

25. $\left(1 + i\sqrt{6}\right)^2$

26. $\left(1 + i\right)^3$

27. Two complex numbers $a + bi$ and $c + di$ are equal if and only if $a = c$ and $b = d$. Find x and y if $2x + y + 3yi = 5 - xi$.

28. Find and simplify the reciprocal of $\frac{2 + 6i}{5}$.

29. Show <u>by substitution</u> that $2 + i$ is a solution of $x^2 - 4x + 5 = 0$.