Algebra 2/Trig H
5.1-5.4

Name_____

HW #_____ HW #_____

DO ALL WORK ON YOUR OWN PAPER.

Factor completely over the real numbers.

1. $5x^3 - 405x$
2. $16x^3y - 88x^2y^2 + 121xy^3$
3. $3x^4 + 3x^2 - 6$
4. $(x^2 + 14x + 49) - 100y^2$
5. $(x-y)^3(x+y) - (x-y)(x+y)^3$
6. $25x^{4n} + 30x^{2n} + 9$
7. $2x - 3\sqrt{x} - 2$

Solve over the real numbers.

8. $(x-4)(x+4) = 6x$
9. $x^6 - 2x^4 + x^2 = 0$
10. $18x^2 = 75x - 42$
11. $30x^3 - 38x^2 - 20x = 0$
12. $\left(\frac{x-1}{x+3}\right)^2 - 4\left(\frac{x-1}{x+3}\right) + 3 = 0$
13. $3(5x-2)^2 + 5 = 194$

Solve over the complex numbers.

14. $-x^2 + 4 = 2x^2 - 5$
15. $\frac{x^2}{5} + 8 = -1$
16. $(1+2x^2)^2 + 6(1+2x^2) - 7 = 0$

Simplify completely. Write answers in *a + bi* form as needed.

17. $\sqrt{\frac{17}{40}}$
18. $\sqrt{108}$
19. $(8 - 3\sqrt{2})^2$
20. $\frac{4\sqrt{5}+2}{2\sqrt{5}-3}$
21. $2i\sqrt{20} \cdot 4i\sqrt{3}$
22. $(2i\sqrt{5})^2$
23. $3\sqrt{-150}$
24. $\sqrt{-6} \cdot \sqrt{-30}$
25. $-i + (7-5i) - 3(2-3i)$
26. $2i(1-4i)^2$
27. $\frac{4-i\sqrt{3}}{4+i\sqrt{3}}$
28. $\frac{5}{2i}$
29. $|6-5i|$

30. Find the zeros of the function: $y = -4x^2 - 24x$

31. The bases of a trapezoid are $4x + 2$ and $3x - 1$, and the height is $2x$. Its area is 66 sq. units. Find the value of x. (hint: area of trapezoid = ½ (height)(sum of bases))

32. The drag force F (in pounds) of water on a swimmer is $F = 1.35s^2$, where s is the swimmer's speed (in miles per hour). How fast must you swim to generate a drag force of 10 pounds? Round the answer to the nearest tenth.

33. Find all possible sets of three consecutive integers such that the square of the second integer is 40 more than the sum of all three integers.

34. Graph $-3 + 2i$, $5 - 4i$, and 2.5 in the complex plane.

35. Graph the parabola $y = 2x^2 - 4x + 5$. Identify vertex, axis of symmetry, two other points, and the maximum or minimum value of the function.

36. Graph the parabola $y = \frac{-1}{2}(x+2)^2 + 4$. Identify vertex, axis of symmetry, two other points, and the maximum or minimum value of the function.

37. Graph the parabola $y = -3(x-4)(x+3)$. Identify x-intercepts, vertex, and axis of symmetry.

38. Graph the function $f(x) = \begin{cases} 2x-3, \text{ if } x > 3 \\ \frac{-2}{3}x + 4, \text{ if } x \le 3 \end{cases}$

39. Write an equation in slope-intercept form for a line perpendicular to the line $2x - 5y = 15$ and containing the point of intersection of the lines $3x - 5y = 23$ and $2x + 3y = -10$.

Selected answers: 5. $-4xy(x-y)(x+y)$ 8. 8, -2 9. 0, 1, -1 10. $\frac{2}{3}, \frac{7}{2}$

11. $0, \frac{-2}{5}, \frac{5}{3}$ 12. -5 13. $\frac{2 \pm 3\sqrt{7}}{5}$ 14. $\pm\sqrt{3}$ 15. $\pm 3i\sqrt{5}$ 16. $\pm 2i$, 0

17. $\frac{\sqrt{70}}{20}$ 18. $6\sqrt{3}$ 19. $82 - 48\sqrt{2}$ 20. $\frac{46 + 16\sqrt{5}}{11}$ 21. $-16\sqrt{15}$

22. -20 23. $15i\sqrt{6}$ 24. $-6\sqrt{5}$ 25. $1 + 3i$ 26. $-104 - 94i$

27. $\frac{13}{19} - \frac{8\sqrt{13}}{19}i$ 28. $\frac{-5}{2}i$ 29. $\sqrt{61}$ 30. 0, -6 31. 3 32. 2.7 mph

33. 7, 8, 9 or -6, -5, -4 35. V(1, 3), axis $x = 1$, minimum = 3 36. V(-2, 4), axis $x = -2$, maximum = 4 37. x-intercepts (-3, 0), (4, 0), V(.5, 36.75), axis $x = .5$ 39. $y = \frac{-5}{2}x - \frac{3}{2}$