Algebra 2H Review: 5.5-5.8, 6.1, 6.3

Solve by completing the square: 1. $5x^2+6x-15=0$ 2. $2x^2-8ix+2=0$

Solve using quadratic formula: 3. $4x^2=28x+15$ 4. $\sqrt{3}x^2+2x-2\sqrt{3}=0$

Solve using any method: 5. $3(x+5)^2-4=50$ 6. $2x^2-3ix+1=0$

Find the value of the discriminant and give the number and type (real, rational, irrational, or conjugate imaginary) of solutions.

7. $7x^2-2\sqrt{14}x+2=0$ 8. $3x^2=8x-5$

9. Find all values of k so that $k^2x^2-8x+4=0$ has 2 conjugate imaginary solutions.

10. The area of a parallelogram with base $2x+1$ and height x is 32 square units. Find the value of x, rounded to the nearest tenth.

11. Write the quadratic function $y=-2x^2+12x-23$ in vertex form. Graph the parabola, and give the vertex, axis of symmetry, and maximum or minimum value of the function.

12. Write the equation of a parabola in vertex form, if it is tangent to the line $y=20$, has y-intercept 15 and x-intercept 3. Give both possible equations. *(This is extra fun!)*

13. Write the equation of a parabola in intercept form, if the x-intercepts are 4 and -1, and the point (5, -12) is on the parabola.

14. Write the equation of a parabola in standard form, given that (-4, 8), (-2, 1), and (2, 5) are on the parabola.

15. Graph the system:
$$y > 2x^2+12x+15$$
$$y < \frac{-1}{2}x^2+5$$

16. Solve $\frac{x^3}{15}+\frac{2x}{5}\geq\frac{x^2+2x}{6}$. Graph the solution and give an algebraic solution.

17. A farmer plans to use 17 meters of fencing to enclose a rectangular pen having area 35 square meters. Only 3 sides of the pen need fencing, because part of an existing wall will form the fourth side. Find the dimensions of the pen. (There are two solutions.)

#18-21: Simplify. Assume that n represents an integer greater than 1 and that all fractions are defined. Do not leave zero or negative exponents in your answers.

18. $\left(\frac{2x^{-1}}{y^4}\right)^3\left(4xy^{-3}\right)^{-2}$ 19. $\left(3^{-8}\cdot 3^5\right)^2\cdot 7^0$

20. $\frac{\left(x^{n-1}\right)\left(y^n\right)^3}{\left(x^{n+1}\right)^2 y^{n+1}}$ 21. $2x^n\left(3x^{n+2}-8x^{3n-2}\right)$

22. Mercury travels approximately 226,000,000 miles in its orbit around the sun, and it takes approximately 2100 hours to complete this revolution. Use scientific notation to set-up a problem to find the speed of Mercury as it revolves about the sun. Give the answer in scientific notation and round the decimal to the nearest hundredth.

#23-27: Simplify.

23. $\left(6x^3+3x^2-5x-1\right)-3\left(7x^3+3x-6\right)$ 24. $2x\left(9x^n+5\right)\left(9x^n-5\right)$

25. $\left(x^2+2x+1\right)\left(2x^2-3x+1\right)$ 26. $\left(8x^2+3y\right)^2$ 27. $(3x-1)^3$

28. Find a simplified expression, in terms of x and π, for the surface area of cylinder with base radius $r=\frac{5}{3}x$ and height $h=2x$. Use the formula $S=2\pi rh+2\pi r^2$.

Review: 29. Find $|-2-10i|$ 30. Solve for x: $\frac{(2x+3)^2}{20}+\frac{1}{5}=\frac{3}{4}$

31. Solve for x: $3x^4+27x^2-108=0$

****

Answers: 1. $\frac{-3\pm 2\sqrt{21}}{5}$ 2. $2i\pm i\sqrt{5}$ 3. $\frac{-1}{2},\frac{15}{2}$ 4. $\frac{-\sqrt{3}\pm\sqrt{21}}{3}$ 5. $-5\pm 3\sqrt{2}$ 6. $\frac{3i\pm i\sqrt{17}}{4}$

7. D = 0, 1 real irrational solution 8. D = 4, 2 real rational solutions 9. $k<-2$ or $k>2$

10. 3.8 units 11. $y=-2(x-3)^2-5$; vertex (3, -5); axis of symmetry $x=3$; max. value -5

12. $y=\frac{-5}{9}(x+3)^2+20$ or $y=-5(x-1)^2+20$ 13. $y=-2(x-4)(x+1)$ 14. $y=\frac{3}{4}x^2+x$

16. $0\le x\le\frac{1}{2}$ or $x\ge 2$ 17. 5 m by 7 m, or 3.5 m by 10 m 18. $\frac{1}{2x^5y^6}$ 19. $\frac{1}{729}$

20. $\frac{y^{2n-1}}{x^{n+3}}$ 21. $6x^{2n+2}-16x^{4n-2}$ 22. 1.08×10^5 mi/hr 23. $-15x^3+3x^2-14x+17$

24. $162x^{2n+1}-50x$ 25. $2x^4+x^3-3x^2-x+1$ 26. $64x^4+48x^2y+9y^2$

27. $27x^3-27x^2+9x-1$ 28. $S=\frac{110\pi x^2}{9}$ 29. $2\sqrt{26}$ 30. $\frac{-3\pm\sqrt{11}}{2}$

31. $\pm\sqrt{3},\ \pm 2i\sqrt{3}$