Algebra 2H Review 5.5-5.8, 6.1, 6.3

Do all problems NEATLY on your own paper.

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. *Use an equation to solve this problem. Round the answer to the nearest tenth.*
The height of a trapezoid is x cm, and its bases are $x + 2$ cm and $3x - 1$ cm. The area is 112 cm^2.
Find x. ($Area = \frac{1}{2}h(b_1 + b_2)$)

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

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

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

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

15. Solve: $21x^2 + 5x - 6 < 0$. Graph the solution and give the algebraic solution.

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

17. *Use one or more equations to solve this problem.*
A farmer plans to use 17 meters of fencing to enclose a rectangular pen with 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 2 solutions.)

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

18. $\left(\dfrac{2x^{-1}}{y^4}\right)^3\left(4xy^{-3}\right)^{-2}$

19. $\left(3^{-8}\cdot 3^5\right)^2\cdot 7^0$

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

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 and solve for Mercury's speed as it revolves around the sun. Give the answer in scientific notation, with the decimal rounded 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 a cylinder with base radius $r=\dfrac{5}{3}x$ and height $h = 2x$. Use the formula $S = 2\pi rh + 2\pi r^2$.

Review: 29. Find $|-2-10i|$

30. Solve for x: $\dfrac{(2x+3)^2}{20}+\dfrac{1}{5}=\dfrac{3}{4}$

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

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