Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ period \_\_\_\_\_\_\_

**ALGEBRA 2 ~ REVIEW for LESSONS 17 – 20**

**LESSON 17 ~ Section 5.2 – Polynomials**

You should know…

* Polynomials occur when we have ***ADDITION AND SUBTRACTION***. It is very important that you look for addition or subtraction before proceeding, because our rules change a little bit.
* Always follow the order of operations. If there are parentheses, look to see why. Is there a subtraction somewhere that’s going to change all of our signs? Do we have an exponent we need to apply first?
* Combining like terms - NEVER changes the exponent, because we’re saying “if I have 2 x’s and add 3 more x’s, how many x’s do I have?” It’s like apples. I can add apples and take away apples, but all I’m changing is how many apples I have, not what the apples look like. When combining like terms, the variables and their exponents don’t change, just the number out front of them changes.
* Multiplying polynomials – use distribution. (This is where FOIL appears. ) ***ALWAYS LOOK TO SEE IF THERE IS A SIGN BETWEEN THE PARENTHESES BEFORE YOU START MULTIPLYING!!!!*** Is this really a multiplication problem, or is it an addition/subtraction problem?
* Remember that exponents are not distributive over addition: $\left(x-a\right)^{2}\ne x^{2}-a^{2}$. You must break apart your problem, and multiply it by itself. $\left(x-a\right)^{2}=\left(x-a\right)\left(x-a\right)= x^{2}-2ax+a^{2}$

**Simplify:**

1. $\left(2x\right)^{3}+2x^{3}$
2. $\left(-6n-13n^{2}\right)+\left(-3n+9n^{2}\right)$
3. $\left(8x^{2}-3x\right)-\left(4x^{2}+5x-3\right)$
4. $-3r^{3}y^{2}\left(-3ry^{5}+2r^{3}y^{4}-5r^{2}\right)$
5. $\left(y-8\right)^{2}$
6. $\left(x-8\right)(x+3)$
7. $\left(x+2\right)\left(x-3\right)\left(x-1\right)$
8. $\left(x+y\right)\left(x^{2}-3xy+2y^{2}\right)$

**LESSONS 18 & 19: Section 5.4 – Factoring**

You should know…

* How to find the GCF of a polynomial. This should ALWAYS be your first step of factoring!
* How to factor a Difference of Squares: $x^{2}-a^{2}=\left(x+a\right)\left(x-a\right)$. Remember that the sum of squares $\left(x^{2}+a^{2}\right)$ is not factorable with the methods we know, so always look for the subtraction sign.
* How to factor a Sum of Cubes: $A^{3}+B^{3}=\left(A+B\right)\left(A^{2}-AB+B^{2}\right)$
* How to factor a Difference of Cubes: $A^{3}-B^{3}=\left(A-B\right)\left(A^{2}+AB+B^{2}\right)$
* How to factor trinomials: $ax^{2}+bx+c$
* How to factor larger polynomials (4 terms) by grouping.
* Remember that a complete factorization has every term broken down as far as possible. Always check for the GCF first, and check for difference of squares at each step. Keep every factor you pull out, even the GCF. You should be able to multiply everything back together again and get your original problem.

**FACTOR EACH POLYNOMIAL COMPLETELY!**

1. $2t^{3}+32t^{2}+128t$
2. $x^{2}-4 $
3. $a^{2}-a-6$
4. $x^{4}-16$
5. $3x^{2}-27$
6. $5y^{3}-40y^{2}+60y$
7. $x^{3}-64$
8. $8x^{3}+27$
9. $2x^{2}-7x+6$
10. $5x^{2}+12x-9$
11. $4ax+14ay-10bx-35by$
12. $10w^{2}-14wv-15w+21v$

**LESSON 20: Roots and Radicals (Sections 5.5, 5.6)**

You must be able to:

|  |
| --- |
| * Factor numbers into prime factors. Imagine or write variables in expanded form.
* Look for pairs (or triples, etc.) to pull out of the radical.
* If numbers are perfect squares, you don’t need to factor, just pull it out as its square root. (For cube root, pull out perfect cubes, etc.)
* Multiply by factors that are already waiting outside, if any.
 |

**Simplify.**

21. $\pm \sqrt{169}$ 22. $-\sqrt{289m^{6}n^{2}}$ 23. $\sqrt{64a^{18}b^{2}c^{8}}$

24. $\sqrt[3]{125x^{6}y^{12}}$ 25. $\sqrt[3]{-64x^{18}}$ 26. $\sqrt[5]{\left(x-2\right)^{5}}$

27. $\sqrt[4]{\left(5x+2\right)^{8}}$ 28. $\sqrt{x^{2}+8x+16}$

**CUMULATIVE REVIEW PROBLEMS:**

29. Solve $\left|q-3\right|-7=2$ 30. Solve $3\left|x-2\right|<15$

31. Solve the system of equations using substitution or elimination.

 $3x+2y=12$



 $x-2y=4$

***Write equations for the following in slope-intercept form:***

32. Perpendicular to $2x-4y=7$ and passing through the point (-4,6).

33. The line with an x-intercept of 3, and a y-intercept of -2.

34. The line parallel to $x+5y=13$ and passing through (6, 7).

***Simplify the following:***

35. $\left(3r^{5}w^{3}\right)^{-3}$

36. $\left(4a^{3}c^{2}\right)^{3}\left(-3ac^{4}\right)^{2}$

37. $\frac{16\left(x^{5}y^{0}\right)^{3}}{8\left(xy^{2}\right)^{2}}$

38. $\frac{4m^{5}y^{6}}{-12my^{3}}$

39. $\frac{a^{-3}b^{4}}{a^{3}b^{-2}}$

40. $\left(\frac{x^{2}y}{xy^{3}}\right)^{-2}$

***Solve by graphing the lines, determining the vertices, and finding the maximum and minimum.***

41. $x+y\leq 20$

 $x\geq 3$

 $x\leq 8$

 $f\left(x,y\right)=10x+7y$

**ANSWER KEY FOR ALGEBRA 2 Lesson 17-20 Review:**

1. $10x^{3}$ 2. $-9n-4n^{2}$ 3. $4x^{2}-8x+3$

4. $-9r^{4}y^{7}-6r^{6}y^{6}+15r^{5}y^{2}$ 5. $y^{2}-16y+64$ 6. $x^{2}-5x-24$

7. $x^{3}-2x^{2}-5x+6$ 8. $x^{3}-2x^{2}y-xy^{2}+2y^{3}$ 9. $2t\left(t+8\right)\left(t+8\right)$

10. $\left(x+2\right)\left(x-2\right)$ 11. $\left(a-3\right)\left(a+2\right)$ 12. $\left(x^{2}+4\right)\left(x+2\right)\left(x-2\right)$

13. $3\left(x+3\right)\left(x-3\right)$ 14. $5y\left(y-6\right)\left(y-2\right)$ 15. $\left(x-4\right)\left(x^{2}+4x+16\right)$

16. $\left(2x+3\right)\left(4x^{2}-6x+9\right)$ 17. $\left(2x-3\right)\left(x-2\right)$ 18. $\left(5x-3\right)\left(x+3\right)$

19. $\left(2a-5b\right)\left(2x+7y\right)$ 20. $\left(2w-3\right)\left(5w-7v\right)$ 21. $\pm 13$

22. $-17m^{3}n$ 23. $8a^{9}bc^{4}$ 24. $5x^{2}y^{4}$

25. $-4x^{6}$ 26. $x-2$ 27. $\left(5x+2\right)^{2} or 25x^{2}+20x+4$

28. $x+4$ 29. $q=-6, 12$ 30. $-3<x<3$

31. $\left(4, 0\right)$ 32. $y=-2x-2$ 33. $y=\frac{2}{3}x-2$

34. $y=-\frac{1}{5}x+\frac{41}{5}$ 35. $\frac{1}{27r^{15}w^{9}}$ 36. $576a^{11}c^{14}$

37. $\frac{2x^{13}}{y^{4}}$ 38. $–\frac{m^{4}y^{3}}{3}$ 39. $\frac{b^{6}}{a^{6}}$

40. $\frac{y^{4}}{x^{2}}$ 41. Vertices: $\left(3, 0\right), \left(8, 0\right), \left(3, 17\right)and \left(8, 12\right) Max:164, Min: 30$

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7. $x^{3}-2x^{2}-5x+6$ 8. $x^{3}-2x^{2}y-xy^{2}+2y^{3}$ 9. $2t\left(t+8\right)\left(t+8\right)$

10. $\left(x+2\right)\left(x-2\right)$ 11. $\left(a-3\right)\left(a+2\right)$ 12. $\left(x^{2}+4\right)\left(x+2\right)\left(x-2\right)$

13. $3\left(x+3\right)\left(x-3\right)$ 14. $5y\left(y-6\right)\left(y-2\right)$ 15. $\left(x-4\right)\left(x^{2}+4x+16\right)$

16. $\left(2x+3\right)\left(4x^{2}-6x+9\right)$ 17. $\left(2x-3\right)\left(x-2\right)$ 18. $\left(5x-3\right)\left(x+3\right)$

19. $\left(2a-5b\right)\left(2x+7y\right)$ 20. $\left(2w-3\right)\left(5w-7v\right)$ 21. $\pm 13$

22. $-17m^{3}n$ 23. $8a^{9}bc^{4}$ 24. $5x^{2}y^{4}$

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