

Summer Review Packet in Preparation for Algebra II Honors

This packet is designed to aid students in brushing up on their Algebra 1 skills in order to better prepare them for Algebra II Honors. The topics included in this packet reflect some of the common errors made in Algebra II Honors by students who are lacking in a strong Algebra 1 foundation. This packet is only meant as a guide and additional reinforcement may be necessary to ensure that your student is well prepared for Algebra II Honors.

Topic 1: Factoring

Topic 2: Order of Operations

Topic 3: Laws of Exponents

Topic 4: Illegally distributing a power over a sum

Topic 5: Simplify Algebraic expressions

Topic 6: Illegally canceling or reducing an expression

Topic 1: Factoring: Algebra II students must be very comfortable factoring linear and quadratic expressions. Factor the following expressions. Remember to always begin by pulling out the common factor. If an expression is not factorable then write “prime”.

1) $3x - 21$

2) $x^2 + 6x + 8$

3) $2x^2 - 22x + 60$

4) $x^2 + 13x + 40$

5) $x^2 - 23x - 50$

6) $2x^2 - 10x - 28$

7) $2x^2 + 5x - 7$

8) $3x^2 - 5x + 2$

9) $3x^3 - 48x$

10) $25x^2 - 36$

11) $x^2 + 49$

Topic 2: Order of Operations: Evaluate the following expressions without using a calculator.

1) $8 + 5 \cdot 4^3 - 10 - 3(8 - 6)$

2) $16 + 4(7 - 4 + 1)$

3) $37 + 3[16 \div (2 \cdot 4)]$

4) $33 - 3[4 \cdot (7 - 5)] + 3^2$

5) $\frac{2\sqrt{121} - 5 \cdot 4}{6 + 12}$

6) $\frac{19 + (2(18 \div 6))^2}{17 - 3 \cdot 3} + \frac{15}{2^3}$

7) $\frac{2 + |5 - 9|}{\sqrt{49}} - \frac{5 \cdot 2^3}{21}$

Topic 3: Laws of exponents. Students must very comfortable using the laws of exponents to simplify an expression. Final answers must contain only positive powers.

1) $x^2 g x^6$

2) $(-5y^{12})(2y^{-3})$

3) $(2x^4 y)^3 g(7y^0)$

4) $\frac{16x^9 y^3}{8x^7 y^8}$

5) $\left(\frac{6x^4 y^{-3}}{12y^{-2}}\right)^3$

6) $\left(\frac{2x^3}{x}\right)^{-4} g(4x^{10})$

7) $\frac{(5x^3 y)^4}{\left(\frac{25x^{21}}{y^6}\right)}$

8) $(x^8 g x^0 g x^{-3} g)(2xy)^5$

Topic 4: Illegally distributing a power over a sum. A very common error is for students to say that $(x + 3)^2$ is equivalent to $x^2 + 9$. This error comes in various forms. For example, students also incorrectly say that $\sqrt{25x^2 + 81}$ is equivalent to $5x + 9$. It is illegal to square root each term because a square root is really a power of $\frac{1}{2}$ and powers can not be distributed over sums. Other common errors of this form are claiming that $\left(27x^{\frac{3}{4}} + y^6\right)^{\frac{1}{3}}$ is equivalent to $3x^{\frac{1}{4}} + y^2$. Again powers can not be distributed over sums or differences.

Simplify the following expressions.

1) $(x + 5)^2$

2) $(2x - 3)^2$

3) $\sqrt{9 + 16}$

4) $\sqrt{(x - 3)^2 + (x + 6)^2}$

Topic 5: Simplifying algebraic expressions. Students need to be able to add, subtract, and multiply algebraic expressions. Simplify the following expressions.

1) $(x^4 + 2x^3 - 8x + 1) + (3x^3 + 5x^2 - 9x - 3)$

2) $(6x^3 - 8x + 2) - (7x^3 - 9x^2 + x - 5)$

3) $4x(x - 7) + 5$

4) $(2x - 1)(x + 5)$

5) $(x - 8)^2 - (x + 2)$

6) $6(x - 3)^2 + (4x - 5)(x + 7)$

Topic #6: Error with canceling/reducing rational expressions. A common error is when students cancel incorrectly. For example, some students incorrectly state that $\frac{4x^2 + 5}{x}$ is equivalent to $4x + 5$ because they think the x in the denominator will cancel with one of the x 's in the first term.

Simplify the following expressions if possible. Be sure to factor first and then cancel!!!

1) $\frac{20x^4}{10x}$

2) $\frac{16x + 8}{2}$

3) $\frac{30x^6 - 6x^2}{3x}$

4) $\frac{5x^4 - x}{x}$

5) $\frac{4xy^3 - 20x^2y}{10x^7y}$

6) $\frac{x^2 - 8x + 15}{4x - 12}$

7) $\frac{(3x)(x^2 - 49)}{x^3 - 8x^2 + 7x}$

Answers:

| Topic 1: Factoring | Topic 2: Order of Operations | Topic 3: Laws of Exponents | Topic 4: Incorrectly Distributing powers |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| 1) $3(x-7)$ 2) $(x+4)(x+2)$ 3) $2(x-6)(x-5)$ 4) $(x+8)(x+5)$ 5) $(x-25)(x+2)$ 6) $2(x-7)(x+2)$ 7) $(2x+7)(x-1)$ 8) $(3x+1)(x-2)$ 9) $3x(x-4)(x+4)$ 10) $(5x-6)(5x+6)$ 11) prime | 1) 312 2) 32 3) 43 4) 18 5) $\frac{1}{9}$ 6) $\frac{70}{8}$ 7) $\frac{-22}{21}$ | 1) x^8 2) $-10y^9$ 3) $56x^{12}y^3$ 4) $\frac{2x^2}{y^5}$ 5) $\frac{x^{12}}{8y^3}$ 6) $\frac{x^2}{4}$ 7) $\frac{25y^{10}}{x^9}$ 8) $32x^{11}y^5$ | 1) $x^2 + 10x + 25$ 2) $4x^2 - 12x + 9$ 3) 5 4) $\sqrt{2x^2 + 6x + 45}$ |

| Topic 5: Simplify | Topic 6: Incorrectly Reducing |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| 1) $x^4 + 5x^3 + 5x^2 - 17x - 2$ 2) $-x^3 + 9x^2 - 9x + 7$ 3) $4x^2 - 28x + 5$ 4) $2x^2 + 9x - 5$ 5) $x^2 - 17x + 62$ 6) $10x^2 - 59x + 19$ | 1) $2x^3$ 2) $8x + 4$ 3) $10x^5 - 2x$ 4) $5x^3 - 1$ 5) $\frac{2y^2 - 10x}{5x^6}$ 6) $\frac{x-5}{4}$ 7) $\frac{3x+21}{x-1}$ |

Students who had difficulty with this packet should reconsider taking Algebra II Honors or should hire a tutor over the summer to work on Algebra 1 skills