

## College Algebra Challenge Exam Review Sheet

### Rules For All Challenge Exams

- All students may take a Challenge Exam to place out of College Algebra or Algebra & Trigonometry. Students who receive a grade of 70% or better on the Challenge Exam will receive a waiver (no credit given) for College Algebra or Algebra & Trigonometry.
- Time allotment: Students will have 90 minutes to complete the actual challenge exam.
- A student may take only one of the exams at a time. For example, if your program requires you to take MTH 120 (College Algebra) **and** MTH 220 (Algebra & Trigonometry) you may take only one of these exams during orientation. If you pass the Algebra & Trigonometry Challenge Exam then you are waived from taking both courses. If you take and pass the College Algebra Challenge Exam then you are waived from taking College Algebra but not Algebra & Trigonometry. You can then arrange to take the Algebra & Trigonometry Challenge Exam at a later date.
- Calculator Restrictions: Only certain types of calculators may be used during the test. Most four-function, scientific or graphing calculators are permitted. Devices that include calculators among their functions-cell phones, laptops, PDAs-are forbidden, as are calculators with built-in algebra capabilities or QWERTY keyboard buttons. Also, certain specific models of calculators are forbidden, including the following: all Texas Instruments model numbers that begin with TI-89 and TI-92, as well as the TI-Nspire CAS (the non-CAS TI-Nspire is allowed); the Hewlett-Packard hp 48GII model and all model numbers that begin with hp 40G, hp 49G, or hp 50G; the Casio Algebra fx 2.0, ClassPad 300, and all model numbers that begin with CFX-9970G; and all electronic writing pads or pen-input devices, except for the Sharp EL 9600.
- The review sheets provide **examples** from the topics that you will encounter on the actual exams. They are not specific examples from the exam.

## Example Problems for the College Algebra Challenge Exam

### 1. Topic: Order of Operations

Evaluate:  $200 + 50 \div 5 \cdot 2^3$                       Answer: 280

### 2. Topic: Simplifying Algebraic Expressions

Simplify:  $5(3x - 2y) - (4y - 7z) - 2(4x + 3z)$                       Answer:  $7x - 14y + z$

### 3. Topic: Exponents

Simplify:                      a)  $(-2)^4 + 2^0 - 2n^0$                       b)  $(a^{-3}bc^5)^{-2}$

Answers:                      a) 15                      b)  $\frac{a^6}{b^2c^{10}}$

### 4. Topic: Solving Linear Equations

Solve for  $x$ :                      a)  $8x - 3(x - 7) = 13 - 4(10 - 2x)$                       b)  $\frac{x + 3}{4} - \frac{2x - 1}{6} = \frac{x}{3} - 2$

Answers:                      a)  $x = 16$                       b)  $x = 7$

### 5. Topic: Solving Word Problems Algebraically

**Example:** The three books atop the best seller list have a combined total of 1200 pages. Book #2 has 24 less than twice the number of pages in Book #1, while Book #3 has 176 more pages than Book #1. How many pages does each book have?

**Answer:** Book #1 has 262 pages, Book #2 has 500 pages, and Book #3 has 438 pages.

### 6. Topic: Solving Linear Inequalities

Solve for  $x$ :  $10 - 4(7 + 4x) \leq 12 - x$                       Answer:  $x \geq -2$

### 7. Topic: Lines

Find the equation of the line which

(a) passes through  $(-1,5)$  and  $(6,-9)$ .                      Answer:  $y = -2x + 3$

(b) is parallel to the line  $3y - 12 = x$  and has a  $y$ -intercept of 11.                      Answer:  $y = \frac{1}{3}x + 11$

### 8. Topic: Multiplying Polynomials

Multiply:                      a)  $(3v - 5w)(6v + 2w)$                       b)  $(8x - 3)^2$

Answers:                      a)  $18v^2 - 24vw - 10w^2$                       b)  $64x^2 - 48x + 9$

**9. Topic: Factoring Polynomials**

Factor completely:      a)  $10x^2 + 5x - 30$       b)  $3m^3n - 48mn$   
Answers:                      a)  $5(2x - 3)(x + 2)$       b)  $3mn(m + 4)(m - 4)$

**10. Topic: Solving Quadratic Equations**

Solve for  $x$ :       $x^2 + 24 = 10x$       Answer:       $x = 4, x = 6$

**11. Topic: Simplifying Rational Expressions**

Simplify:       $\frac{5x^2 - 5x - 60}{10x^2 - 90}$       Answer:       $\frac{x - 4}{2(x - 3)}$

**12. Topic: Multiplying and Dividing Rational Expressions**

Perform the operations and simplify:       $\frac{4x + 28}{x^2 - 49} \cdot \frac{x - 7}{12x - 72} \div \frac{x^2 + 11x + 30}{x^2 - 36}$

Answer:       $\frac{1}{3(x + 5)}$

**13. Topic: Adding and Subtracting Rational Expressions**

Perform the operation and simplify:       $\frac{x}{x + 5} - \frac{1}{x + 2}$

Answer:       $\frac{x^2 + x - 5}{(x + 5)(x + 2)}$

**14. Topic: Simplifying Complex Fractions**

Simplify:       $\frac{1 + \frac{1}{n}}{1 - \frac{1}{n^2}}$       Answer:       $\frac{n}{n - 1}$

**15. Topic: Solving Rational Equations**

Solve for  $x$ :       $\frac{8}{x^2 + 2x - 15} = \frac{1}{x - 3} - \frac{4}{x + 5}$

Answer:      No Solutions ( $x = 3$  is extraneous).

**16. Topic: Simplifying, Adding, and Subtracting Radicals**

Simplify:       $\sqrt{98} - 3\sqrt{50} + \sqrt{162}$       Answer:       $\sqrt{2}$

**17. Topic: Operations with Complex Numbers**

a) Multiply:  $(8 - 3i)(5 - 6i)$       b) Divide:  $\frac{23 + 14i}{3 + 4i}$

Answers:      a)  $22 - 63i$       b)  $5 - 2i$