

## Diagnostic Review – Units 5 - 8

The Math Diagnostic Sequence at the College of Western Idaho allows students to test out of Units in the developmental mathematics sequence. The diagnostic level 5-8 test has 10 questions. If you complete a level with a passing score, you may attempt the next level in the sequence. You are limited to two attempts per level on the Diagnostic Test. The two attempts do not need to be on the same day.

Units 5, 6, 7, 8 – Exponents, Polynomials, Factoring, Quadratic Equations, Rational Expressions & Equations, Relations & Functions, and Function Notation

### Topics for Unit 5-8 Diagnostic Test

1. Topic: Simplify polynomials by combining like terms
  - Example:  $4xy + 5y - 7x + 9y + 2xy - 19$
2. Topic: Subtract polynomials
  - Example:  $(-7x^2 + 8x - 12) - (x^2 - 5)$
3. Topic: Multiply two binomials by using FOIL
  - Example:  $(5x - 8)(10x + 4)$
4. Multiply two or more polynomials
  - Example:  $3x(2x - 4)(5x - 3)$
5. Square a binomial sum
  - $(3x + 5)^2$
6. Add/Subtract polynomials in several variables
  - $(3x^2 - 4xy + 7y^2) - (4x^2 - 6xy + 10y^2)$
7. Multiply polynomials in several variables
  - $(6x - 2y)(x + 4y)$

Factor out the greatest common factor from a polynomial

8.  $30y^3 - 20y^2 + 10y$

Factor by grouping

9.  $12y^2 - 6y + 10y - 5$

Factor trinomials

10.  $x^2 - 3x - 18$

Factor polynomials

11.  $5x^2 - 13x - 6$

Factor the difference of two squares

12.  $25A^2 - 81$

Factor polynomials completely

13.  $5x^2 - 35x + 60$

Use the rules of exponents to simplify an expression

14.  $(m^3n^2)^3(-m^2n^5)^2$

Use the rules of exponents to simplify a rational expression

15.  $\frac{(ab^5)^{-6}}{a^{10}b^{-5}}$

Solve quadratic equations by factoring

16. Solve  $x^2 - 12x + 32 = 0$

Use the square root property to solve quadratic equations

17. Solve  $(x + 4)^2 = 25$

Use the quadratic formula to solve equations

18. Solve  $5x^2 + 2x - 2 = 0$

Find the domain and range of a relation and determine whether it is a function

19.  $\{(4, 5), (6, 3), (2, 8), (4, 7), (5, 5)\}$

Evaluate a function

20. If  $f(x) = (x - 8)^2 - x$ , find  $f(4)$ .

Find the domain of a function. Use interval notation.

21.  $g(x) = \frac{6x+7}{\sqrt{3x-8}}$

Application involving projectile motion

22. A rock is thrown straight up from a cliff that is 24 feet above water. If the height of a rock  $h$ , in feet, after  $t$  seconds is given by the equation  $h = -16t^2 + 20t + 24$ , how long will it take for the rock to hit the water?

Simplify rational expressions

23.  $\frac{6x^2+11x-10}{6x^2+7x-20}$

Multiply/Divide rational expressions

24. Multiply  $\frac{2x^2-8}{18x} \cdot \frac{12x}{5x+10}$

Add/Subtract rational expressions

25. Subtract  $\frac{12x^2-5x}{2x^2-4x-6} - \frac{7x}{2x+2}$

Simplify complex rational expressions

26. Simplify  $\frac{\frac{1}{4} - \frac{1}{x^2}}{\frac{1}{x} + \frac{1}{2}}$

Find restricted values for rational expressions

27.  $\frac{x+4}{x^2-x-30}$

Solve rational equations

28. Solve  $\frac{5}{x-2} = 7 - \frac{10}{x+2}$

Answers:

Units 5 - 8 – Exponents, Polynomials, Factoring, Quadratic Equations, Rational Expressions & Equations, Relations & Functions, and Function Notation

1. $6xy - 7x + 14y - 19$ <i>Note: Order doesn't matter</i>	2. $-8x^2 + 8x - 7$	3. $50x^2 - 60x - 32$	4. $30x^3 - 78x^2 + 36x$
5. $9x^2 + 30x + 25$	6. $-x^2 + 2xy - 3y^2$	7. $6x^2 + 22xy - 8y^2$	8. $10y(3y^2 - 2y + 1)$
9. $(6y + 5)(2y - 1)$	10. $(x - 6)(x + 3)$	11. $(5x + 2)(x - 3)$	12. $(5A + 9)(5A - 9)$
13. $5(x - 3)(x - 4)$	14. $m^{13}n^{16}$	15. $\frac{1}{a^{16}b^{25}}$	16. $x = 4, 8$
18. $x = -\frac{1}{5} \pm \frac{\sqrt{11}}{5}$	19. Domain $\{2, 4, 5, 6\}$ Range $\{3, 5, 7, 8\}$ Not a function	20. $f(4) = 12$	21. $(2\frac{2}{3}, \infty)$
			22. 2 seconds
			23. $\frac{3x-2}{3x-4}$
24. $\frac{4(x-2)}{15}$	25. $\frac{x(5x+16)}{2(x-3)(x+1)}$	26. $\frac{x-2}{2x}$	27. The restricted values for the given expression are $-5, 6$ .
			28. $x = -\frac{6}{7}, 3$

Some websites to help you practice are:

IXL <https://www.ixl.com/math/algebra-1>

S.O.S Math <http://www.sosmath.com/algebra/algebra.html>

Khan Academy <https://www.khanacademy.org/math/algebra?t=practice>

Purplemath <http://www.purplemath.com/>