Diagnostic Review – Units 9 - 12

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 9-12 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 9 - 12 – Radical Functions, Systems of Linear Equations & Inequalities, Translations of Graphs, and Exponential & Logarithmic Functions

Topics for Unit 9-12 Diagnostic Test

1. Topic: Write an exponential expression as a radical expression
   - Example: $(10x)^{2/5}$
2. Topic: Simplify radical expressions
   - Example: $\sqrt{75x^6y^5}$
3. Topic: Add/subtract radical expression
   - Example: $4x\sqrt[3]{2x^2y} - 5\sqrt[3]{16x^5y} + \sqrt{4x^4y^2}$
4. Topic: Solve an equation involving one radical expression
   - Example: $\sqrt{4x-5} + 12 = 16$
5. Topic: Simplify radicals with negative radicands
   - Example: Simplify $\sqrt{-18}$
6. Topic: Add/subtract complex numbers
   - Example: $(6-10i) - (4+7i)$
7. Topic: Mult/Div complex numbers
   - Example: $(3-4i)(5+i)$
8. Topic: Determine whether a given ordered pair is a solution to a system of equations
   - Example: Is (3, -1) a solution to the system of equations?

     $$\begin{cases} 7x + 2y = 19 \\ x - 4y = 7 \end{cases}$$

9. Topic: Solve a system of equations by graphing
   - Example: Solve by graphing

     $y = 4x - 4$

     $y = -x + 6$

10. Topic: Solve a system of equations by substitution
    - Example: Solve by substitution

      $3x + 6y = -6$

      $x + y = 4$
11. Topic: Solve a system of equations by elimination
    - Example: Solve by elimination

      $8x + y = -9$

      $-4x + y = 3$
12. Topic: Solve a word problem by using a system of equations
    - Example: Isaiah weighs 20 pounds more than his friend, Geoff. If the sum of their weights is
      340 pounds, how much does each man weigh?
13. Topic: Solve an inequality, graph it, and state the solution in interval notation.
    - Example: Solve and graph $10x - 5 \geq 2x + 11$
14. Topic: Solve three-part inequalities, and state the answer in interval notation
    - Example: Solve $-4 < 3 - 4x \leq 5$
15. Topic: Solve a compound inequality, and state answer in interval notation
    - Example: Solve $6x - 3 > 9 \; and \; 2x + 23 > 5x + 5$
16. Topic: Solve absolute value equation.
    - Example: Solve $5|4x + 3| - 7 = 23$
17. Topic: Solve an absolute value inequality. Use interval notation.
    - Example: Solve $|2x + 5| + 4 \geq 13$
18. Topic: Solve a polynomial inequality. Use interval notation.
    - Example: Solve $x^2 - 4x \leq -14x - 24$
19. Topic: Graph a system of inequalities
    - Example: Graph $\begin{cases} y < x + 4 \\ 2x + 6y \geq 12 \end{cases}$
20. Topic: Graph a quadratic function
    - Example: Graph $f(x) = -(x - 3)^2 - 2$
21. Topic: Find the vertex of a quadratic function
    - Example: $f(x) = \frac{1}{2}x^2 + 2x + 4$
22. Topic: Graph an absolute value function
    - Example: Graph $g(x) = |x - 2| - 1$
23. Topic: Change an exponential equation into a logarithmic equation
    - Example: $5^{-3} = \frac{1}{125}$

24. Topic: Solve an exponential equation
    - Example: Solve $\sqrt{3} = 27^x$
25. Topic: Find the domain of a radical function. Use interval notation.
    - Example: $f(x) = \sqrt{3x - 12}$
26. Topic: Evaluate a logarithmic expression
    - Example: Evaluate $\log_4 64$
27. Topic: Form a composite function $(fog)(x)$
    - Example: Find $(fog)(x)\ if$
      $f(x) = x^2 + 5$ and $g(x) = \frac{1}{x}$

Answers:

Units 9 - 12 – Radical Functions, Systems of Linear Equations & Inequalities, Translations of Graphs, and Exponential & Logarithmic Functions

1. $\sqrt[5]{100x^2}$ or $\left(\sqrt[5]{10x}\right)^2$ or $\sqrt[5]{(10x)^2}$

2. $5x^3y^2\sqrt{3y}$

3. $-6x\sqrt[3]{2x^2y} + 2x^2y$

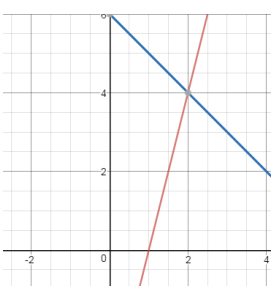
4. x = $\frac{21}{4}$

5. $3i\sqrt{2}$

6. $2 - 17i$

7. $19 - 17i$

8. Yes



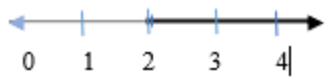
9. (2, 4)

10. (10, -6)

11. (-1, -1)

12. Geoff weighs 160 pounds, and Isaiah weighs 180 pounds

13. $[2, \infty)$



14. $\left[-\frac{1}{2}, \frac{7}{4}\right)$

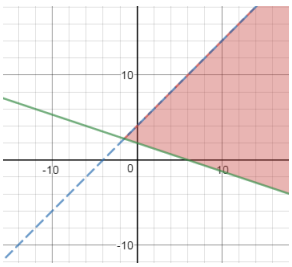
15. (2, 6)

16. $\left\{\frac{3}{4}, -\frac{9}{4}\right\}$

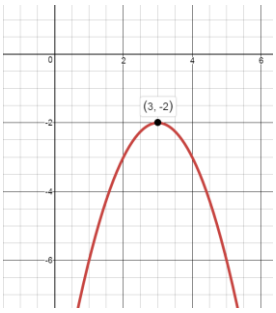
17. $(-\infty, -7] \cup [2, \infty)$

18. $[-6, -4]$

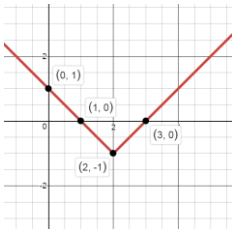
19.



20.



21. (-2, 2)

22. 

23. $\log_5\left(\frac{1}{125}\right) = -3$

24. $x = \frac{1}{6}$

25. $[4, \infty)$

26. 3

27. $(fog)(x) = \left(\frac{1}{x}\right)^2 + 5$ or $(fog)(x) = \frac{1}{x^2} + 5$

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/