

# Placement Test Review Units 9-12

Radical Functions, Systems of Linear Equations, Inequalities, Transformations of Graphs, and Exponential/Logarithmic Functions.

The Math Placement Test Sequence at the College of Western Idaho allows students to test out of Units in the developmental mathematics sequence. The Placement test for Units 9-12 has 15 questions. If you complete a level with a score of 70% or higher, you may attempt the next level in the sequence. You are limited to two attempts per level on the Placement Test. The two attempts must not be on the same day.

Sample problems (and associated **topics**):

1. Simplify  $\sqrt{75x^6y^5}$ . Assume that all expressions under radicals represent nonnegative numbers. (**Simplify Radical Expressions**).
2. Add or subtract  $4x\sqrt{2x^2y} - 5\sqrt{16x^5y} + \sqrt{4x^4y^2}$ . Simplify by collecting like radical terms, if possible. (**Add and Subtract Radical Expressions**).
3. Use radical notation to write the expression  $(10x)^{\frac{2}{5}}$ . Simplify if possible. Assume that all variables represent nonnegative quantities. (**Write an exponential expression as a radical expression**).
4. Use exponential notation to write the expression  $\sqrt[3]{-343x^6y^2}$ . Simplify if possible. (**Write a radical expression as an exponential expression**).
5. Subtract  $(6 - 10i) - (4 + 7i)$ . (**Adding and Subtracting Complex Numbers**).
6. Multiply  $(3 - 4i)(5 + i)$ . (**Multiplying and Dividing Complex Numbers**).
7. Divide. Write the final answer in  $a + bi$  form. (**Multiplying and Dividing Complex Numbers**).

$$\frac{2i}{5 - i}$$

8. Calculate  $i^{43}$ . (**Calculate Powers of Imaginary Numbers**).
9. Divide. Rationalize the denominator. (**Multiply and Divide Rational Expressions**).

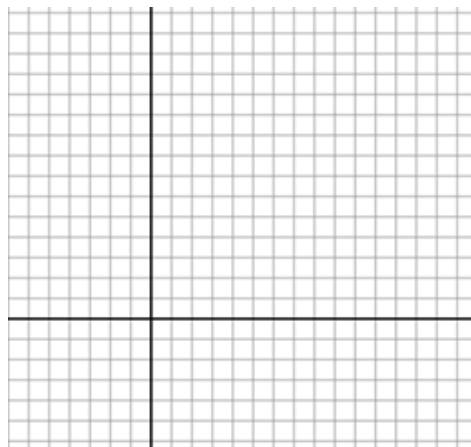
$$\frac{2}{\sqrt{6x}}$$

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10. Solve  $\sqrt{4x - 5} + 12 = 16$ . (**Solve a radical equation**).

11. Graph the equation  $y = \sqrt{x - 2} + 3$  and state its domain in interval notation. (**Graph a radical equation**).

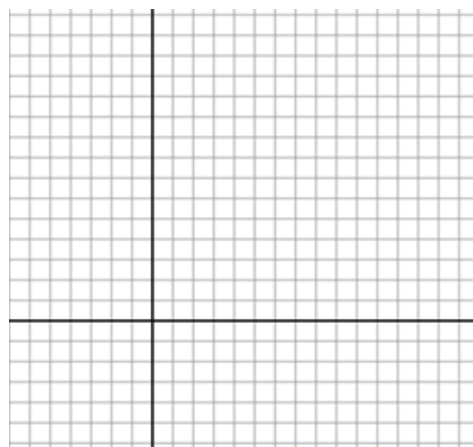


12. Is (3,-1) a solution to the system of equations? (**Determine if an Ordered Pair is a Solution to a System of Linear Equations**).

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

13. Solve the system of equations by graphing. (**Solve a system of equations by graphing**).

$$\begin{cases} y = 4x - 4 \\ y = -x + 6 \end{cases}$$



14. Solve by the substitution method. (**Solve a system of equations using substitution**).

$$\begin{cases} 3x + 6y = -6 \\ x + y = 4 \end{cases}$$

15. Solve by the elimination method. (**Solve a system of equations using elimination**).

$$\begin{cases} 2x + 3y = 20 \\ 7x + 2y = 53 \end{cases}$$

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16. Isaiah works two part-time jobs. His job at a movie theater pays \$15/hr, and his job at a grocery store pays \$17/hr. Last week, he worked a total of 22 hours and earned \$350. How many hours did he work at each job? **(Solve an application problem using a system of linear equations).**

17. Solve and graph the inequality  $10x - 5 \geq 2x + 11$ . State the solution in interval notation. **(Solve an inequality).**

18. Solve the compound inequality  $6x - 3 > 9$  and  $2x + 23 > 5x + 5$ . State the solution in interval notation. **(Solve a compound inequality).**

19. Solve the inequality  $-4 < 3 - 4x \leq 5$ . State the solution in interval notation. **(Solve three-part inequalities).**

20. Solve the quadratic inequality  $x^2 - 4x \leq -14x - 24$ . State the solution in interval notation. **(Solve a quadratic inequality).**

21. Solve the rational inequality. State the solution in interval notation. **(Solve a rational inequality).**

$$\frac{x^2 - 13x - 30}{x - 6} \geq 0$$

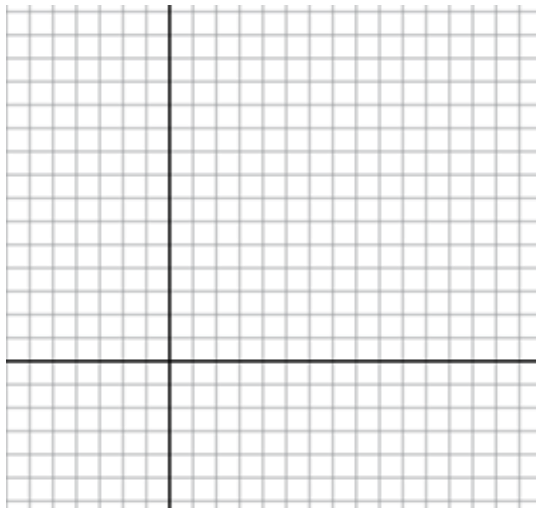
22. Solve the absolute value equation  $5|4x + 3| - 7 = 23$ . **(Solve an absolute value equation).**

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23. Graph the function. (**Graph an absolute value equation**).

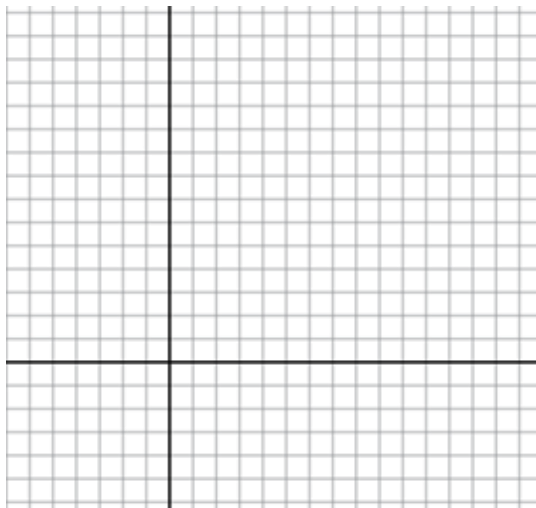
$$f(x) = |x + 4|$$



24. Solve the absolute value inequality  $|2x + 5| + 4 \geq 13$ . Write the answer in interval notation. (**Solve an absolute value inequality**).

25. Graph the system of inequalities. (**Graph a system of inequalities**).

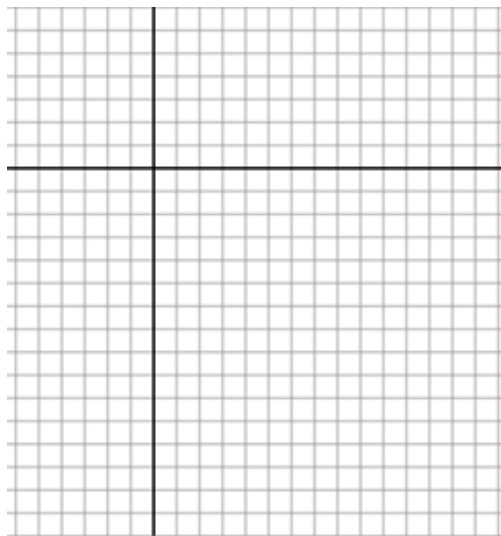
$$\begin{cases} y < x + 4 \\ 2x + 6y \geq 12 \end{cases}$$



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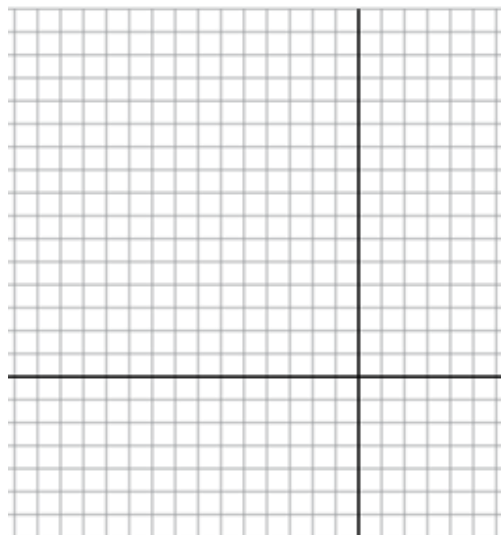
26. Graph the function  $g(x) = -(x - 3)^2 - 2$ .  
(Graph a function using transformations).



27. Find the vertex. (Find the vertex of a quadratic function).

$$h(x) = \frac{1}{2}x^2 + 2x + 4$$

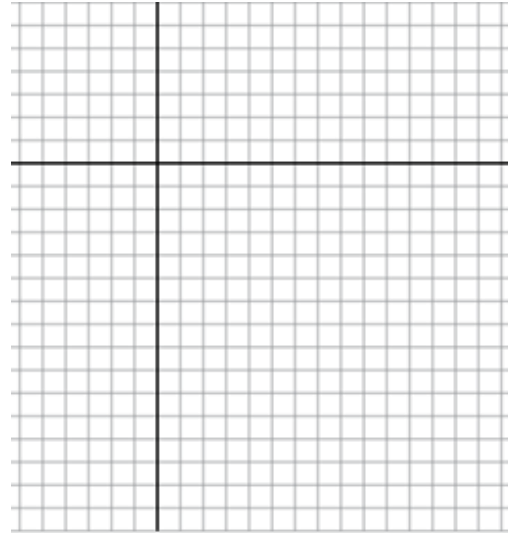
28. Graph the function  $j(x) = 2^x + 1$ . (Graph exponential equations).



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29. Graph the function  $p(x) = \log_3(x - 2)$  and state its domain in interval notation. (**Graph logarithmic equations**).



30. Solve the equation for  $x$ . (**Evaluate logarithmic expressions and equations**).

$$\log_4 64 = x$$

31. Change the exponential equation into a logarithmic equation. (**Convert between exponential and logarithmic equations**).

$$5^{-3} = \frac{1}{125}$$

32. Solve the equation for  $x$ . (**Solve exponential equations**).

$$\sqrt{3} = 27^x$$

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Answers:

1.  $5x^3y^2\sqrt{3y}$

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

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

4.  $(-343x^6y^2)^{\frac{1}{3}} = -7x^2y^{\frac{2}{3}}$

5.  $2 - 17i$

6.  $19 - 17i$

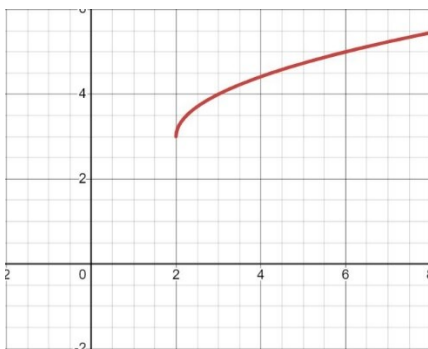
7.  $-\frac{1}{13} + \frac{5}{13}i$

8.  $-i$

9.  $\frac{\sqrt{6x}}{3x}$

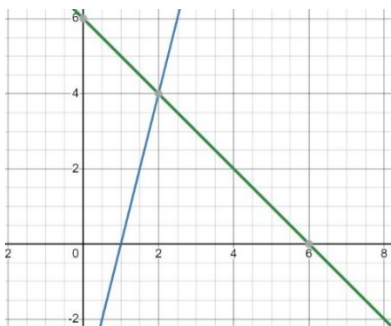
10.  $\frac{21}{4}$

11. Domain:  $[2, \infty)$



12. yes

13. (2,4)



14. (10, -6)

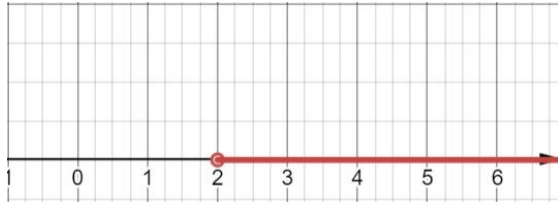
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15. (7,2)

16. 10 hours at the grocery store and 12 hours at the theater

17.  $[2, \infty)$



18. (2,6)

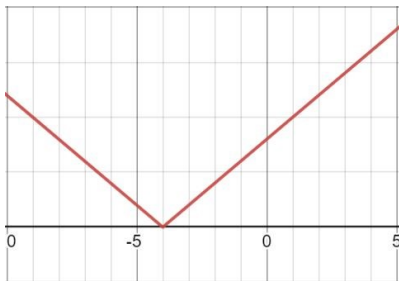
19.  $[-\frac{1}{2}, \frac{7}{4})$

20.  $[-6, -4]$

21.  $[-2, 6) \cup [15, \infty)$

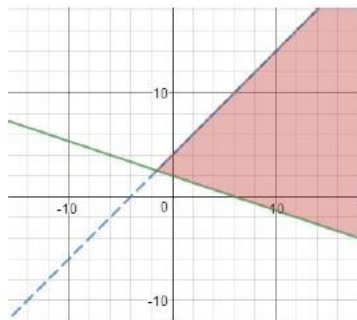
22.  $\{-\frac{9}{4}, \frac{3}{4}\}$

23.



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

25.

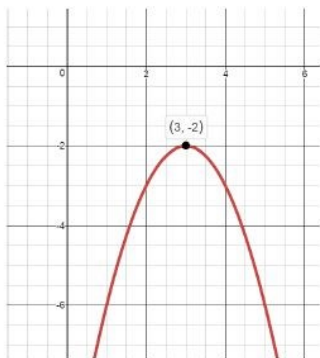




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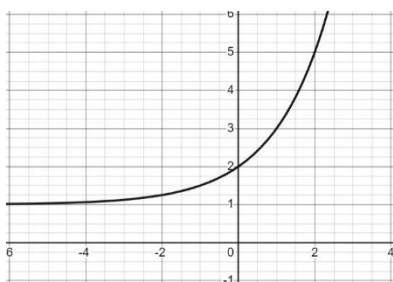
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26.

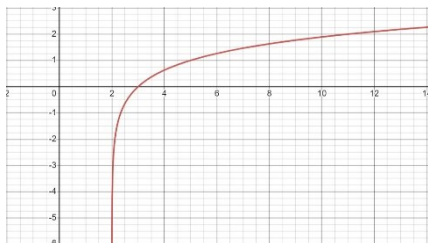


27. (-2,2)

28.



29. Domain:  $(2, \infty)$



30. 3

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

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

Some websites to help you practice include:

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/>