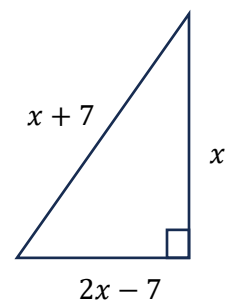# Placement Test Review Units 6-8

Factoring, Quadratic Equations, Rational Expressions & Equations, Relations & Functions, and Function Notation

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 6-8 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. Factor out the greatest common factor: $6x^4 - 18x^3 + 18x^2$. (**Factor out the greatest common factor from a polynomial.**)

2. Factor by grouping: $42x^3 - 30x^2 + 7x - 5$. (**Factor by grouping.**)

3. Factor the trinomial: $3s^2 - 10s + 8$. (**Factor trinomials of the form $x^2 + bx + c$.**)

4. Factor the polynomial: $7x^2 - 32xy - 15y^2$. (**Factor trinomials of the form $ax^2 + bxy + cy^2$.**)

5. Factor: $81c^2 - 25$. (**Factor the difference of two squares.**)

6. Factor: $a^3 + 64$. (**Factor the sum or difference of two cubes.**)

7. Solve: $a^2 + 14a + 45 = 0$. (**Solve quadratic equations by factoring.**)

8. Use the square root property to solve the equation: $(x + 8)^2 = 36$. (**Solve quadratic equations using the square root property.**)

9. Use the quadratic formula to solve the equation: $9x^2 - 7x - 5 = 0$? Give exact answers, using radicals as necessary. (**Solve quadratic equations using the quadratic formula.**)

10. A canopy has corner posts that are anchored by support lines. The length of each support line is 7 feet longer than the height of the post, and the support line is anchored at a distance that is 7 feet less than twice the height of the post. Determine the height of the corner post. (**Solve application problems using the Pythagorean Theorem.**)

11. Write the standard form of the equation of the circle with center (-2,5) and radius 4. (**Write the standard from of an equation of a circle.**)

12. Determine the domain and the range of the relation, and tell whether the relation is a function: {(15,4), (20,-8), (39,4), (15,3), (56,3)}. (**Find the domain and range of a relation. Determine if relations are functions.**)

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13. Given the function $f(x) = x^2 - x + 6$, find each of the following: $f(2)$, $f(-7)$, $f(0)$. (**Evaluate functions.**)

14. If an object is propelled from a height of 4 feet with an initial velocity of 96 feet per second, its height h is given by the equation $h = -16t^2 + 96t + 4$. At what time(s) will the object's height be 132 feet? (**Solve application problems involving functions.**)

15. Find all numbers for which the rational expression is undefined. (**Find restricted values for rational expressions.**)

$$\frac{2w + 9}{4w + 7}$$

16. Write the rational expression in lowest terms, (**Simplify rational expressions.**)

$$\frac{y^2 - 6y + 8}{y^2 + 4y - 12}$$

17. Add. (**Add and subtract rational expressions with unlike denominators.**)

$$\frac{2}{v + 8} + \frac{5}{7v}$$

18. Simplify. (**Simplify complex fractions.**)

$$\frac{\frac{1}{3} + \frac{7}{y}}{\frac{1}{5} - \frac{9}{y}}$$

19. Solve the equation: (**Solve rational equations.**)

$$\frac{20}{2x - 10} + \frac{1}{x - 5} = \frac{11}{2}$$

20. A person can copy final exams in 30 minutes using a new copy machine. Using an old copy machine, the same job takes 70 minutes. If both copy machines are used, how long will it take to copy the final exams? (**Solve problems involving rate of work.**)

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Answers:

1. $6x^2(x^2 - 3x + 3)$
2. $(6x^2 + 1)(7x - 5)$
3. $(3s - 4)(s - 2)$
4. $(7x + 3y)(x - 5y)$
5. $(9c + 5)(9c - 5)$
6. $(a + 4)(a^2 - 4a + 16)$
7. $a = -9, -5$
8. $x = -14, -2$
9. $\frac{7 \pm \sqrt{229}}{18}$
10. 10.5 feet
11. $(x + 2)^2 + (y - 5)^2 = 16$
12. Domain: {15, 20, 39, 56}, Range: {-8, 3, 4}. This is not a function.
13. $f(2) = 8, f(-7) = 62, f(0) = 6$
14. At $t = 2$ seconds and $t = 4$ seconds.
15. The number for which the rational expression is undefined is $-\frac{7}{4}$.
16. $\frac{y - 4}{y + 6}$
17. $\frac{19v + 40}{7v(v + 8)}$
18. $\frac{5(y + 21)}{3(y - 45)}$
19. $x = 7$
20. Working together, the two machines could finish the job in 21 minutes.

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/