Honors Precalculus

Math Maintenance Assignment

Welcome to Honors Precalculus! In order to ensure success in this course, there is a mandatory summer assignment packet. This packet is due on the first day of your math class whether it occurs in first or second semester. While it is best to not put the assignment off to the last minute, you want to complete the assignment close enough to the start of your course so that the ideas are fresh. There will be an assessment on this material the first week of class, after the packet has been reviewed.

All topics in this assignment should be a review. You should not only be familiar with the topics but you should know them well enough to be tested on them. This is material that will not be taught in the course. It is expected that you come in with a strong understanding of these topics. If you are unsure of how to do these problems, feel free to seek help with them. They are many websites with helpful videos including Khan Academy, You Tube, Math is fun.com, Purple Math.com., shmoop.com, and Algebrahelp.com.

Give us your best work while giving yourself the opportunity to get off to a great start! We look forward to having you in class!!

Sincerely,

The Math Department

1. Evaluate the expression for the given value of x.

   a. $-x^2 + x - 1$ $x = 2$

   b. $-x^2 + x - 1$ $x = -2$

2. Simplify each expression.

   a. $\dfrac{4^2 u^3 v^{-4}}{8u^{-2}v}$

   b. $\dfrac{2^{-4} r^{-1} s^{-3}}{4^{-2} r s^{-3}}$

3. Use the properties of radicals to simplify the expression.

   a. $\sqrt{18u}\sqrt{2u}$

   b. $\dfrac{\sqrt[3]{32n^4}}{\sqrt[3]{4n}}$

4. Simplify each expression.

   a. $\sqrt{50} - \sqrt{18}$

   b. $2\sqrt{32} + 3\sqrt{72}$

5. Rewrite the expression by rationalizing the denominator.

   a. $\dfrac{1}{3-\sqrt{2}}$

   b. $\dfrac{2}{\sqrt{5}+4}$

6. Simplify the expression.

   a. $(64)^{-2/3}$

   b. $(3x^{2/5})(2x^{1/2})$

7. Simplify.

   a. $8y - [2y^2 - (3y - 8)]$

   b. $\left(x + \dfrac{1}{x}\right)(x - 3)$

8. Find the product.

   a. $(4x - 3)^2$

   b. $(3\sqrt{2} + 5)(3\sqrt{2} - 5)$

9. Factor completely.

   a. $x^5 - x$

   b. $x(x - 5) + 4(x - 5)$

   c. $25x^2 - 81$

   d. $x^2 - 12x + 36$

   e. $x^3 - 125$

f. $8x^3 + 27$

g. $2x^2 + 21x + 10$

h. $x^3 - x^2 + 2x - 2$

10. For what values of x is the function undefined?

a. $\dfrac{1}{x-6}$

b. $\sqrt{x+3}$

c. $\dfrac{1}{\sqrt{x}}$

11. Write the rational expression in simplest form: $\dfrac{x^2-36}{(4x-24)}$

12. Perform the operation and simplify.

a. $\dfrac{x^2-4}{x^4-2x^2-8} \cdot \dfrac{x^2+2}{x^2}$

b. $\dfrac{4x-6}{(x-1)^2} \div \dfrac{2x^2-3x}{x^2+2x-3}$

c. $2x + \dfrac{3}{2(x-4)}$

d. $\dfrac{1}{x} - \dfrac{x-1}{x^2+1}$

13. Simplify the complex fraction.

a. $\dfrac{\left(\dfrac{1}{2x-3} - \dfrac{1}{2x+3}\right)}{\left(\dfrac{1}{2x} - \dfrac{1}{2x+3}\right)}$

b. $\dfrac{\left(\dfrac{2}{x} - 3\right)}{\left(1 - \dfrac{1}{x-1}\right)}$

14. Solve the equation.

a. $(x+4)^2 = 18$

b. $-2x^2 - 5x + 27 = 0$

c. $5x^4 - 12x^3 = 0$

d. $x^4 - 5x^2 + 6 = 0$

e. $\sqrt{3x-2} = 4 - x$

f. $|x-2| = 10$

g. $\dfrac{x+1}{3x-1} = \dfrac{x-2}{2x-3}$

h. $3 = 2 + \dfrac{2}{z+2}$

15. Solve the inequality. Then, graph the solution on a number line.

    a. $9x - 8 \leq 7x + 16$
    b. $-19 < 3x - 17 \leq 34$
    c. $|x + 4| < 1$

16. Use inequality notation to describe the set.

    a. q is nonnegative.

    b. y is at most 45.

    c. T is at least 11 and at most 34.

    d. k is less than 7 but no less than -2.

    e. The weight of a dog, W, is no more than 75 pounds.

17. You can rent a midsize car from Company A for $250 per week with unlimited mileage. A similar car can be rented from Company B for $150 per week plus 25 cents for each mile driven. How many miles must you drive in a week in order for the rental fee for Company B to be greater than for Company A?

18. Write the equation of the circle with:
    A. Center (2, -5) and radius 4
    B. Center (2,1) and passing through the point (2,5)
    C. Center at the origin and radius $\sqrt{5}$

19. Find the distance between the points (-4,-3) and (1,1). Then, find the midpoint between them.

20. A triangle is formed by connecting the points (-2,-2), (3,6), and (3,-2). Find the lengths of the sides of the triangle. What kind of triangle is formed? How do you know?

21. Write an equation of the line:
    A. Through (0,4) with m=-2
    B. Through the points (2,-5) and (-1,3)
    C. With y-intercept 3 and x-intercept -2
    D. Through the point (1,2) and parallel to the line y=3x-2
    E. Through the point (-1,-5) and perpendicular to the line y=-2x+4
    F. Vertical line through the point (2,-1)
    G. Horizontal line through the point (2,-1)

22. What is the discriminant of a quadratic? What does it tell you about the zeros of the polynomial?

23. What value of c would make $x^2 - 5x + c$ a perfect square?