



AP Precalculus

Summer Assignment – 2024

Mr. Beck

Dear AP Precalculus Students:

Welcome to AP Precalculus. We are excited to give students an opportunity to gain college credit and develop their mathematical skills with AP Precalculus. You can be assured that you will be challenged to deepen your mathematical understanding through this course and be prepared for more advanced college-level math, including AP Calculus and AP Statistics, after taking this course.

AP Precalculus requires the completion of a summer assignment that is due on the first day of school. It is vital that you complete this summer assignment and understand the skills needed for this course. This assignment is modeled on the published prerequisite skills from College Board:

- Proficiency with the skills and concepts related to linear and quadratic functions, including algebraic manipulation, solving equations, and solving inequalities
- Proficiency in manipulating algebraic expressions related to polynomial functions, including polynomial addition and multiplication, factoring quadratic trinomials, and using the quadratic formula
- Proficiency in solving right triangle problems involving trigonometry
- Proficiency in solving systems of equations in two and three variables
- Familiarity with piecewise-defined functions
- Familiarity with exponential functions and rules for exponents
- Familiarity with radicals (e.g., square roots, cube roots)
- Familiarity with complex numbers
- Familiarity with communicating and reasoning among graphical, numerical, analytical, and verbal representations of functions

There will be a quiz on the first day of school over the topics covered in the summer assignment. If you fail to complete all requirements of the summer assignment or if you earn below a 60% on the quiz, you will be asked to transfer into another math class.

I will be available over the summer to help students via e-mail: sbeck@tka.net. Please allow time for a response. I look forward to meeting you in August! Join the Deltamath class at <https://www.deltamath.com/students?code=M55F-V8L5> before using the QR code on the problem set to view examples, help videos, and additional practice.

Sincerely,

Mr. Beck

Work the following problems and be prepared for an assessment during the first week of class. Solutions are available at the QR code link at the end of the document.

1. Solve the following inequality *algebraically*.

$$x^2 + x - 6 > 0$$

2. Solve the following system of equations algebraically. If there are infinite solutions state “infinite solutions” and if there are no solutions state “no solutions.”

$$y = x^2 + 2x + 3$$

$$y = x + 5$$

3. Given $f(x) = -2x^2 + 5x + 10$, find $f(-10)$

4. Which quadratic equation has roots $-7 + 9i$ and $-7 - 9i$?

A. $x^2 - 14x + 140 = 0$

B. $x^2 - 14x + 130 = 0$

C. $x^2 + 14x + 130 = 0$

D. $x^2 + 14x + 140 = 0$

5. What is the discriminant of the quadratic equation $2x^2 + 5x - 7 = 0$?

A. -81 B. -31 C. 31 D. 81

6. Solve for the roots in *simplest form* using the quadratic formula:

$$x^2 - 59 = 8x$$

7. Solve for the roots in *simplest form* using the quadratic formula:

$$3x^2 - 12x = -27$$

8. Factor completely: $3x^3 + 3x^2 - 60x$

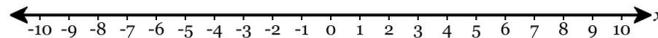
9. Factor the expression completely: $x^4 + 12x^2 + 35$

10. Factor completely:

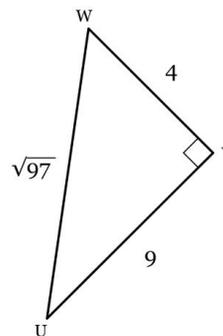
$$1 - y^9$$

11. Identify the real roots of the function below then use those (real) roots to create and fill in the sign table.

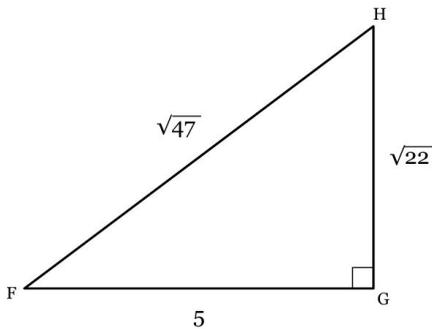
$$f(x) = -(x + 8)(2x + 5)$$



12. Find the exact value of $\sin W$ in simplest radical form.



13. Find the value of $\tan F$ rounded to the nearest hundredth, if necessary.



14. Solve the following system of equations for all three variables.

$$2x + 8y + z = -7$$

$$2x + 7y - z = -2$$

$$x + 7y - z = 4$$

- 15.

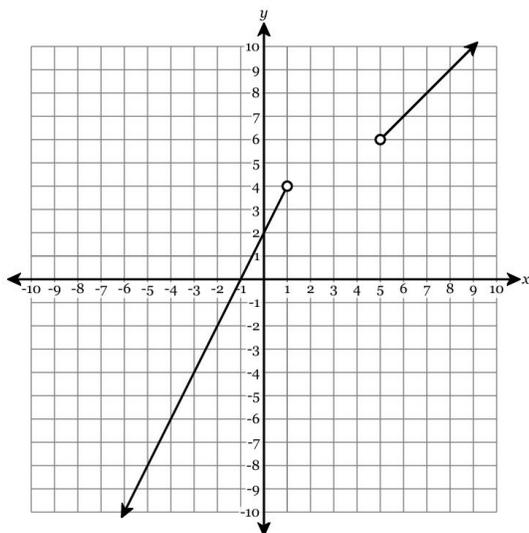
$$f(x) = \begin{cases} -\frac{5}{2}x - 3 & \text{for } x < -2 \\ -3 & \text{for } x = -2 \\ x + 7 & \text{for } x > -2 \end{cases}$$

Find $f(-2)$

16. Write the following absolute value function as a piecewise function.

$$f(x) = |2x - 6|$$

17. Express the function graphed on the axes below as a piecewise function.



18. Select the equivalent expression.

$$\left(\frac{a^{-8}}{a^7}\right)^{\frac{1}{20}}$$

- A. $\frac{1}{\sqrt[3]{a^4}}$ B. $\sqrt[4]{a^3}$ C. $\frac{1}{\sqrt[4]{a^3}}$ D. $\sqrt[3]{a^4}$

19. The expression $\sqrt[4]{3^5} \cdot \sqrt[3]{3^4}$ is equivalent to

- A. $3^{\frac{5}{3}}$ B. $9^{\frac{31}{12}}$ C. $3^{\frac{31}{12}}$ D. $9^{\frac{5}{3}}$

20. If the expression $6x^{-\frac{5}{2}}y^{-\frac{5}{4}}\sqrt{xy^2}$ is written in the form ax^by^c , then what is the product of a , b and c ?

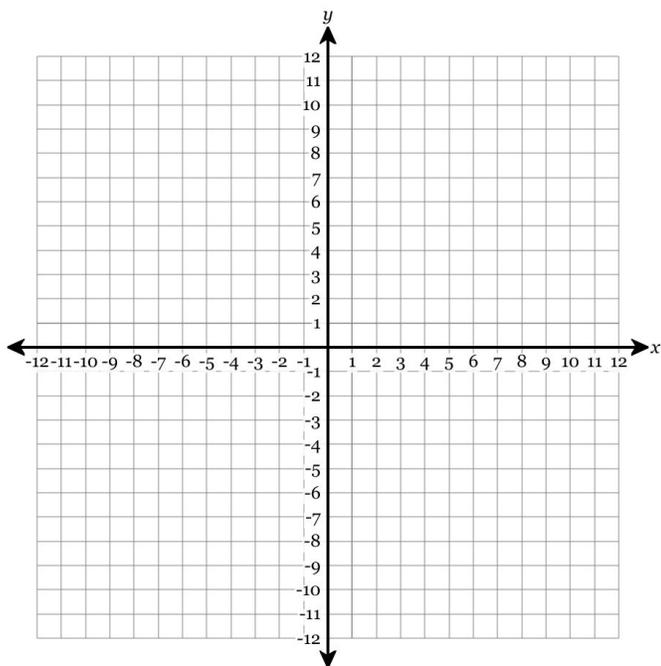
21. Solve for x :

$$81^3 = 27^{x+4}$$

22. Express the given expression without logs, in simplest form. Assume all variables represent positive values.

$$\log_9(9^{-6w})$$

23. Graph the function $f(x) = -3\left(\frac{1}{3}\right)^{x+6}$ on the axes below. You must plot the asymptote and any two points with integer coordinates.



24. Given $x > 0$, the expression $\sqrt[5]{x^{27}}$ is equivalent to

- A. $x^5\sqrt{x^3}$ B. $x^5\sqrt[5]{x^2}$
 C. $x^6\sqrt{x^2}$ D. $x^6\sqrt[5]{x^3}$

25. What are the roots of the equation $4x^2 - 36x + 85 = 0$ in simplest $a + bi$ form?

26. Simplify the expression to a + bi form:

$$(1 - 5i)(5 + 6i)$$



Scan the QR code or visit deltamath.com/qr/MJ9Q7-B78F2 to view full solutions.