

# AP Precalculus 2023-2024 Summer Assignment

**Congratulations!** You will be enrolled in AP Precalculus for the next school year. Before studying precalculus, all students should develop proficiency in topics typically found in the Algebra 1-Geometry-Algebra 2 content sequence. Students should have developed the following:

- Proficiency with the skills and concepts related to linear and quadratic functions, including algebra 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 system 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 representation of functions.

This packet will review the content above to ensure a fresh and smooth start to the year. **Show all work that leads you to each solution on separate sheets of paper.** You may use outside resources to HELP but all solutions should be your own. Packet will count as part of your first quarter grade. **Need help? Use this document for notes: <https://tinyurl.com/APPCFHS>**

**Write the equation of the line in point slope**

**form  $y - y_1 = m(x - x_1)$  using  $m = \frac{y_2 - y_1}{x_2 - x_1}$**

**given: (NOTES: P. 2)**

- (1) (0,1) and (1,2)
- (2) (-3,-1) and (5, -2).
- (3) Through (4,4) and parallel to  $y = \frac{9}{4}x$
- (4) Through (3,4) and perpendicular to  $y = -\frac{3}{5}x - 4$
- (5) Through (5,3) with slope=0.

**Isolate x.**

- (6)  $5 = 7x - 16$
- (7)  $2x - 3 = 5 - x$
- (8)  $\frac{1}{2}(x - 3) + x = 17 + 3(4 - x)$
- (9)  $\frac{5}{x} = \frac{2}{x-3}$
- (10)  $2x + 4 \geq 3$
- (11)  $-2x + 4 \geq 3$

**Factor the following polynomials. (NOTES: P. 5-6)**

- (12)  $x^2 - x - 20$
- (13)  $x^2 - 10x + 21$
- (14)  $x^2 + 10x + 16$
- (15)  $x^2 + 8x - 105$
- (16)  $4x^2 + 11x - 3$

$$(17) -2x^2 + 7x + 15$$

$$(18) 9x^2 - 16$$

$$(19) 3ab^2 + 12bc$$

**Solve for x by (a) factoring (b) quadratic formula**

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}. \text{ (NOTES: P. 7)}$$

$$(20) -x^2 - 3x - 2 = 0$$

$$(21) 2x^2 + 2x - 4 = 0$$

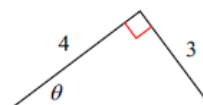
**Find the value of the trig function below.**

Answers should be written as a fraction. (NOTES: P. 2)

$$(22) \cos \theta$$

$$(23) \sin \theta$$

$$(24) \tan \theta$$



**Given  $f(x) = x^2 - 3x + 4$  and**

**$g(x) = x + 1$ , find the following:**

(NOTES: P. 4&9)

$$(25) f(3)$$

$$(26) f(a)$$

$$(27) f(-t)$$

$$(28) f(x) + g(x)$$

$$(29) f(x) - g(x)$$

$$(30) f(x)g(x)$$

$$(31) g(f(x))$$

Solve the following system of equations using substitution or elimination. (NOTES: P. 3-4)

$$(32) \begin{cases} y = -6x + 19 \\ 6x - y = 5 \end{cases}$$

$$(33) \begin{cases} -3x + 8y = -7 \\ -6x + 10y = -20 \end{cases}$$

$$(34) \begin{cases} x + y + z = 2 \\ 6x - 4y + 5z = 31 \\ 5x + 2y + 2z = 13 \end{cases}$$

State the domain of the functions below using interval notation. (NOTES: P. 8)

$$(35) h(x) = (x - 3)^2$$

$$(36) f(x) = \sqrt{x + 1}$$

$$(37) f(x) = \frac{1}{x-5}$$

Simplify the following expressions. Answers should contain only positive exponents. (NOTES: P. 4)

$$(38) (3y)2x^2y^2$$

$$(39) (3x^2y^3)^3$$

$$(40) (x^{-1}y^2)^4$$

$$(41) \frac{2x^4y^3}{4x^2}$$

Write each expression in radical form given exponential form or vice versa. (NOTES: P. 4)

$$(42) 4^{\frac{5}{3}}$$

$$(43) 2^{\frac{1}{2}}$$

$$(44) (\sqrt{5})^5$$

$$(45) \frac{1}{\sqrt[3]{7n}}$$

Simplify each radical expression. (NOTES: P. 1)

$$(46) \sqrt{384x^3yz^2}$$

$$(47) 2\sqrt[3]{81x^2z^3}$$

$$(48) -2\sqrt{12} + 3\sqrt{12}$$

$$(49) 2\sqrt{24} - \sqrt{12} - \sqrt{3}$$

$$(50) \sqrt{10}(4\sqrt{5} + \sqrt{6})$$

(a) Classify the following function as exponential growth or decay and (b) state the y-intercept. (NOTES: P. 9)

$$(51) y = 2(0.5)^x$$

$$(52) y = e^x + 3$$

Simplify the complex numbers. (NOTES: P. 1)

$$(53) (3 - 6i)^2$$

$$(54) (2 - i) - (8 - 2i)$$

$$(55) i(3i)(7 + 8i)$$

Rationalize the denominator. (NOTES: P. 9)

$$(56) \frac{2+4i}{5+4i}$$

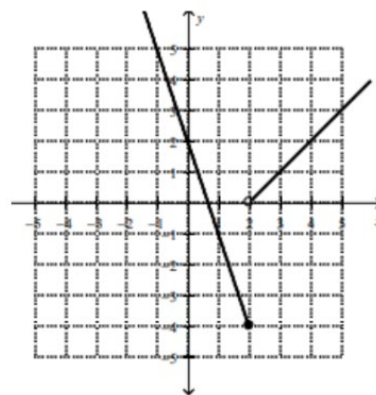
$$(57) \frac{2}{\sqrt{2}}$$

Find the values below for the given piecewise functions. (NOTES: P. 7)

$$(58) f(12) \text{ given}$$

$$f(x) = \begin{cases} -18x + 20, & x < 19 \\ -16x^2, & x \geq 19 \end{cases}$$

$$(59) f(1) \text{ from the graph below.}$$



$$(60) f(-4) \text{ from the graph below.}$$

