

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

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

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

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

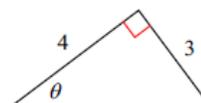
Find the value of the trig function below.

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)

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

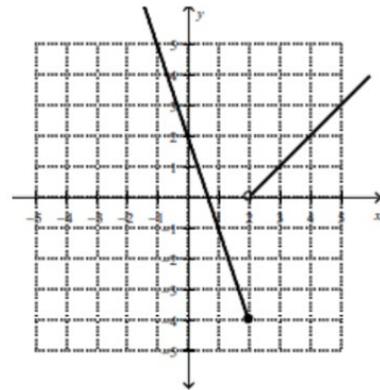
$$(57) \frac{2}{\sqrt{2}}$$

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

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

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

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



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

