

AP Precalculus Summer Assignment

Instructions: Carefully read and answer each of the following questions, showing all work and circling answers on separate lined notebook paper. Number each problem and organize work **CLEARLY!** If you do not know how to solve a problem or answer a question, look it up. There may be quizzes or tests on any of these skills during the first few days of school.

DUE: FIRST DAY OF SCHOOL!!

For problems #1 – 10: real-world formulas from different scientific fields are listed. For each equation, use basic algebra skills to rearrange and solve the equation for the specified variable

Problem #	Field	Formula Name	Equation	Solve for
1	Mathematics	Quadratic Formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	c
2	Biological Sciences	Body Mass Index (BMI)	$B = 703 \left(\frac{w}{h^2} \right)$	h
3	Biological Sciences	Enzyme Kinetics (reaction rate)	$v = V \left(\frac{S}{K + S} \right)$	K
4	Physics/Engineering	Acceleration	$a = \frac{v_f - v_i}{t}$	v_i
5	Physics/Engineering	Density	$\rho = \frac{m}{V}$	V
6	Physics/Engineering	Kinetic Energy	$K = \frac{1}{2}mv^2$	v
7	Space Science	Einstein's Cosmological Constant (Counterbalances the effect of gravity)	$\Delta = \frac{8\pi G\rho}{3c^2}$	G
8	Space Science	Planck-Einstein Relation (energy of a light wave)	$E = \frac{hc}{\lambda}$	λ
9	Statistics	Binomial Distribution Standard Deviation	$\sigma = \sqrt{npq}$	q
10	Statistics	Confidence Interval Error	$e = z \sqrt{\frac{p(1-p)}{n}}$	n

For questions #11 – 14, solve the given linear equation

11. $7(x + 3) = -2(x - 9) + 5$	12. $4t - (30 + 6t) = -39t$
13. $-2.1y + 9.7 = 8.1y + 23.98$	14. $6(3 + 2x) - 4x = 2(x - 6)$

For questions # 15 – 18: factor out the greatest common factor (GCF)

15. $-4x^5 - 20x^3 + 8x^2$	16. $2x^2y^7 + 16xy^8 - 4xy^2$
17. $24x^8 - 12x^5 + 80x$	18. $90x^7y^3 + 45x^5y^2 - 27x^2y + 18x$

For questions # 19 – 26: factor the given trinomial

19. $x^2 + 6x + 8$	20. $y^2 + 5y + 6$
21. $t^2 + 5t - 14$	22. $b^2 + 2b - 35$
23. $2x^2 - x - 15$	24. $3x^2 + 17x + 10$
25. $3x^2 - 13x + 4$	26. $6x^2 - x - 2$

For questions # 27 – 30: first factor out a GCF, then factor fully

27. $2a^2 + 14a + 20$	28. $3x^2 - 15x + 18$
29. $16x^4 + 40x^3 - 24x^2$	30. $-12t^5 + 4t^4 + 8t^3$

For questions # 31 and 32: first factor out a GCF (if any), then factor fully

31. $4t^2 - 81$	32. $5y^5 - 80y^3$
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For questions #33 – 36, convert the exponential equation into a logarithmic equation.

33. $27^t = 19$	34. $e^x = 37$
35. $3^2 = y$	36. $y^4 = 238$

#37. Consider the exponential function $f(x) = 2^x$. For this function, finish the table **and sketch its graph**.

x	-2	-1	0	1	2
$f(x)$					

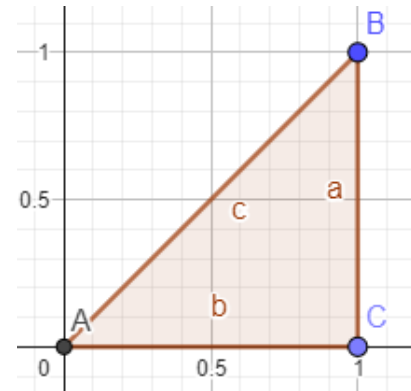
#38. Consider the logarithmic function $f(x) = \log_2(x)$. For this function, finish the table **and sketch its graph**.

x	0	$\frac{1}{2}$	1	2	4
$f(x)$					

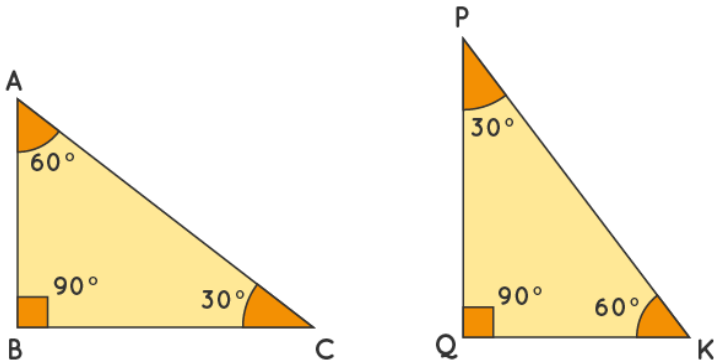
For questions #39 and #40, refer to the triangle to the right.

#39. Solve for the hypotenuse of the triangle.

#40. For the triangle, what are the measurements for each angle?
How do you know? Justify your answer!



For questions #41 - #46 refer to the following special right triangles. Note the given information below.



Given 1: segment AB = segment QK

Given 2: segment AB = 1 unit

Find the measurement of each segment.

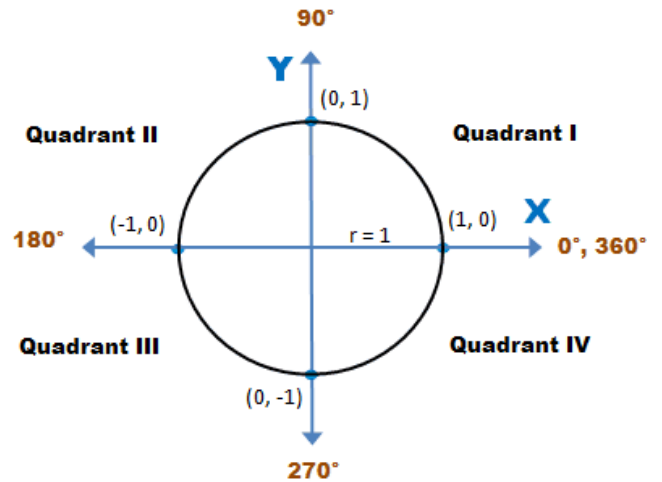
41. AC	42. AB
43. BC	44. QK
45. PK	46. PQ

For questions #47 and 48, consider the graph to the right.

On a unit circle, 180° is exactly 1π radians.

#47. How many radians are in 90° ?

#48. How many radians are in 360° ?



For questions #49 - 52: (a) use the conversion formula to convert the degrees to radians and (b) state which quadrant the angle is in.

Conversion Formula Degrees to Radians

$$(\text{Degrees}) \cdot \frac{\pi}{180^\circ}$$

49. 12°	50. 300°
51. 240°	52. 135°

53. Justifying Your Work: Select any **one** of the above math problems from this assignment. EXPLAIN, in words, how you solved the problem. Explain it as if you are explaining it to an algebra 1 student for the first time. Responses should be at least 2 – 3 full sentences and thoughtful! AP Precalculus has a focus on contextualizing, justifying, and explaining answers. Just “doing” the math is **not** enough.

#54. Self-Reflection: In a **full paragraph** (5 – 6 full sentences) reflect upon your experiences in algebra 1, geometry, and algebra 2. How do you feel about math? Do you have any concerns coming into this class? What do you think you need to do to succeed in this class? Are you excited for AP Precalculus? What do you think AP precalculus is about?