

Pre-Calculus Level 1

Summer Packet

This packet of exercises reflects skills that the Math Department considers essential for your success in PreCalculus!

In this packet you will find the following:

- Questions on material previously learned. (Some material you may not have seen due to adjustments made during virtual learning)
- Topics from Khan Academy referenced in the directions for each problem set. If you are having difficulty recalling how to do a specific type of problem, the Khan Academy videos are an excellent resource for re-teaching. Go to www.khanacademy.org, type in the phrase provided, and it will take you to a video(s) about the topic. Khan Academy also provides further practice on the topics that you can do for your own self-assessment.

Your Responsibility is to:

- **DO YOUR BEST** to complete all problems and show all necessary work **clearly and carefully**
- Turn in the packet on **THE FIRST DAY OF SCHOOL!** It will be collected and checked for completion on the first day of school.

You will be tested on the material within the first two weeks of school.

Have a great summer!

Pre-Calc Summer Packet

Simplify. Your answer should contain only positive exponents. (Khan Academy Topic: simplifying expressions with exponents)

1) $3u^{-3}v^4 \cdot 3u^{-1}v^0$

2) $3x^0 \cdot 4y^2$

3) $3a^{-2}b^{-3} \cdot 2a^3b^3$

4) $4xy^3 \cdot x^{-2} \cdot 2x^3y^4$

Find each product. (Khan Academy Topic: Multiplying Binomials)

5) $(-5r - 2)(-4r + 2)$

6) $(-2n + 1)(4n + 1)$

7) $(5v - 6)^2$

Simplify each difference. (Khan Academy Topic: Polynomial basics)

8) $(2b^4 + 8b^2 + 8b^3) - (3b^4 + 7b^2 - 5)$

9) $(2p^3 + 2 + 7p) - (p - 5p^3 + 1)$

Solve each equation by factoring. (Khan Academy Topic: Solving a quadratic by factoring)

10) $a^2 - 6a = 7$

11) $k^2 + k - 20 = 0$

Factor each completely. (Khan Academy Topic: Factoring quadratics)

12) $2n^2 - 200$

Simplify each expression. (Khan Academy Topic: "Adding and Subtracting Rational expressions" AND "Multiplying and Dividing Rational Expressions")

13) $\frac{4}{k+6} - \frac{3}{k-6}$

14) $\frac{2n}{2} + \frac{6n}{3n-4}$

15) $\frac{p^2 - p - 72}{8} \cdot \frac{8}{p^2 + 14p + 48}$

16) $\frac{18v - 27}{7} \div \frac{18v - 27}{v + 9}$

Simplify. (Khan Academy Topic: "Simplifying Radical Expressions")

17) $\frac{\sqrt{5x^3y}}{\sqrt{2x^4y^4}}$

18) $\frac{\sqrt{8x}}{\sqrt{10x}}$

19) $(7 - 6i) - (3 - 6i)$

20) $(5 + i)^2$

Solve each equation with the quadratic formula. (Khan Academy Topic: "How to Use the Quadratic Formula")

21) $3n^2 = -4n + 16$

22) $12x^2 + 8 = -12x$

Evaluate each expression. (Khan Academy Topic: "Logarithms")

23) $\log_{64} \frac{1}{4}$

24) $\log_2 \frac{1}{8}$

Condense each expression to a single logarithm. (Khan Academy Topic: "Operations with Logarithms")

25) $5 \log_6 x + 15 \log_6 y$

26) $4 \log_6 z + \frac{\log_6 x}{2}$

Expand each logarithm.

27) $\log_7 (xy^6)^4$

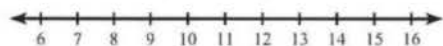
28) $\log_7 \left(\frac{x^5}{y} \right)^5$

Solve each equation. Remember to check for extraneous solutions. (Khan Academy Topic: "Equations with Square Roots and Cube Roots")

29) $\sqrt{2r+2} = \sqrt{3r-2}$

Solve each inequality and graph its solution.(Khan Academy Topic: "Graphing Inequalities 1 and 2")

30) $129 \geq -3(-3 - 5x)$



Solve each equation.(Khan Academy Topic: "Solving Absolute Value Equations")

31) $\left| \frac{x}{9} \right| = 3$

Perform the indicated operation.(Khan Academy Topic: "Introduction to Function Composition")

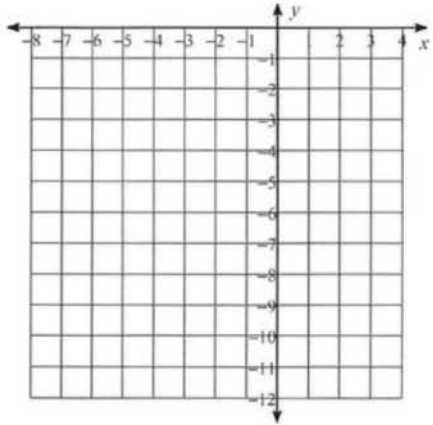
32) $f(n) = 3n - 1$
 $g(n) = -3n^2 - n$
Find $(f \circ g)(n)$

Find the inverse of each function.(Khan Academy Topic: "Inverse Functions")

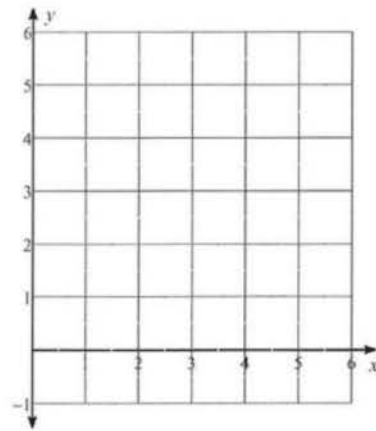
33) $g(x) = 4x$

Sketch the graph of each function. (Khan Academy Topic: "Quadratics and shifts")

34) $y = -2x^2 - 4x - 5$



35) $y = \frac{1}{2}(x - 2)^2 + 2$



Solve each equation. Remember to check for extraneous solutions. Show your work.

36) $\frac{x - 6}{x^2} = \frac{1}{x} - \frac{4}{x}$

37) $\frac{2}{n^2 + 5n} = \frac{1}{n + 5} + \frac{1}{n^2 + 5n}$

38) $\frac{5}{3b^3} = \frac{b - 6}{6b^2} - \frac{b^2 + 4b - 12}{6b^3}$

39) $\frac{1}{p + 1} - \frac{p - 2}{p + 2} = \frac{1}{p^2 + 3p + 2}$