

Summer Math Packet for students entering HONORS PRECALCULUS

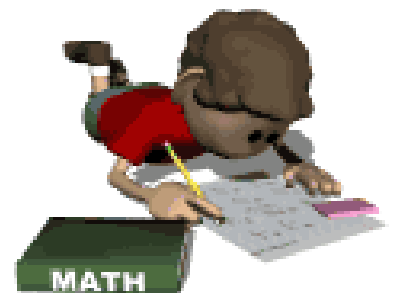
Name: _____

The problems in this packet are designed to help you review topics from previous mathematics courses that are important to your success in Honors PreCalculus.

Do all the problems on your own, making sure to show your work on separate paper to explain how you determined your answer. You may use words, symbols, or both in your work, but you must show work to receive full credit.

Bring your finished packet with you to your Honors PreCalculus class on the first day of school. You will be assessed on these skills during the first week of school as part of your 1st quarter grade.

Enjoy your summer! ☺ We look forward to seeing you in August. If you have any questions, please contact the mathematics Resource Teacher at [Laura D Goetz@mcpsmd.org](mailto:Laura_D_Goetz@mcpsmd.org) .



NO CALCULATORS FOR # 1 – 27 all

For questions 1 through 8, use the following functions: $f(x) = x - 3$ $g(x) = 2x - 8$ $h(x) = x^2 - 2$

Evaluate:

1. $f(g(3))$
2. $h(f(-7))$

Perform the following operations.

3. $f(x) + g(x)$
4. $f(x) - g(x)$
5. $f(x) \cdot g(x)$
6. $\frac{f(x)}{g(x)}$ What is the domain of the function $h(x) = \frac{f(x)}{g(x)}$?
7. $g(h(x))$
8. $h(f(x))$

9. If $f(x) = \sqrt{x+8}$ and $g(x) = 4x$,
 - a. What is the domain of $f(g(x))$?
 - b. What is the domain of $g(f(x))$?

For 10 - 13, graph each function in a standard window. State whether the function is one to one.

10. $f(x) = 2x - 5$

11. $f(x) = |x|$

12. $f(x) = -x^2$

13. $f(x) = x^3 - 9x$

14. If $f(x) = \frac{1}{3}x + 5$, determine the inverse function, $f^{-1}(x)$.
15. If $g(x) = 9x - 10$, determine the inverse function, $g^{-1}(x)$.
16. If $f(x) = -x^2$, on what interval of x-values is $f(x)$ decreasing?

17. What are the right and left end behaviors of the following functions?

a) $f(x) = x^3 - 4x - 8$

b) $f(x) = -x^4 - 4x^3 - 4$

Solve:

18. $x^2 - 3x + 11 = 0$

19. $3x^2 + x + 3 = 0$

20: Divide: $(2x^3 - 9x^2 - 8x + 15) \div (x - 5)$

21. **Fill in the blank with the number that completes the square.**

a) $x^2 - 6x + \underline{\hspace{2cm}}$

b) $x^2 + 10x + \underline{\hspace{2cm}}$

22. **Rewrite using rational exponential notation:**

a) $\sqrt[3]{17}$

b) $\sqrt[4]{x^3}$

23. **Rewrite using radical notation:**

a) $(-7)^{\frac{4}{3}}$

b) $x^{\frac{2}{5}}$

24. **Evaluate.**

a) $9^{\frac{1}{2}} \cdot 81^{\frac{3}{4}}$

b) $27^{\frac{2}{3}}$

c) $\left(\frac{3^4}{7^4}\right)^{\frac{1}{4}}$

d) $\left(2^{\frac{1}{5}} \cdot 2^{\frac{1}{2}}\right)^{10}$

25. **Graph each function and state its domain and range.**

a) $y = \sqrt{x-3} + 5$

b) $y = \sqrt[3]{x+5}$

26. **Perform the indicate operations. Simplify the result.**

a) $\frac{x^2 - 4}{x^2 - 3x - 10} \cdot \frac{x^2 - 25}{x - 2}$

b) $\frac{6}{x^2 - 2x - 15} \div \frac{12}{x - 5}$

c) $\frac{3x^2 - 48}{x^2 + 7x + 12} \div \frac{x^2 - 2x - 8}{x^2 + 5x + 6}$

d) $\frac{x}{x+5} + \frac{5}{x+4}$

e) $\frac{4x}{2x+1} - \frac{2x}{x-3}$

f) $\frac{2x+3}{x^2+4x+4} + \frac{5}{x+2}$

27. Solve each system of equations for x and y .

a) $x = 4y - 3$
 $x^2 - 4y^2 = 9$

b) $5x^2 + y^2 = 30$
 $9x^2 - y^2 = -16$

You MAY use a calculator for questions 28 – 31

For each set of data in questions 28 and 29 below,

- a) Determine the degree of the polynomial that models the data.
b) Use the regression feature of your calculator to write a function that models the data.

28.

x	1	2	3	4	5
$f(x)$	5	14	37	80	149

29.

x	0	1	2	3	4
$f(x)$	3	6	11	18	27

30. An arrow is shot from a height of 32 feet with an initial velocity of 56 ft/sec. The equation of the height $h(t)$ (in feet) of the arrow at time t (in seconds) is $h(t) = -16t^2 + 56t + 32$.

- a) After how many seconds will the arrow hit the ground?
b) How many feet in the air will the arrow be at $t = 1.5$ seconds?
c) What is the maximum height, in feet, that the arrow will reach?

31. Sam throws a ball up from the top of a building. The table below shows the height of the ball above the ground.

Time (sec) x	Height (ft) $f(x)$
0	400
1	434
2	436
3	406

- a) Write a polynomial function that best models the data.
b) How high is the ball after 4 seconds?
c) When does the ball hit the ground?