Name _____

2026-2027
Honors Calculus
Summer Assignment

- **ALL WORK SHOULD BE COMPLETED IN THIS PACKET.**
- **EVERY ANSWER SHOULD BE CIRCLED.**
- **No FINAL ANSWERS WITHOUT SUPPORTING WORK WILL BE ACCEPTED AND MAY BE REQUIRED TO BE RESUBMITIED.**
- **PLEASE BE SURE TO USE NOTES FROM THE PREVIOUS YEARS AS WELL EDUCATIONAL RESOURCES SUCH AS KHAN ACADEMY**
- **WORKING WITH A TUTOR ON THESE EXACT PROBLEMS IS NOT PERMITIED.**
- **PHOTOMATH and any similar websites are NOT PERMITIED.**
- **THIS ASSIGNMENT WILL BE HANDED IN ON THE FIRST DAY OF CLASS AND WILL COUNT AS YOUR FIRST ASSIGNMENT.**

1. If $f(x)=x^2+1$, $g(x)=3x-5$ and $h(x)=\begin{cases}\sqrt{x+1}, & x\geq -1\\ 2x+7, & x<-1\end{cases}$ then find:

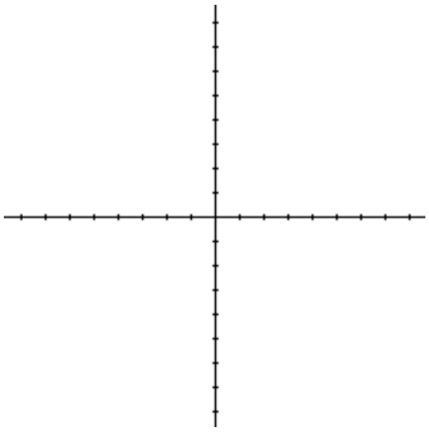
A. $f(a+2)$

B. $(f\cdot g)(x)$

C. $h(8)$

D. $(g\circ f)(x)$

2. Graph $-2x+5y-6=0$ on the coordinate axes below.



3. Find the equation of the line passing through the points $P(7,2)$ and $Q(1,-7)$.

Slope-intercept Form: _____ Point-slope Form: _____

4. **A.** Write the equation of a line with *undefined slope* passing through $(7, 11)$.

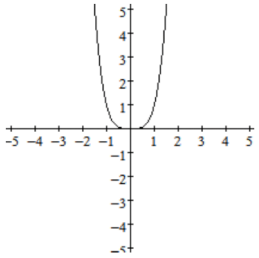
B. Write the equation of a line with *slope equal 0* and passing through $(3, -5)$.

5. Use any convenient method to solve the system. $\begin{cases} 7x - y = 9 \\ 2x + 3y = 19 \end{cases}$

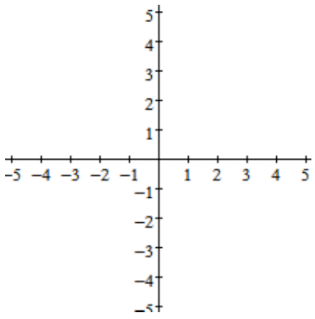
6. Find the slope of the line which connects the point (b, 3b) to the point (3b, 6b). [Note: b≠0.]

7. The graph of $y = 2\sin\left(3x - \frac{\pi}{2}\right)$ has an amplitude of _____, a period of _____, and a phase shift of _____ to the _____ (left/right) when compared to the graph of y = sinx.

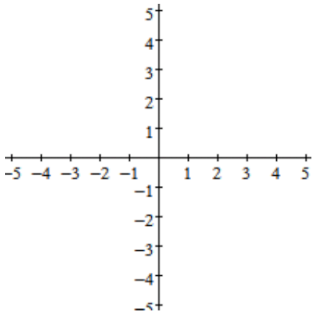
8. The graph of a certain *"parent function"* $y = f(x)$ is shown below. Sketch the graph of each of the *transformed* functions in **A – C.**



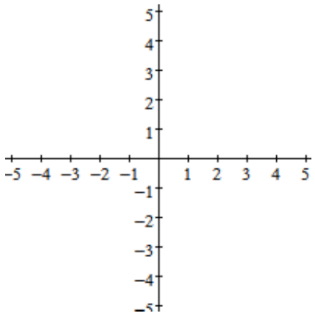
A. $y = f(x) - 3$



B. $y = f(x+1)$



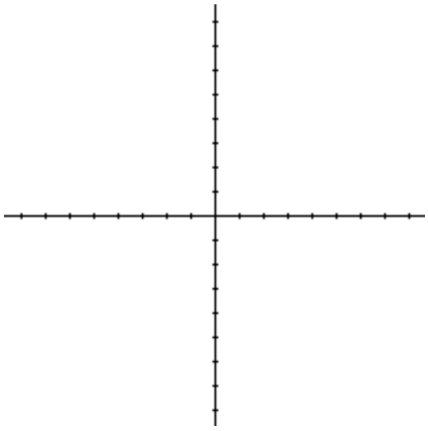
C. $y = -2f(x)$



9. Describe the *"end behavior"* for the function $f(x) = x^3 - 6x^2 + 9x - 7$.

10. If $f(x) = lnx$ and $g(x) = e^{x+1}$, find $f(g(2)) - g(f(e))$.

11. For the following rational function $y = \dfrac{2x^2 + x - 6}{x^2 - 9}$ find the equations of the *vertical and horizontal asymptotes*, the location of any *holes* in the graph. Use you calculator to graph this function and copy the results below, showing any *asymptotes* as dotted lines.

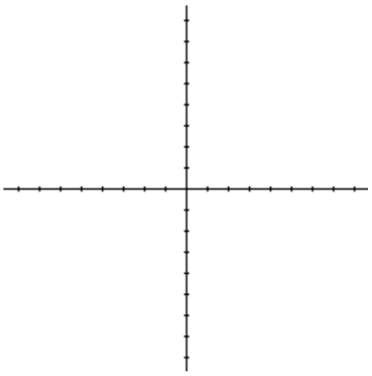


12. Given the function, f(x), evaluate f(-1), f(0), f(2) and f(4)

$$f(x) = \begin{cases} x^2 - 2 & \text{if } x < 2 \\ 4 + |x - 5| & \text{if } x \geq 2 \end{cases}$$

13. Find a **cubic** equation that has –3 and $1-2i$ as roots.

14. Sketch a graph of a *fourth degree* equation with *exactly two* different real roots.



15. If $f(x) = g^{-1}(x)$ and $g(x) = \dfrac{2x}{x-1}$, find $f(5)$.

16. Solve for x: $e^{2x+1} - 3 = 0$

17. Use *synthetic division* to divide $(3x^4 - 5x^2 + 6x - 5)$ by $(x + 3)$. Write your answer in the space provided



18. Solve $x^4 - 5x^2 - 10x - 6 = 0$ for *all* its roots.



19. Solve: $\frac{3x-4}{4} - 3 = \frac{4x-5}{3}$

20. Solve: $\frac{2}{x+2}+\frac{x^2}{x^2-4}=\frac{1}{x-2}$

21. Solve over the *real numbers*: $x-\sqrt{x+10}=2$

22. A linear function f(x) is parallel to the line $y=\frac{4}{5}x-7$ and passes through the point (-5, 0). What is f (-6)?

23. Suppose $0°\le\theta\le 90°$ and $\sin(\theta)=\frac{4}{5}$. Find:

A. $\tan(\theta)$ **B.** $\cos(\theta)$

24. The terminal side of $\angle\theta$ passes through the point $(-5, 12)$. Find the following in *fraction form*.

A. $\sin(\theta)$ **B.** $\sec(\theta)$

25. **Without** using your calculator find each of the following in *simple radical form*:

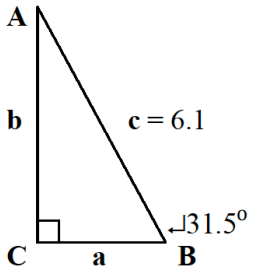
A. $\sin(60°)$

B. $\tan\left(\frac{\pi}{2}\right)$

C. $\cos(135°)$

D. $\tan\left(\frac{2\pi}{3}\right)$

26. For the triangle shown, $\angle B = 31.5^{o}$ and side $c = 6.1$

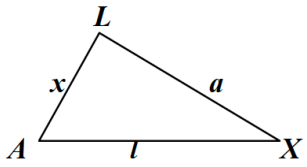


A. Find $\angle A$, accurate to one decimal place.

B. Find side *b* accurate to *two significant digits.*

C. Find side *a* accurate to *two significant digits.*

27. In *triangle LAX*, $x = 12, l = 15,$ *and* $m\angle A = 68^{\circ}$. Find side ***a*** accurate to one decimal place.



28. The quadratic function g(x) has a vertex at (-5, 0) and y-intercept of (0, -5). What is g(1)?

29. Simplify the expression $\dfrac{x^3 + 125}{x + 5}$ and then evaluate the resulting expression for x = -5.

30. Find $x^2 - y^2$ given that x + y = 7 and x – y = 3.

31. Express $\sqrt[3]{64s^9t^{15}}$ in simplified form, using *rational exponents*.

32. Simplify; leave your answer with rational exponents: $(5ac)^{\frac{1}{3}}\left(a^2c^3\right)^{\frac{1}{3}}$

33. Simplify; leave your answer with rational exponents: $\left(x^{10}y^{2}\right)^{\frac{1}{5}}y^{\frac{3}{5}}$

34. Given $f(x)=x^{2}+5$ find $\dfrac{f(3+h)-f(3)}{h}$ $(h\neq 0)$.

35. State the domain of $w(x)=\dfrac{2x+1}{x+3}$.

36. **A.** Write $3^{4}=81$ in *logarithmic form*.

B. Write $\log_{2}\left(\dfrac{1}{8}\right)=-3$ in *exponential form*.

C. Evaluate $\log_{\frac{1}{3}}(27)$

D. Evaluate $\log_{5}\left(5^{\pi}\right)$

E. Evaluate $7^{\log_{7}(17.234)}$

37. Solve: $3\log_7(4)+4\log_7(3)=\log_7(x)$

38. [5] Solve $\log_5(x-3)+\log_5(x+3)=\log_5(16)$

39. Evaluate $81^{\frac{3}{4}}+8^{\frac{2}{3}}+125^{\frac{1}{3}}$

40. The graphs of $g(x) = \ln(x + 3)$ and $f(x)=\dfrac{2x+1}{x+3}$ have the same vertical asymptote. What is it?

41. [5] Solve using logarithms. $7^{(x-2)} = 5^{(3-x)}$. (Answer accurate to three decimal places.)

42. Solve $400 = 2e^{0.032t}$. (Answer accurate to three decimal places.)

43. *Evaluate g(x) = 5sinx + cos(2x) for* $x = \frac{\pi}{2}$.

44. If the perimeter of a rectangle is 68 and the width is 10, find the length of a diagonal.

45. Use long division to find the quotient. $\frac{3x^4 - 5x^2 + 3}{x + 2}$

46. Find the horizontal asymptote (if any) of the rational functions.

a) $f(x) = \dfrac{5}{x^2 + 8}$

c) $f(x) = \dfrac{x^2 + 3x + 2}{3 - x^2}$

b) $f(x) = \dfrac{x^2 + 7x - 1}{x - 1}$

47.

Factor each completely.

1) $x^2 - 3x - 40$

2) $4m^2 - 12m - 160$

3) $5b^2 + 34b + 45$

4) $12x^2 + 6x - 60$

5) $50n^2 - 105n - 135$

6) $10n^2 + 19n - 56$

48. Simplify the following expression: $\dfrac{\cos\theta}{1+\sin\theta} + \tan\theta$

49. θ is an acute angle and sin θ and cos θ are given. Use identities to find the indicated value.

$$\sin\theta = \frac{\sqrt{7}}{4},\ \cos\theta = \frac{3}{4}.\quad \text{Find } \sec\theta.$$

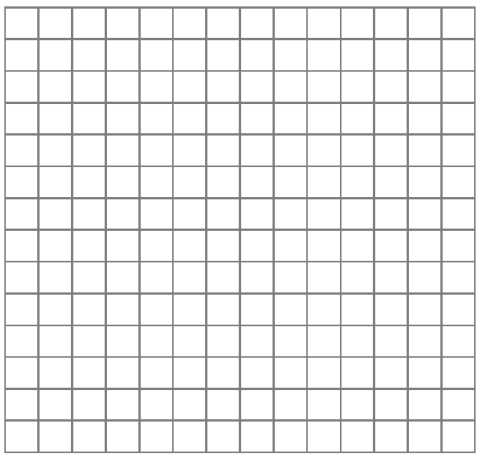
50. Solve the equation: $\sqrt{26-11x} = 4-x$

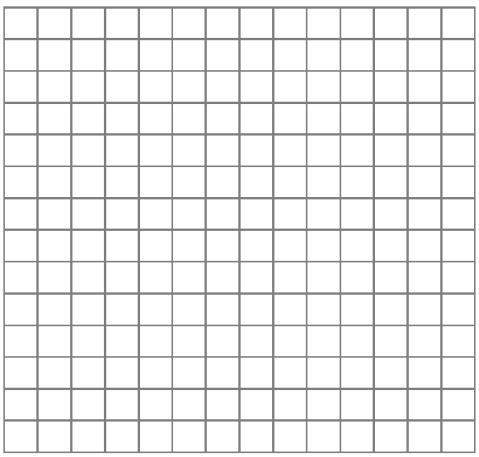
51. A rectangular soccer field has an area of 500 square meters. If the width of the field is x meters, write an expression for the perimeter of the field in terms of x

52. Graph each piecewise function.

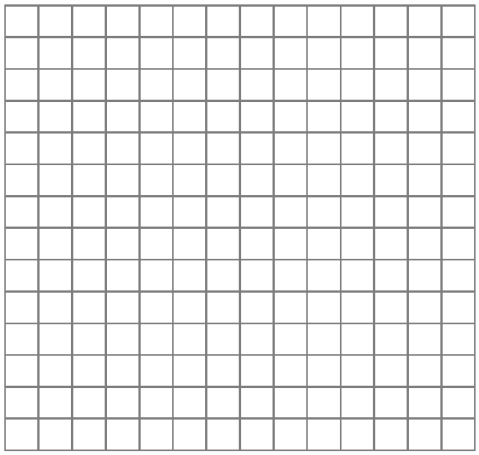
$$h(x) = \begin{cases} x^2 + 2 & \text{if } x < 0 \\ x + 2 & \text{if } x \geq 0 \end{cases}$$

$$h(x) = \begin{cases} x^3 - 1 & \text{if } x < 0 \\ |x - 3| - 4 & \text{if } x \geq 0 \end{cases}$$





$$h(x) = \begin{cases} (x + 10)^2 - 4 & \text{if } x < -8 \\ x + 4 & \text{if } -8 \leq x < -4 \\ \sqrt{x + 4} & \text{if } x \geq -4 \end{cases}$$



53. Solve each of the following inequalities:

$$1 \leq 2x - 9 < 9$$

$$|5x - 4| > 6$$

$$|2x + 3| < 8$$

$$x^2 = 7x - 10$$

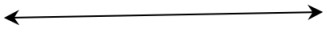
54. Solve $4 - 8sinx = 0$ for x values $0 \leq x < 2\pi$

55. Solve $2cos^2x + cosx - 1 = 0$ for x values $0 \leq x < 2\pi$

56. Convert to radians: $300°$

57. Suppose that $cosx = -\frac{3}{7}$ and that $sinx > 0$, find the values of the other five trig functions of x

58. Complete the following table:

Interval	Set	Graph
$(-\infty, -1]$		
	$\{x: -3 < x < 3\}$	