AP CALCULUS AB SUMMER ASSIGNMENT Name_____

I Abide by the Honor Code.

Due: Submit via file upload to Canvas by Tuesday, August 13, 2024 at 7:30am. This assignment is a test grade.

ALL WORK MUST BE SHOWN NEATLY ON A SEPARATE DOCUMENT. CALCULATORS MAY BE USED ONLY ON THE EXERCISES THAT REQUIRE ROUNDING. CIRCLE ANSWERS. LATE PAPERS WILL BE PENALIZED.

1. Find an equation in point-slope form of the line that passes through the points (-2, 9) and (1, 7).

2. Describe the transformations that occur from $y = |x|$ to $y = -2|x - 1| + 3$.

3. Find all x-intercepts and y-intercepts of $x^2 + 8x + 3y^2 - 6y = 9$.

4. Determine the symmetry of $2xy + 3x^2 = 9$ with respect to each of the following. Write yes or no and justify your answer with work.
   a. X-axis
   b. Y-axis
   c. Origin

5. Find and simplify $\frac{f(a+h)-f(a)}{h}$ for $f(x) = 3x^2 + 4x$.

6. Given $f(x) = \sqrt{x+4}$, find f^{-1} and its domain.

7. For the functions *f* and *g* defined by $f(x) = 3x^2 + 5$ and $g(x) = 2x + 8$, find $g[f(x)]$.

8. Find the domain of $h(x) = \sqrt{6 - 5x}$.

9. Solve $9^{x-1} = 27^{x+2}$.

10. Find all real solutions to $x^4 - 13x^2 + 36 = 0$.

11. Use algebra to find the minimum value of the function $f(x) = 4x^2 - 3x - 5$. Give an exact value. Do not approximate.

12. Solve $\ln x = 1.935$ to the nearest thousandth.

13. Expand completely $\log_a \frac{a}{x^2\sqrt[3]{y^2}}$.

14. Solve $2300 = 4305e^{0.042t}$ for *t.* Round to the nearest thousandth.

15. Solve $\log_3 x + \log_3(x+2) = \log_3(x+12)$.

16. Let $f(x) = \frac{3x^2+5x+2}{9x^2-1}$. Find all asymptotes algebraically. Write "none" if the graph does not have that kind of asymptote.
    a. Vertical
    b. Horizontal
    c. Slant
    d. Determine algebraically all points (if any) at which the graph crosses any asymptotes.

17. The graph of $f(x) = k(x+c)^5(x-d)^4$
    a. Crosses the x-axis at
    b. Touches the x-axis at

18. Solve $2x^3 - 5x^2 + 3x > 0$.

19. Use the change of base formula to find $\log_5 21$ to the nearest thousandth.

20. Let $g(x) = \begin{cases} x^2 + 4 \; for \; x \leq -1 \\ x - 10 \; for -1 < x < 3 \\ 2x + 5 \; for \; x \geq 3 \end{cases}$. Evaluate:
    a. $g(5)$
    b. $g(-1)$
    c. $g(2)$

21. Determine the equation of the slant asymptote of $f(x) = \frac{x^3-2x^2}{x^2+1}$.

22. Find the exact values of the five remaining trigonometric functions if $\sin t = -\frac{3}{7}$ and t is in quadrant III.

23. Evaluate each of the following (credit will not be given for either a or b if the unit circle is used):
    a. $\sin\frac{3\pi}{4}$
    b. $\sec(-\frac{5\pi}{6})$
    c. $\tan\pi$

24. Solve for $0 \leq x \leq 2\pi$ (credit will not be given if the unit circle is used).
    a. $2\cos x - 1 = 0$
    b. $\sin 2x - \cos x = 0$

25. Use trigonometric identities to rewrite each expression in terms of a single trigonometric function.
    a. $(1+\sin x)(1-\sin x)$
    b. $\cos t\,(\sec t - \cos t)$

26. Find the equations for all asymptotes.
    a. $f(x) = \tan 3x$
    b. $g(x) = \csc 2x$

27. Evaluate each of the following (credit will not be given if the unit circle is used):
    a. $\sin^{-1}\left(\frac{1}{2}\right)$
    b. $\cos^{-1}\left(-\frac{1}{2}\right)$
    c. $\tan^{-1}(-1)$