A.P. Calculus Mini Exam #1 Name _____

No calculators may be used on this exam

I. Multiple Choice

_____ 1. If $f(x) = x^3 - 3x^2 - 2x + 5$ and $g(x) = 2$
Then $g(f(x)) =$
(A) $2x^3 - 6x^2 - 4x + 10$ (B) $2x^2 - 6x + 1$
(C) -6 (D) -3 (E) 2

_____ 2. The graph of the equation $xy = 99$ exhibits which of the following symmetries? There may be more than one answer -- give all that apply.
(A) x-axis (B) y-axis (C) Origin
(D) $y = x$ (E) No symmetry

_____ 3. Let $f(x)$ have an inverse function $g(x)$. Then $f(g(x))$ =
(A) 1 (B) x (C) $\frac{1}{x}$ (D) $f(x) \cdot g(x)$ (E) None of these

_____ 4. The domain of $f(x) = \frac{x-1}{x^2+1}$ is
(A) all $x \neq 1$ (B) all $x \neq 1, -1$ (C) all $x \neq -1$
(D) $x \geq 1$ (E) all reals

_____ 5. Determine the angle of inclination of $\sqrt{3}x + y = 2006$
(A) $-30°$ (B) $-60°$ (C) $30°$ (D) $120°$ (E) $150°$

_____ 6. The equation of all lines perpendicular to $3x + 5y = 8$ is:
(A) $3x - 5y = k$ (B) $3x + 5y = k$
(C) $5x - 3y = k$ (D) $5x + 3y = k$
(E) $y = \frac{3}{5}x + k$

_____ 7. Determine the range of the Sine function.
(A) $y \geq 0$ (B) $0 \leq y \leq 2\pi$ (C) $-\infty < y < +\infty$
(D) $-1 \leq y \leq 1$ (E) $-1 < y < 1$

_____ 8. Which of the following statements is true?

(A) $\log(A - B) = \log\left(\frac{A}{B}\right)$

(B) $\log\left(\frac{A}{B}\right) = \frac{\log A}{\log B}$

(C) $\log\left(\frac{A}{B}\right) = \log(A) - \log(B)$

(D) $\log(A - B) = \log(A) - \log(B)$

_____ 9. If a, b, and c represent the sides of a triangle, and h is the altitude to side b, $s = \frac{1}{2}(a+b+c)$, which of the following does ***not*** find the area of the triangle?

(A) $\sqrt{s(s-a)(s-b)(s-c)}$ (B) $\frac{1}{2}bh$

(C) $\frac{1}{2}bc\sin A$ (D) $\sqrt{a^2+b^2}$

_____ 10. Convert $\frac{2\pi}{5}$ radians to degrees:

(A) 36° (B) 40° (C) 72° (D) 450°

(E) None of the above

- -

II. Free Response. Show all work on your own paper

11. Divide $5x^3 + 26x^2 - 21x + 18$ by x + 6 .

12. Rewrite the function $f(x) = |x - 1| - 2$ in piecewise form without using absolute value symbols.

13. Transform the parametric equations to a Cartesian equation by eliminating the parameter.

x = 2 – 3t

y = 1 + 15t

14. Determine the *exact* value of $\cot\left(Cos^{-1}\left(-\frac{1}{2}\right)\right)$

15. Write an equation of a line that passes through the point (2, 6) and has a slope of –3.

16. If $\cos\theta = \frac{2}{3}$ and $0 < \theta < \frac{\pi}{2}$, Determine the value of $\cos(2\theta)$

17. If $\cos\theta = \frac{4}{5}$ and $\frac{3\pi}{2} < \theta < 2\pi$, Determine the exact values of the remaining trigonometric functions of θ.

18. Graph the function y = cos(x) for one period.

19. Graph the following on the coordinate axes:

$$|y| = |x-1|$$

20. Graph $f(x) = \begin{cases} x & \text{if } x < 0 \\ -x+1 & \text{if } 0 \le x \le 6 \\ -3 & \text{if } x > 6 \end{cases}$

Extra Credit: Name the three items that Mr. P believes are important in achieving success in A.P. Calculus: _____

_____

_____