Calculus CP
Summer Assignment

Name_____

Period_____

This packet is intended to provide you with an opportunity to review concepts learned in prior math classes that are essential for success in calculus. You must show work, where necessary, to receive full credit. You will NOT be allowed to use a calculator in class so you must be able to complete this packet without the aide a calculator. Please complete this packet on paper since we will be collecting it on the first day of class. It should *not* be completed in OneNote.

To help you with the packet, please use your notes from prior classes or the following sites as a good resource: Khan Academy, Purple Math, and YouTube. Sites which give you a worked-out answer, such as PhotoMath, are not aacceptable resources.

Points: 10 points

Due: September 5th, 2023

Part 1: Factoring

Directions: Factor completely.

1. $27x^3 + 64$

2. $5x + 21x^2 - 6$

3. $4x^4 + 52x^2 + 144$

4. $4n^2 - 1$

5. $b^2 - 2b - 12$

6. $27m^3 + 27m^2 - 210m$

7. $-9x^2 - 95x - 50$

Part 2: Domain

Directions: Determine the domain of each function. Write answer in interval notation.

8. $f(x) = -x^3 + 8x - 11$
9. $g(x) = \sqrt{5 - 2x}$
10. $f(x) = \sqrt[3]{7x + 4}$
11. $f(x) = \frac{5}{4x-3}$

Part 3: Rational Expressions

Directions: Determine the domain, vertical asymptotes and holes, and horizontal asymptotes.

12. $g(x) = \frac{2x-5}{3x+4}$

13. $f(x) = \frac{-x+4}{x^2-16}$

Directions: Write as a rational expression.

14. $\frac{4-\frac{3}{5y}}{\frac{6}{5y}+2y}$

15. $\frac{\frac{2}{x+3}+1}{7x-4}$

Part 4: Rules of Exponents

Directions: Simplify. All answers should be written with positive exponents only with no fractional exponents in the denominator.

16. $\frac{a^{-4}b^{0}}{(a^{4}b^{3})^{3}(a^{-3}b^{2})}$

17. $\left(\frac{(xy^{-3})(x^{5}y)}{x^{6}y^{2}}\right)^{-3}$

18. $m^{-\frac{5}{4}}m^{\frac{1}{2}}\left(m^{\frac{7}{4}}\right)^{-2}$

Part 5: Equations

Directions: Solve each equation.

19. $3(2x-1)+2x=5+4(6+2x)$

20. $x-10=-3x^2$

21. $\frac{4}{x^{1/3}}-2=0$

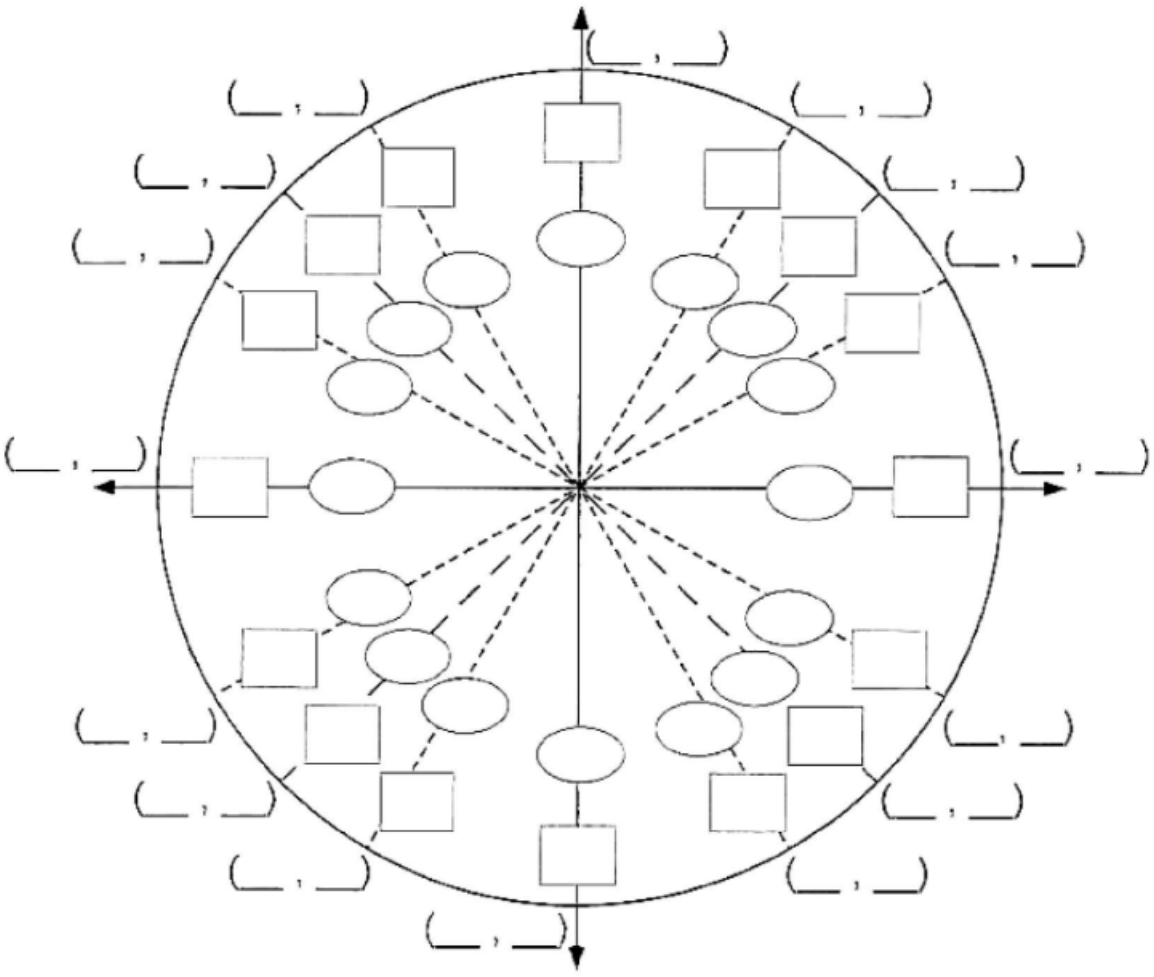
22. $-7x+5x^2=-1$

23. $25x^2-16=0$

Part 6: Trigonometry

Directions: Fill-in the Unit Circle with degree measurements, radian measurements, and coordinates with the 16 special values.

Unit Circle



NOTE: These values MUST be memorized for class this year.

Directions: Find the exact value of each trigonometric function.

24. $\sin\left(\frac{2\pi}{3}\right)$

25. $\cos\left(\frac{7\pi}{4}\right)$

26. $\csc\left(\frac{11\pi}{6}\right)$

27. $\tan(3\pi)$

28. $\tan\left(-\frac{5\pi}{6}\right)$

29. $\cot\left(\frac{13\pi}{3}\right)$

30. $\sin\left(-\frac{17\pi}{4}\right)$

31. $\sin^2\left(\frac{5\pi}{4}\right)\cos\left(\frac{\pi}{3}\right)$

32. $\sin\left(\frac{16\pi}{3}\right) - \cos^3\left(-\frac{11\pi}{3}\right)$

Answer Key

Part 1: Factoring

1. $(3x+4)(9x^2-12x+16)$
2. $(7x-3)(3x+2)$
3. $4(x^2+9)(x^2+4)$
4. $(2n-1)(2n+1)$
5. $prime$
6. $3m(3m-7)(3m+10)$
7. $-(9x+5)(x+10)$

Part 2: Domain

8. Domain: $(-\infty,\infty)$
9. Domain: $\left(-\infty,\frac{5}{2}\right]$
10. Domain: $(-\infty,\infty)$
11. Domain: $\left(-\infty,\frac{3}{4}\right)\cup\left(\frac{3}{4},\infty\right)$

Part 3: Rational Expressions

12. Domain: $\left(-\infty,-\frac{4}{3}\right)\cup\left(-\frac{4}{3},\infty\right)$

    Vertical Asymptote(s): $x=-\frac{4}{3}$

    Hole(s): none

    Horizontal Asymptote(s): $y=\frac{2}{3}$

13. Domain: $(-\infty,-4)\cup(-4,4)\cup(4,\infty)$

    Vertical Asymptote(s): $x=-4$

    Hole(s): $\left(4,-\frac{1}{8}\right)$

    Horizontal Asymptote(s): $y=0$

14. $\frac{20y-3}{6+10y^2}$
15. $\frac{x+5}{7x^2+17x-12}$

Part 4: Rules of Exponents

16. $\frac{1}{a^{13}b^{11}}$
17. y^{12}
18. $\frac{m^{\frac{3}{4}}}{m^5}$

Part 5: Equations

19. $no\ solution$
20. $x=-2,\frac{5}{3}$
21. $x=8$
22. $x=\frac{7\pm\sqrt{29}}{10}$
23. $x=\pm\frac{4}{5}$

Part 6: Trigonometry

24. $\frac{\sqrt{3}}{2}$
25. $\frac{\sqrt{2}}{2}$
26. -2
27. 0
28. $\frac{\sqrt{3}}{3}$
29. $\frac{\sqrt{3}}{3}$
30. $-\frac{\sqrt{2}}{2}$
31. $\frac{1}{4}$
32. $\frac{-4\sqrt{3}-1}{8}$