

GRADING		
Problem	Possible	Earned
1	12	
2	9	
3	12	
4	12	
5	10	
6	12	
7	8	
8	10	
9	10	
10	8	
11	7	
12	14	
13	20	
14	15	
15	15	
16	15	
17	12	
Total	201	

Name: _____

Instructor: _____

Time: _____

Please check to make sure that your copy of the examination has one cover page and all eleven (11) pages with problems numbered 1-17.

Work in a neat and well-organized manner. Show your work on all problems. Indicate your answers clearly.

Only an approved (TI-30) scientific calculator will be permitted on the final examination for this course; however, calculators or computers with graphic, word-processing, symbolic manipulation or programming capabilities will not be allowed for this exam. The use of books, notes or other resource materials will not be permitted on the final examination.

All cell phones and electronic devices are PROHIBITED during the final examination.

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[12] 1. Find the exact values of

a) $\sin\frac{4\pi}{3}$

b) $\cot\frac{5\pi}{4}$

c) $\tan\left(\arcsin\frac{2}{5}\right)$

[9] 2. Find the range of

a) $y = 1 + \cos x$

b) $y = \arcsin x$

c) $y = 4\cos x$

[12]3. Suppose $\sin \theta = \frac{2x}{3}$ for some acute angle θ . Express in terms of x .

a) $\cos \theta$

b) $\sin 2\theta$

[12]4. Solve each equation on the interval $0 \leq \theta < 2\pi$.

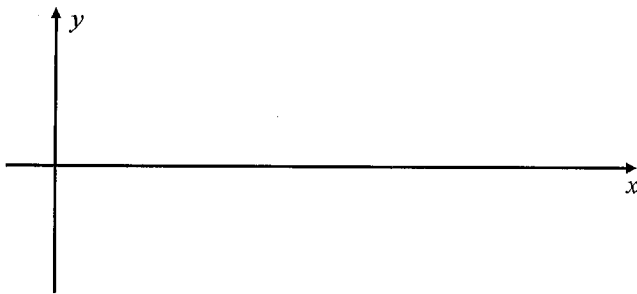
a) $\cos \theta = -\frac{1}{2}$

b) $\sin 2\theta = 0$

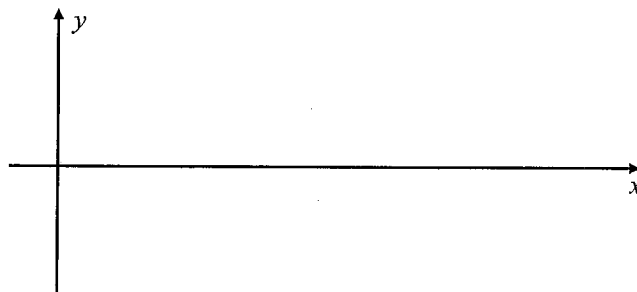
[10] 5. Find **all** solutions to $\cos 2\theta = \frac{1}{2}$.

[12] 6. Graph each function over one complete period.
Clearly label each graph pointing out x -intercepts and maximum and minimum points.

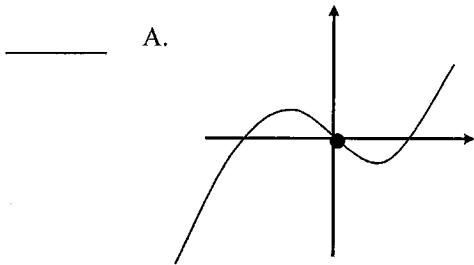
a) $y = 3\sin 2x$



b) $y = \cos\left(x - \frac{\pi}{4}\right)$



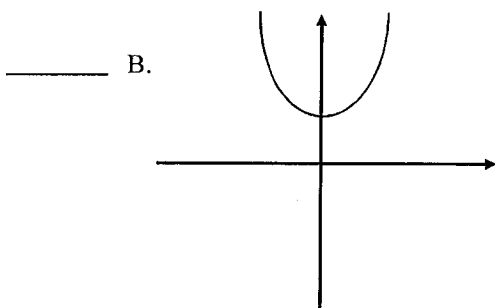
[8] 7. a) Match each graph with the appropriate equation. (Not all equations will match with a graph.)



1) $y = x^3 + x^2$

2) $y = x^3 - x$

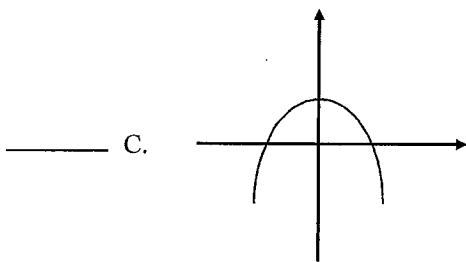
3) $y = 4 - x^2$



4) $y = x^2 - 4$

5) $y = -4 - x^2$

6) $y = x^4 - 4x^3 + 6x^2 - 4x + 1$

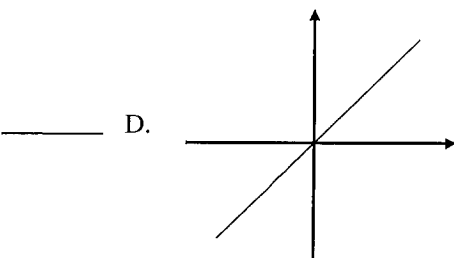


7) $y = x^4 - 2x^2 + 1$

8) $y = x^3 - x^2$

9) $y = x^4 + 1$

10) $y = x$



[10]8. Establish the identity:

a) $\sin^2 \theta \cos^2 \theta = \frac{1}{4}(1 - \cos^2 2\theta)$

b) $\frac{\cos^2 \theta}{1 + \sin \theta} = 1 - \sin \theta$

[10] 9. Decompose into partial fractions and determine the coefficients.

a) $\frac{-2x}{x^2 + 9x + 18}$

b) $\frac{3x^2 + 10x - 1}{x^3 + x^2 - 2x}$

[8]10. Factor completely

a) $x^4 - 7x^2 - 144$

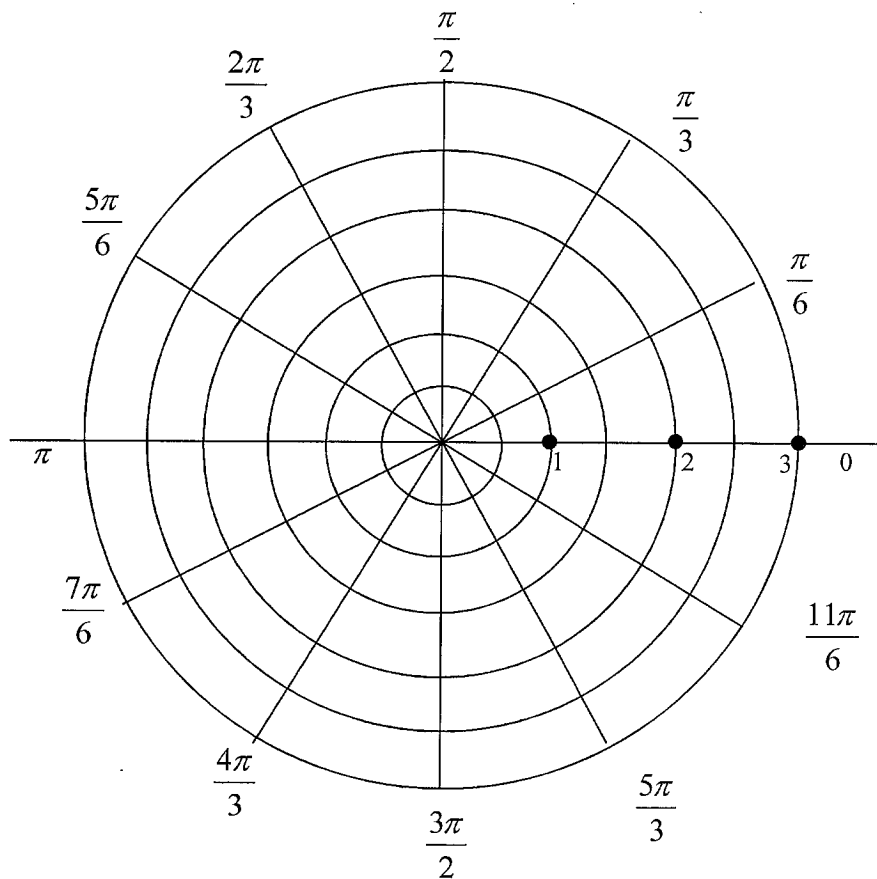
b) $x^4 + 64x$

[7] 11. Simplify $\frac{x^2}{\sqrt{1-x^2}}$ if $x = \sin \theta$.

[14] 12. Consider $r = 1$ and $r = 1 + \sin \theta$.

a) Find all points of intersection. Only an algebraic solution will receive full credit.

b) Graph $r = 1$ and $r = 1 + \sin \theta$ on the same graph. Label points of intersection.



[20] 13. Compute the value of each of the following limits. In the case that the limit is not a finite number, determine whether it is $+\infty$ or $-\infty$.

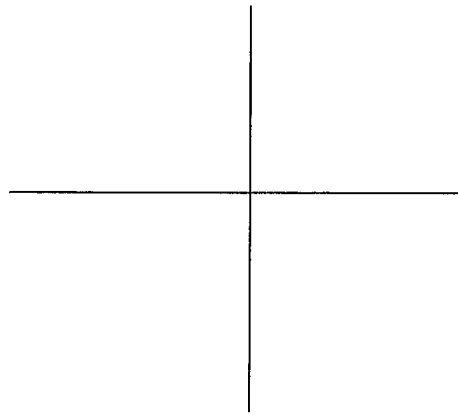
a)
$$\lim_{x \rightarrow 1} \frac{x^2 + x - 2}{x^2 - 4x + 3}$$

b)
$$\lim_{x \rightarrow -1} \frac{\sqrt{10+x} - 3}{x+1}$$

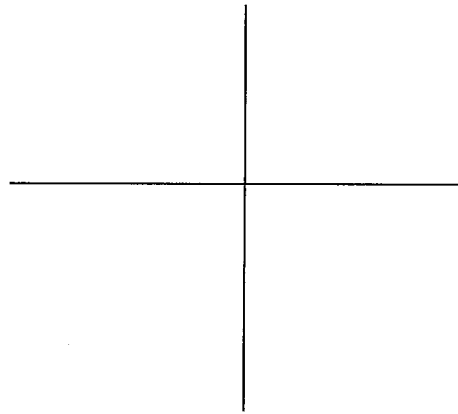
c)
$$\lim_{x \rightarrow 0} \frac{\frac{1}{x+4} - \frac{1}{4}}{x-4}$$

[15] 14. Graph (You must label at least 3 points and/or any asymptotes, if applicable)

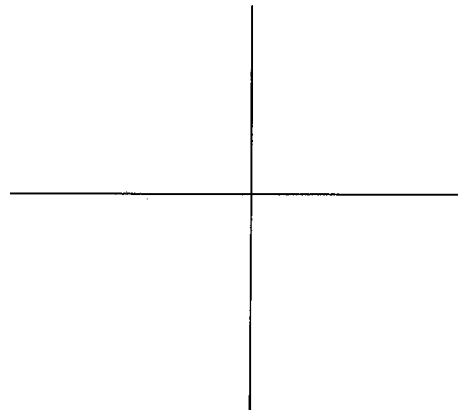
a) $y = x^2 - 2x + 3$



b) $y = e^{2x}$



c) $y = \ln(4 - x)$



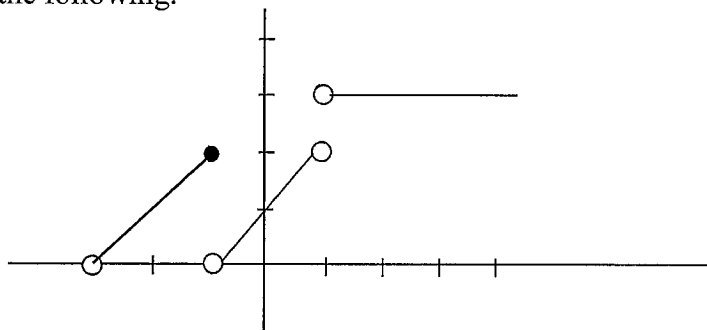
[15] 15. Find the domain of the following functions.

a) $y = \frac{x^2 - 9}{x + 3}$

b) $y = \tan x$

c) $y = \frac{1}{2 - e^x}$

[15] 16. Evaluate the following.



a) $\lim_{x \rightarrow -1^+} f(x)$

b) $\lim_{x \rightarrow -1} f(x)$

c) $\lim_{x \rightarrow 2^+} f(x)$

d) $\lim_{x \rightarrow -1^-} f(x)$

e) $\lim_{x \rightarrow 0} f(x)$

[12] 17. Suppose $f(x) = x^2 - 4x + 6$.

a) Find $f(x+h)$.

b) Compute $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$.