

**MATH 7A - FINAL EXAM
SAMPLE**

NAME: _____

SHOW ALL WORK NEATLY AND CLEARLY MARK YOUR ANSWERS.

This test is in two parts. On part one, you may not use a calculator; on part two, a calculator is necessary. When you complete part one, you turn it in and get part two. Once you have turned in part one, you may not go back to it.

PART ONE - NO CALCULATORS ALLOWED

Find each of the following:

(a) $\sin(60^\circ) =$ _____

(b) $\csc(3\pi/4) =$ _____

(c) $\csc(225^\circ) =$ _____

(d) $\tan^{-1}(-\sqrt{3}) =$ _____

(e) $\cos^{-1}(\sqrt{3}/2) =$ _____

(f) $\cos(11\pi/6) =$ _____

(g) $\sin^{-1}\pi =$ _____

(h) $\cot 90^\circ =$ _____

(i) $\tan^{-1}(-1) =$ _____

(j) $\sin^{-1}(1) =$ _____

(k) $\cos(150^\circ) =$ _____

(l) $\cot(3\pi) =$ _____

(m) $\sin(9\pi/4) =$ _____

(n) $\cot(3\pi/4) =$ _____

(o) $\tan(-225^\circ) =$ _____

(p) $\sec(315^\circ) =$ _____

(q) $\cos^2\theta + \sin^2\theta =$ _____

MATH7A - FINAL EXAM PART TWO
SAMPLE

NAME: _____

SHOW ALL WORK NEATLY. Exact answers expected unless otherwise specified. Units should be given where appropriate.

Fill in the blanks with the most appropriate answer.

(1) The slope of a line perpendicular to $3x-4y=2$ is _____

(2) In which quadrant(s), if any, is $\cos\theta > 0$ and $\cot\theta < 0$ _____.

(3) The slant asymptote for the graph of $f(x) = \frac{2x^2 - 4x + 5}{x - 3}$ is _____

(4) $\ln e^3 =$ _____

(5) The range of $f(x) = \sin^{-1}(x)$ is _____

(6) $\frac{\pi}{8}$ radians = _____ degrees

(7) $\ln\left(\sqrt[3]{\frac{xy^2}{z^3}}\right)$ can be expanded as _____

(8) Factor completely: $2x^3-54$ _____

(9) The domain of $f(x) = \cos^{-1}(x)$ is _____

(10) $\log_7\left(\frac{1}{49}\right) =$ _____

(11) Find exactly $\cos(\tan^{-1}(-3/5))$

(12) Find the equation of the line passing through the vertex of $y=3x^2-4x+1$ and through the x-intercept of $y=\log_3(x-1)$

(13) Given $f(x) = x|x|$. Rewrite f as a piecewise defined function (remove the bars).

(14) Find domain. Answer in interval notation.

(a) $f(x) = \frac{\log_2(x-1)}{x-5}$

(b) $g(x) = \sqrt{\frac{x-3}{x+1}}$

(15) Given $\cos \theta = \frac{-1}{4}$ and θ is in Quadrant III, find:

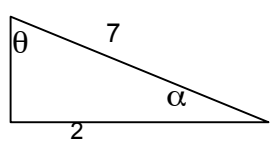
(a) $\sin \theta =$ _____

(b) $\tan \theta$ _____

(16) Given $f(x) = 3x^2 - x$, find $\frac{f(x+h) - f(x)}{h}$

(17) A man wishes to put a fence around a rectangular field and then subdivide the field into three smaller rectangular plots by placing two fences parallel to one of the sides. If he can only afford 40 yards of fencing, what is the maximum area he can enclose?

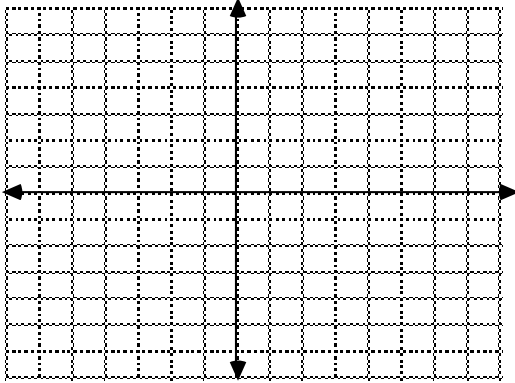
(18) Given the following right triangle, find $\cos \alpha$, $\tan \theta$ exactly and approximate the value of θ and α



$\cos \alpha =$ _____ $\tan \theta =$ _____ $\theta =$ _____ approx, $\alpha =$ _____ approx .

- (19) Graph $f(x) = \begin{cases} 3 & \text{if } x \leq -2 \\ 2x+1 & \text{if } -2 < x \leq 0 \\ \log_2 x & \text{if } x > 0 \end{cases}$ Show scale. Label coordinates of 2 points.

(9 points)



(20) Simplify:

(a) $\frac{x^{-1} + y^{-2}}{x^{-2} - y^{-1}}$

(b) $\frac{x(8x-1)(x^2+5)^{-\frac{1}{2}} - 8(x^2+5)^{\frac{1}{2}}}{(8x-1)^2}$

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- (21) Find the equation of the line which passes through the x intercept of $f(x) = \log_3(x-1)$ and is perpendicular to the line $3x - y = 8$.

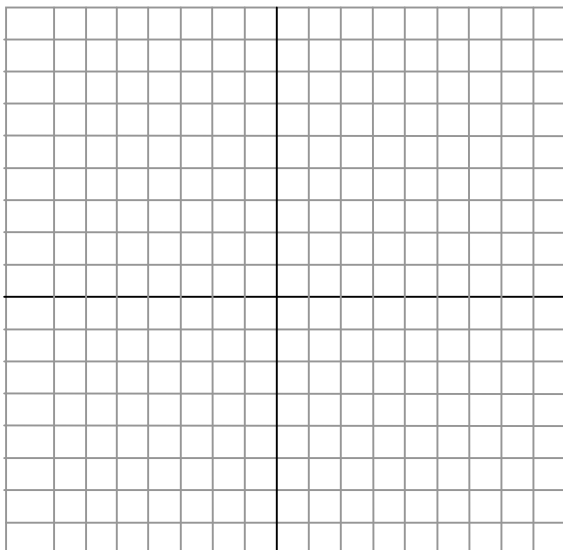
(15 points)

(answer wrong on solns)

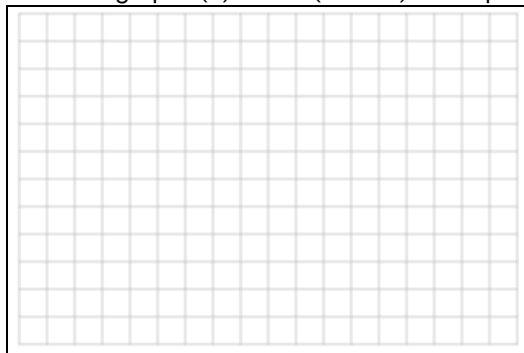
(22) Given the polynomial $f(x) = x^4 - 4x^3 - 3x^2 + 10x + 8$,

- (a) discuss end behavior
- (b) find the y intercept
- (c) find the x intercepts and discuss the behavior near them.
- (d) plot one additional point for accuracy and sketch the graph.

SHOW ALL WORK



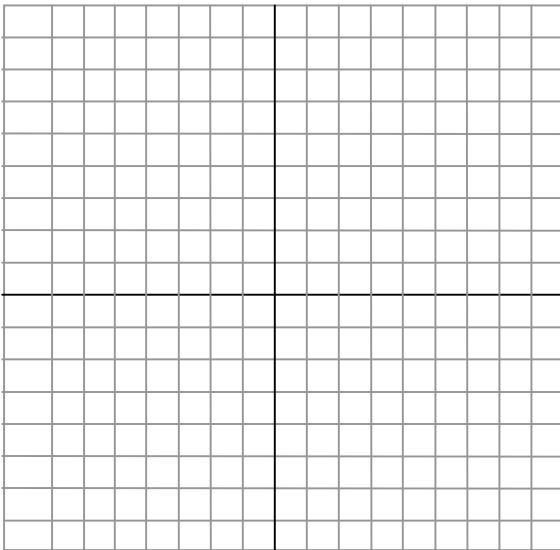
(23) Sketch the graph $f(x) = 3\sin(2x - \pi/4)$. One period, label highs and lows. (15 points)



(24) Sketch the graph of $y = \frac{2x^2 + 7x - 4}{x^2 + x - 2}$. (15 points)

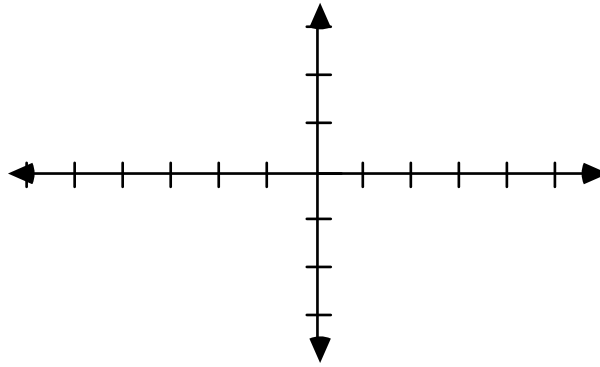
- (a) find asymptotes
- (b) find the y intercept
- (c) find the x intercepts and discuss the behavior near them.

SHOW ALL WORK



(25) A man looks up and sees an airplane flying in his direction at a level altitude of 2 miles. He watches the airplane for a few minutes. During that period of time he notices that the angle of elevation to the airplane changes from 45° to 60° . How far has the plane traveled in that time?

(26) Graph $f(x) = \cot(3x)$



(27) Solve:

(a) $6x^{-1/2} - 5x^{1/2} + x^{3/2} = 0$

(b) $(x-1)^2(2x+3) \leq 0$

answer wrong on solns

(c) $7^{x+3} = 2^{x-3}$

(d) $\log_2(-x) = 2 - \log_2(3-x)$

(28) Given $f(x) = e^x - 4$

(a) find $f^{-1}(x)$.

(b) Graph $f(x)$ and $f^{-1}(x)$. Label each graph and label one point on each graph.

(c) Find the domain and range for $f(x)$ and for $f^{-1}(x)$.

(15 points)

