

Math165 DL - TEST#3 - Take-Home Test Instructions

Date to start and submit Test3 on Blackboard: Friday Dec 11th morning to Saturday Dec 12th night.

Please carefully read the instructions below. Failure to comply with any of the instructions below may result in my being unable to accept or grade your test or initiating disciplinary actions.

1. The test will be made available on Blackboard on Friday Dec 11 early morning and will be due Saturday Dec 12 midnight.
2. The test must be completed by yourself. You may not check or discuss your test answers or consult any one else (no classmates, no tutors, no family or friends etc) regarding the test questions or any similar questions to complete the test.
3. Also, you may not consult any external resources. This means no internet searches, materials from other classes or books or any notes you have taken in other classes etc. You may not use Google or any other search engines or services for the test.
4. Write all answers clearly numbered as per the test questions order on separate neat sheets of paper. Take pictures, combine into single pdf and submit back in Blackboard on the same test3 page. You have done the same for other tests.
5. Optional: You must print the test and write your answers clearly in the space provided below each question. If you need more space to complete a problem, write your answer clearly on a separate sheet, label it and indicate that below the question so I know to look for that answer on a separate sheet.
6. You must turn in only a single completed copy of the test. Clearly scan or take clear pictures of your answer sheets and combine all into a single pdf file. Do not submit individual files for each page.
7. Any questions regarding the test should be directed only to me (your instructor).
8. Note that the Final exam is proctored exam and many of these questions may be asked on the Final exam so if you do take any help on this test I would know if you have hard time with these on Final exam so show your own best effort on this test3, though it is not proctored and is a takehome test.

Instructions:

Answer all the following questions. Wherever necessary, show complete work (all steps) to get full credit.

- 1) Find the inverse of given function. State the domain and the range of $f(x)$ and $f^{-1}(x)$.

$$f(x) = 2 \sin x - 3$$

(10 pts)

$$f^{-1}(x) =$$

Domain of $f(x)$: _____Range of $f(x)$: _____Domain of $f^{-1}(x)$: _____Range of $f^{-1}(x)$: _____

- 2) What is the domain of the inverse sine function?

(2 pts)

A) all real numbers, except odd multiples of $\frac{\pi}{2}$ B) all real numbers from $-\pi/2$ to $\pi/2$, inclusive

C) all real numbers

D) all real numbers in the interval $[-1, 1]$

- 3) What is the range of $\cos^{-1}(x)$ function?

(2 pts)

A) $[-1, 1]$

B) All real numbers

C) $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$ D) $[0, \pi]$

- 4) Evaluate the following expressions (DO NOT USE CALCULATOR, find exact values)

(12 pts)

(a) $\cos^{-1}\left(-\frac{\sqrt{2}}{2}\right) =$ _____

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

(c) $\sin\left(\tan^{-1}\left(\frac{\sqrt{3}}{3}\right)\right) =$ _____

(d) $\sin\left(\sin^{-1}\left(\frac{3}{2}\right)\right) =$ _____

For the question below, use a calculator to find the value in radian measure rounded to two decimal places

$$\sec^{-1}\left(\frac{\sqrt{7}}{2}\right) =$$

- 5) Given that $\cos \alpha = -\frac{3}{4}$, $\frac{\pi}{2} < \alpha < \pi$; $\tan \beta = \frac{\sqrt{5}}{2}$, $\pi < \beta < \frac{3\pi}{2}$ (8 pts)

Find the exact value of $\sin(\alpha - \beta)$.

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- 6) Establish the identity: $\sec t + \tan t = \frac{\cos t}{1 - \sin t}$ (8 pts)

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- 7) Solve the equation on the interval $0 \leq \theta < 2\pi$. (16 pts)

(a) $\cos 2\theta + \cos \theta = 0$ (No calculator, give answers in terms of π)

(b) $3 \tan^2 \theta - 1 = 2$ (No calculator, give answers in terms of π)

(c) $5 \cos \theta - 1 = 2$ (Use a calculator)
Round the answer to two decimal places

8) Use the information given to find the exact value of the indicated trigonometric functions.

$$\sin \theta = -\frac{\sqrt{6}}{4}, \quad \tan \theta < 0$$

(10 pts)

Find the following:

(a) $\sin(2\theta) =$

(b) $\cot(\theta) =$

(c) $\cos\left(\frac{\theta}{2}\right) =$

(d) $\cos\left(\theta + \frac{\pi}{6}\right) =$

9) Use the sum/difference of angles or double/ half angles formulas to find the exact values of the following expressions: (SHOW COMPLETE WORK)

(12 pts)

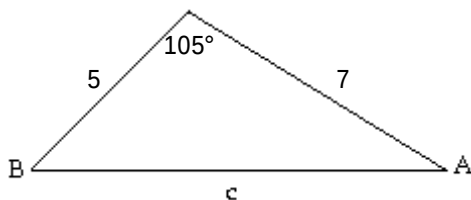
(a) $\tan \frac{7\pi}{12} =$

(b) $\cos 195^\circ =$

(c) $\sin 112.5^\circ =$

10) Solve the triangle.

(10 pts)



11) FORMULAS:

$\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$ $\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$ $\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \cdot \tan B}$ $\sin(2\theta) = 2 \sin \theta \cos \theta$ $\cos(2\theta) = \cos^2 \theta - \sin^2 \theta$ (or) $2\cos^2 \theta - 1$ (or) $1 - 2\sin^2 \theta$ $\tan(2\theta) = \frac{\sin(2\theta)}{\cos(2\theta)}$ or $= \frac{2 \tan \theta}{1 - \tan^2 \theta}$	$\sin \left(\frac{\theta}{2} \right) = \pm \sqrt{\frac{1 - \cos \theta}{2}}$ $\cos \left(\frac{\theta}{2} \right) = \pm \sqrt{\frac{1 + \cos \theta}{2}}$ $\tan \left(\frac{\theta}{2} \right) = \pm \sqrt{\frac{1 - \cos \theta}{1 + \cos \theta}}$ Law of Sines: $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$ Law of Cosines: $c^2 = a^2 + b^2 - 2 \cdot a \cdot b \cdot \cos C$ $b^2 = a^2 + c^2 - 2 \cdot a \cdot c \cdot \cos B$ $a^2 = b^2 + c^2 - 2 \cdot b \cdot c \cdot \cos A$
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