

MATH 7B - TEST 1
UNIT 1 – Trig and Inverse Trig Review plus Applications

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

(1) Find each of the following:

(a) $\cos(30^\circ) =$ _____

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

(c) $\sec(\pi) =$ _____

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

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

(f) $\cos(5\pi/3) =$ _____

(g) $\tan^{-1} 0 =$ _____

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

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

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

(k) $\cos(120^\circ) =$ _____

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

(m) $\sin(9\pi/2) =$ _____

(n) $\cot(5\pi/4) =$ _____

(o) $\tan(-45^\circ) =$ _____

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

(q) $\cos\left(\frac{4\pi}{3}\right) =$ _____

(r) $\cos^{-1}(-1) =$ _____

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

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

(2) In what quadrant is each of the following angles?:

(a) $\beta = \cos^{-1}(-1/3)$ _____

(b) $\theta = \sin^{-1}(0.2)$ _____

(c) $\alpha = \tan^{-1}(-5)$ _____

NAME: _____

MATH 7B Test 1 - SAMPLE

PART TWO - CALCULATORS ALLOWED (no graphing)

Show your work on this paper. EXACT answers are expected unless otherwise specified.

Fill in the blanks.

In problems 1 - 5 fill in the blank with the most appropriate answer

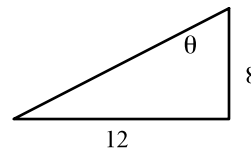
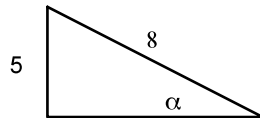
- (1) The range of the function $f(x) = \cos^{-1}x$ is _____
- (2) How many solutions does the equation $\cos x = \frac{1}{4}$ have? _____
- (3) How many solutions does the equation $x = \sin^{-1}\left(\frac{1}{5}\right)$ have? _____
- (4) The domain of the function $f(x) = \sin^{-1}x$ is _____.
- (5) $\sin^{-1}(\sin(3\pi/4)) =$ _____

(6) Evaluate each of the following exactly:

(a) $\cos(\tan^{-1}(-1/5)) =$ _____

(b) $\tan(\cos^{-1}(-3/4)) =$ _____

(7) Given the figures below, solve for the variable exactly. Then use your calculator to get an approximation



(a) $\alpha =$ _____ \approx _____

(b) $\theta =$ _____ \approx _____

(8) How would you restrict the domain of $f(x) = \cos 2\pi x$ in order to make it a one-to-one function? Show how you arrived at that restriction.

(9) Using your calculator, find approximations for the following, in radians, correct to 3 decimal places.

(a) $\tan^{-1}(5/3) =$ _____ (b) $\cos^{-1}(-0.25) =$ _____ (d) $\sin^{-1}\left(\frac{\sqrt{2}}{3}\right) =$ _____

(10) Solve the following equations exactly. (all solutions)

(a) $\sin \theta = \frac{-\sqrt{2}}{2}$

(b) $\cos x = \frac{\sqrt{3}}{2}$

(c) $\tan 4\theta = 1$

(11) Solve the following equations exactly for $0 \leq \theta \leq 2\pi$. Simplify answers when possible

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

(b) $\tan \theta = \frac{\sqrt{3}}{3}$

(c) $\sin 2\theta = -1$

(12) Solve the following equations exactly for $0 \leq \theta \leq 2\pi$. Simplify answers when possible

(a) $\tan \theta = 8$

(b) $\cos \theta = -0.3$

(c) $\sin \theta = -\frac{1}{6}$

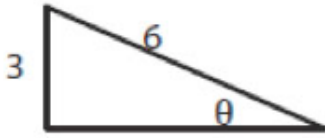
(13) Solve the following equations exactly for $0 \leq \theta \leq 2\pi$. Simplify answers when possible.

(a) $2\sin(\theta) - 1 = 0$

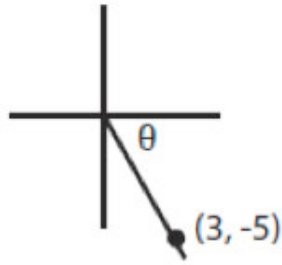
(b) $2\cos(\theta) - 3 = 6$

(c) $\cot(2\theta) - 1 = 0$

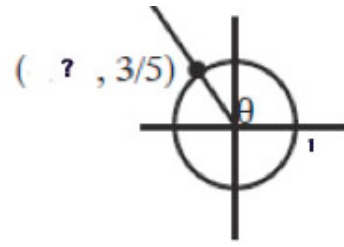
(14) Given the following figures, find:



(a) $\tan \theta =$ _____
 $\theta \approx$ _____



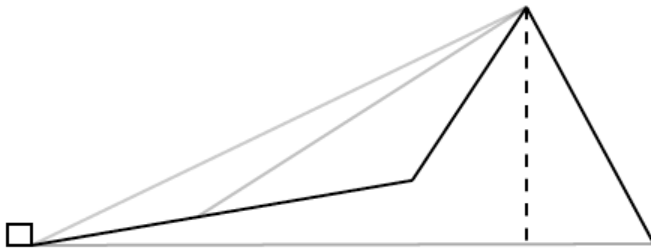
(b) $\cos \theta =$ _____
 $\theta \approx$ _____



(c) $\cos \theta =$ _____
 $\theta \approx$ _____

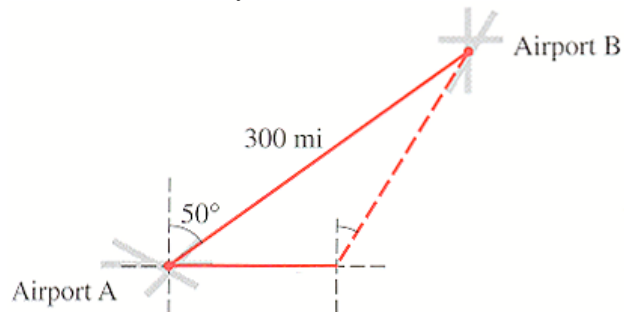
(15) To measure the height of a building, two sightings are taken a distance of 50 feet apart. If the first angle of elevation is 40° and the second is 32° , what is the height of the building (exact and approximate).

(16) A man observes that the angle of elevation of a mountain peak from his house is 26° . Leaving the house he walks 2000 ft. up a slope of 10° directly towards the mountain and then finds that the angle of elevation of the peak to be 31° . What is the height of the mountain peak (relative to the house). Exact and approximate.



- (17) Find all remaining parts of the following triangle(s) $a=12$, $b=31$, $A=20.5^\circ$ and find the area.

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- (18) Airport B is 300 mi from airport A at a bearing N 50° E (see the figure). A pilot wishing to fly from A to B mistakenly flies due east at 150 mi/h for 30 minutes, when he notices his error.



- (a) How far is the pilot from his destination at the time he notices the error? Give your answer correct to the nearest mile.
- (b) What bearing should he head his plane in order to arrive at airport B? Give your answer correct to the nearest degree.