

Round to 2 decimal places

Math 112

Test 3A

Sec 8.7-8.8, 9.1-9.5 & 13.1-13.3

100

NAME: Answers

Ave quiz % =

Ave HW % =

Test 1. 2. 73 =

Total =

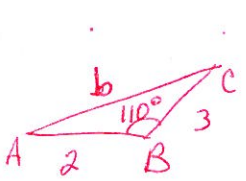
Total /5 = semester % =

Show all your work. Partial credit is based on your work shown!

10pts

9.3 1. Solve for the missing side in a triangle where $a = 3$, $c = 2$, and angle $B = 110^\circ$.

Note: SAS
∠B is between sides a & c.



4pts $b^2 = 3^2 + 2^2 - 2(3)(2)\cos 110^\circ$

$b^2 = 9 + 4 - 12(-.342001)$

$b^2 = 13 + 4.10424...$

$b^2 = 17.10424...$

$b = 4.135727...$

2pts $b \approx 4.14$

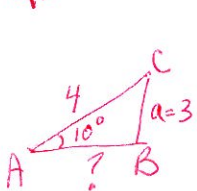
optional work shown 4pts

-4 if answers wrong & no work is shown partial credit based on work shown.

10pts

9.2 2. In a triangle if side $a = 3$ inches, $b = 4$ inches, and angle $A = 10^\circ$, find angle(s) C.

[find angle(s) B first]



$\frac{\sin A}{a} = \frac{\sin B}{b}$

3pts $\frac{\sin 10^\circ}{3} = \frac{\sin B}{4}$

1pt $3\sin B = 4\sin 10^\circ$
 $\sin B = \frac{4(.17364817...)}{3}$
 $\sin B = .23153...$

OK if ∠ rounded to 1 decimal pt

$B = \sin^{-1}(.23153...)$

(1pt each # + 1pt rounding)

* $B_1 = 13.39^\circ$ or $B_2 = 166.61^\circ$

thus * $C_1 = 156.61^\circ$ & $C_2 = 3.39^\circ$

(-2pts if only have B_1 & C_1)

9.4 Find the area of each triangle. Neither triangle is a right triangle. Round the answers to two decimal places and include appropriate units with your answer. Show all your work.

5pts

3 a. sides $a = 10$ feet, $b = 8$ ft., and $c = 5$ ft.

$S = \frac{10+8+5}{2} = \frac{23}{2} = 11.5$ (optional) (-1 pt if $\neq \frac{23}{2}$)

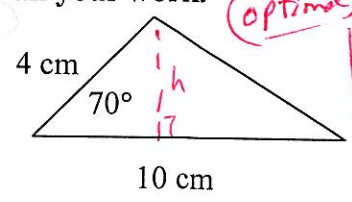
$A = \sqrt{11.5(1.5)(3.5)(6.5)}$

optional → $A = \sqrt{392.4375}$

$A \approx 19.81 \text{ ft}^2$

5pts

3b.



(optional) note:

$\sin 70^\circ = \frac{h}{4}$
 $4(\sin 70^\circ) = h$
 $3.7587... \approx h$

3pts $A = \frac{1}{2}(10)(4)(\sin 70^\circ)$

$A = 20(.93969262...)$ ← optional

2pts $A \approx 18.79 \text{ cm}^2$

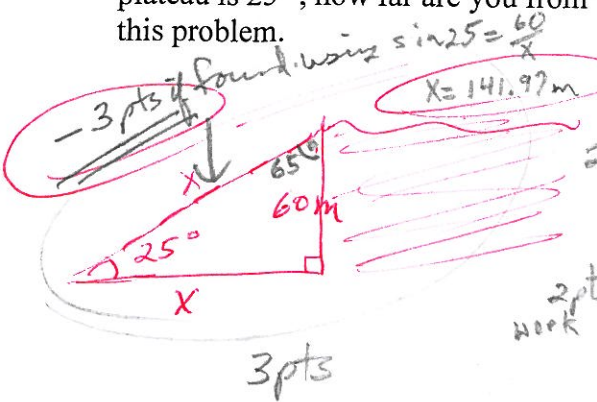
01 (Could use law of sine)

Math 112

10 pts Show all your work.

Test 3, page 2

4. Suppose you are headed toward a plateau 60 meters high. If the angle of elevation to the top of the plateau is 25° , how far are you from the base of the plateau? 128.67m Draw a sketch to illustrate this problem. (optional)



2pts $\tan 25^\circ = \frac{60m}{x}$

2pts $x \tan 25^\circ = 60m$

2pts work $x = \frac{60}{\tan 25^\circ} = 128.67 \text{ meters}$

or $\tan 65^\circ = \frac{x}{60m}$

$x = 60 (\tan 65^\circ)$

5. Give answers as exact values, in fractional forms of π , on the interval $0 \leq \theta < 2\pi$.

8 pts Show all your work.

10 pts Show all your work.

b. $2 \sin^2 \theta + 3 \sin \theta - 1 = 0$

$\sec^2 \theta = 4$

$\cos^2 \theta = \frac{1}{4}$ 2pts 2pts

$\cos \theta = \pm \sqrt{\frac{1}{4}} = \pm \frac{1}{2}$

$\theta = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$ 4pts

4pts $2 \sin^2 \theta + 3 \sin \theta + 1 = 0$

$(2 \sin \theta + 1)(\sin \theta + 1) = 0$

2pts $2 \sin \theta + 1 = 0$ or $\sin \theta + 1 = 0$

$\sin \theta = -\frac{1}{2}$ $\sin \theta = -1$ 2pts

$\theta = \frac{7\pi}{6}, \frac{11\pi}{6}$ $\theta = \frac{3\pi}{2}$ 2pts

8pts

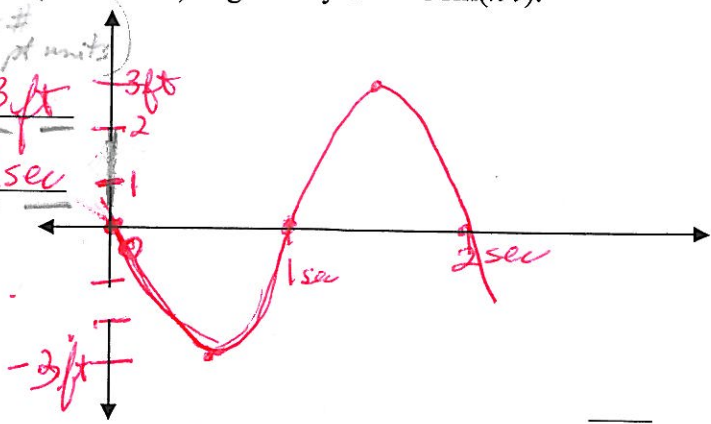
6. The displacement, d , (in feet) of an object at time t (in seconds) is given by $d = -3 \sin(\pi t)$.

[Include units with your answers.]

a. In this simple harmonic motion, what is the maximum displacement from its rest position? 3ft

b. What is the time required for one oscillation? 2sec

c. Draw a sketch to illustrate this motion. Label each axis with appropriate units.



1pt overall understanding of $d = -3 \sin \theta$

1pt accuracy of drawing,

8pts

7. a. Write out the terms in the indicated sequence and then find the sum.

4pts
$$\sum_{n=1}^5 (n+3)^2 = (1+3)^2 + (2+3)^2 + (3+3)^2 + (4+3)^2 + (5+3)^2$$

$$= 4^2 + 5^2 + 6^2 + 7^2 + 8^2$$

$$= 16 + 25 + 36 + 49 + 64 = 190$$

b. Use the sum(seq(...)) feature of your graphing calculator to find the sum of the first 28 terms of this sequence. Write down what you type into your calculator and then indicate the result.

4pts
$$\text{sum}(\text{seq}((n+3)^2, n, 1, 28, 1)) = 10,402$$

or $(x+3)^2, x,$ optional

8pts

8. Write the next two terms for each sequence and then write the n^{th} term for each sequence.

a. $\frac{2}{1}, \frac{4}{5}, \frac{6}{25}, \frac{8}{125}, \frac{10}{625}, \frac{12}{3125}, \frac{14}{15625}, \dots, \frac{2n}{5^{n-1}}$

~~1pt~~ recursive
 $a_1 = \frac{2}{1}$
 then
 $a_n = \frac{a_{n-1} + 2}{5(a_{n-1})}$

b. $\frac{1}{1 \cdot 2}, \frac{1}{2 \cdot 3}, \frac{1}{3 \cdot 4}, \frac{1}{4 \cdot 5}, \frac{1}{5 \cdot 6}, \frac{1}{6 \cdot 7}, \dots, \frac{1}{n(n+1)}$

can't use a_{n-1} for 2 diff #s

8pts Show all your work.

9. $\sum_{k=1}^{\infty} 4\left(\frac{1}{2}\right)^{k-1}$ a. What is the first term of this infinite geometric sequence? 4 2pts

b. What is the common ratio? $\frac{1}{2}$ 2pts

c. What is the sum of the infinite geometric sequence?

4pts

$S_{\infty} \approx \frac{4}{1 - \frac{1}{2}} = \frac{4}{\frac{1}{2}} \approx 8$ or $\text{sum}(\text{seq}(4(0.5)^{n(n-1)}, n, 1, \dots, 1))$

(increase this # till you see the limit)

~~1pt~~ $s_n = \frac{4(1 - (\frac{1}{2})^n)}{1 - \frac{1}{2}} \approx 4$

10pts Show all your work.

10. a. What type of sequence is: 7, 16, 25, 34, 43, 52, ...? arithmetic 2pts

b. Write a formula for the nth term. $7 + 9 + 9 + 9 + 9 + 9$

2pts $a_n = 7 + (n-1)9 \text{ or } (9n - 2)$ // or $a_1 = 7$
 $a_n = (a_{n-1}) + 9$

c. What is the 25th term in this sequence?

3pts $a_{25} = 7 + (24)9 \text{ or } 9(25) - 2$
 $= 223$

d. What is the sum of the first 25 terms of this sequence?

3pts
$$\text{Sum} = S_{25} = \frac{25}{2}(7 + 223) = 2875$$

or $\text{sum}(\text{seq}(9n-2, n, 1, 25)) = 2875$