

Name Key

Math Analysis/Honors Algebra 3-4 Review sheet 4.7-4.8

Show all work for full credit!!!!

1. Evaluate $\arcsin(-0.3549)$ (in radians rounded to four decimal places).

-0.3628

2. Evaluate $\arccos(-0.5249)$ (in radians rounded to four decimal places).

2.1234

3. Solve the right triangle. Find side lengths to the nearest tenth.
 $A = 23^\circ$, $a = 17$

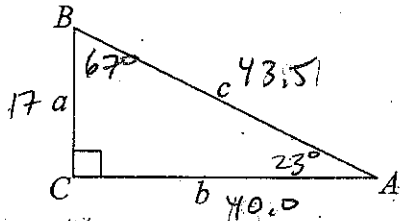
$B =$ 67°

$B = 90 - 23$

$\tan 23^\circ = \frac{17}{b}$

$b = \frac{17}{\tan 23^\circ} = 40.0$

$c^2 = 17^2 + 40^2 = 1889$
 $c = 43.5$



$b =$ 40.0

$c =$ 43.5

4. Solve the right triangle. Find side lengths to the nearest tenth.
 $B = 71^\circ$, $b = 29$

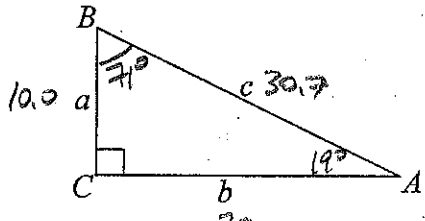
$A =$ 19°

$A = 90 - 71 = 19$

$\tan 71^\circ = \frac{29}{a}$

$a = \frac{29}{\tan 71^\circ} = 9.9$

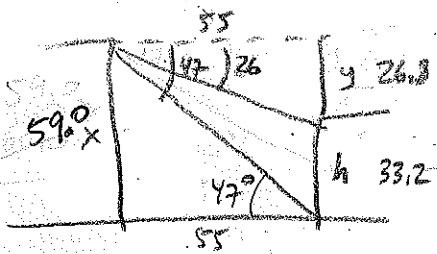
$c^2 = 10^2 + 29^2 = 941$
 $c = \sqrt{941} = 30.7$



$a =$ 10.0

$c =$ 30.7

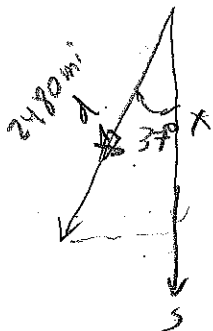
5. The angle of depression from the top of one building to the foot of a building across the street is 47° . The angle of depression to the top of the same building is 26° . The two buildings are 55 feet apart. What is the height, to the nearest tenth of a foot, of the shorter building?



$\tan 47^\circ = \frac{x}{55}$ $\tan 26^\circ = \frac{y}{55}$
 $x = 55 \tan 47^\circ$ $y = 55 \tan 26^\circ$
 $x = 59.0$ $y = 26.8$

$h = x - y = 59.0 - 26.8 = 32.2$ 32.2 ft

6. The airplane flying 620 miles per hour has a bearing of $S37^\circ W$. After flying 4 hours, how far south, to the nearest mile, has the plane traveled from its point of departure?



$d = rt$
 $d = \frac{(620 \text{ miles}) \times (4 \text{ hrs})}{hr}$
 $d = 2480 \text{ miles}$
 $\cos 37^\circ = \frac{x}{2480}$
 $x = 2480 \cos 37^\circ$
 $x = 1980.6 \approx 1981$

1981 miles

#1. Sketch the graph of the function $f(x) = -\frac{5}{2} \csc(2x + 3\pi) + 1$ Consider: $-\frac{5}{2} \sin(2x + 3\pi) + 1$

(Label both axes)

A/refl.: $\frac{5}{2}$ / yes

P: π

PS: $-\frac{3\pi}{2}$

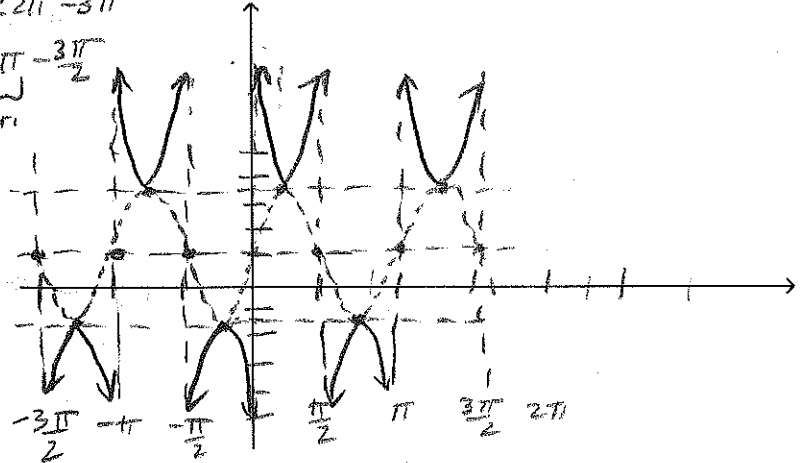
Start: $-\frac{3\pi}{2}$

End: $-\frac{\pi}{2}$

Int: $-\frac{3\pi}{2}, -\pi, -\frac{\pi}{2}$

VS: 1

$0 < 2x + 3\pi < 2\pi$
 $-3\pi < 2x < 2\pi - 3\pi$
 $-\frac{3\pi}{2} < x < \pi - \frac{3\pi}{2}$
 PS peri



#2. Sketch the graph of the function $f(x) = 4 \cos\left(\frac{x}{2} + \frac{\pi}{8}\right) - 2$ (Label both axes)

A/refl.: 4 / no

P: 4π

PS: $-\frac{\pi}{4}$

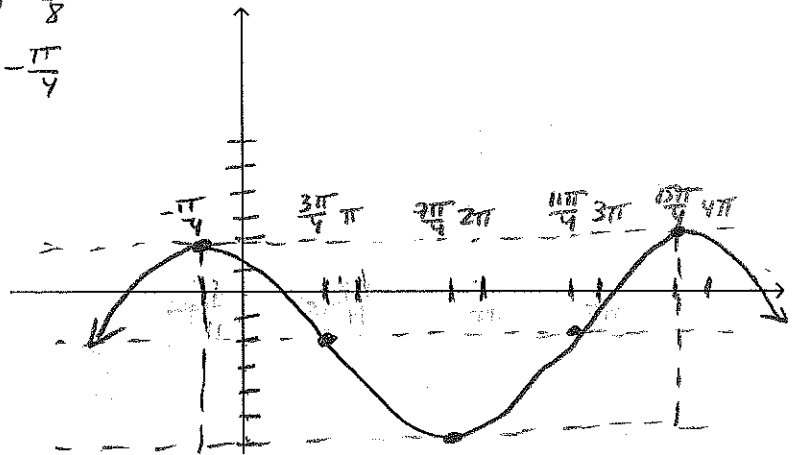
Start: $-\frac{\pi}{4}$

End: $\frac{15\pi}{4}$

Int: $\frac{3\pi}{4}, \frac{11\pi}{4}$

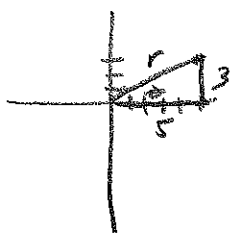
VS: -2

$0 < \frac{x}{2} + \frac{\pi}{8} < 2\pi$
 $-\frac{\pi}{8} < \frac{x}{2} < 2\pi - \frac{\pi}{8}$
 $-\frac{\pi}{4} < x < 4\pi - \frac{\pi}{4}$
 PS P



#3. Evaluate $\arcsin(-0.4897)$ (in radians, rounded to four decimal places). -0.5117

#4. Find the exact value of $\sin\left(\arctan\left(\frac{3}{5}\right)\right)$. (You must show a sketch!) $\frac{3\sqrt{34}}{34}$

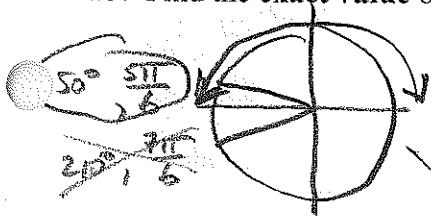


$\sin(\theta)$ $\tan\theta = \frac{3}{5} = \frac{y}{x}$
 $r^2 = 3^2 + 5^2$
 $r^2 = 9 + 25$
 $r^2 = 34$
 $r = \sqrt{34}$
 $\sin\theta = \frac{y}{r} = \frac{3}{\sqrt{34}}$
 $\frac{3}{\sqrt{34}} \cdot \frac{\sqrt{34}}{\sqrt{34}} = \frac{3\sqrt{34}}{34}$

#5. Find the exact value of $\arccos\left(\frac{-\sqrt{3}}{2}\right)$.

Degrees: 150°

Radians: $\frac{5\pi}{6}$



cosines are x/s , we want the arc (angle) whose cosine is $-\frac{\sqrt{3}}{2}$

range of arccos function: $[0, \pi]$

#6. Solve the right triangle. Find side lengths to the nearest tenth.

$A = 38^\circ$, $a = 15$

$\angle B = 90^\circ - 38^\circ = 52^\circ$

law of sines:

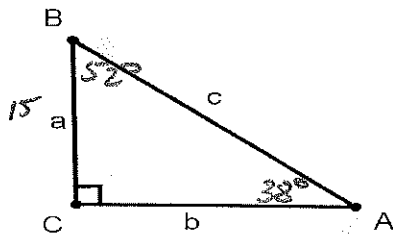
$\frac{b}{\sin 52^\circ} = \frac{15}{\sin 38^\circ}$

$b = \frac{15 \sin 52^\circ}{\sin 38^\circ} = 19.2$

$B =$ 52°

$b =$ 19.2

$c =$ 24.4



Pythagorean thm:

$c^2 = a^2 + b^2$

$c^2 = 15^2 + (19.2)^2$

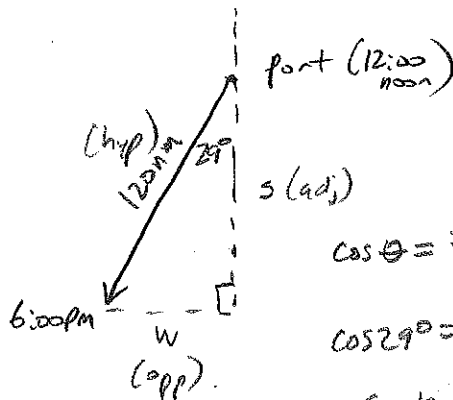
$c^2 = 593.64$, $c = 24.4$

#7. A ship leaves port at noon and has a bearing of $S 29^\circ W$. If the ship sails at 20 knots (nautical miles per hour), how many nautical miles south and how many nautical miles west will the ship have traveled by 6:00PM?

$d = rt$

$d = \frac{20 \text{ nm} \cdot 6 \text{ hrs}}{1 \text{ hr}}$

$d = 120 \text{ nm}$



south: 105.0 nm

west: 58.2 nm

$\cos \theta = \frac{\text{adj}}{\text{hyp}}$

$\cos 29^\circ = \frac{s}{120}$

$\sin \theta = \frac{\text{opp}}{\text{hyp}}$

$\sin 29^\circ = \frac{w}{120}$

$s = 120 \cos 29^\circ = 104.95$

$w = 120 \sin 29^\circ = 58.17$

#8. From city A to city B, a plane flies 650 miles at a bearing of $N 48^\circ E$. From city B to city C, the plane flies 810 miles at a bearing of $S 65^\circ E$. Find the distance from city A to city C, and the bearing from city A to city C.

notes:

- add in alt int \angle s

$- 48^\circ + 65^\circ - \text{top } \angle = 113^\circ$

- law of cosines to find d :

$d^2 = 650^2 + 810^2 - 2(650)(810)\cos 113^\circ$

$d^2 = 1490039.878$

$d = 1220.67$

- law of sines for angle α :

$\frac{810}{\sin \alpha} = \frac{1220.67}{\sin 113^\circ}$

- cross multiply

$1220.67 \sin \alpha = 810 \sin 113^\circ$

$\sin \alpha = \frac{810 \sin 113^\circ}{1220.67} = 0.610819$

distance: 1220.7 miles

bearing: $N 85.6^\circ E$

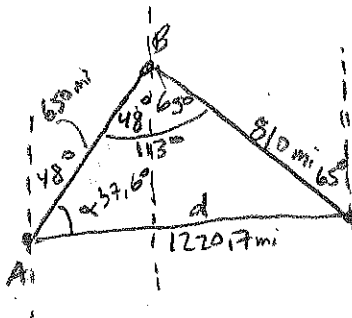
$\sin \alpha = 0.610819$

$\alpha = \sin^{-1}(0.610819)$

$\alpha = 37.6^\circ$

- bearing angle is $\alpha + 48^\circ$

$37.6 + 48 = 85.6^\circ$



Name _____

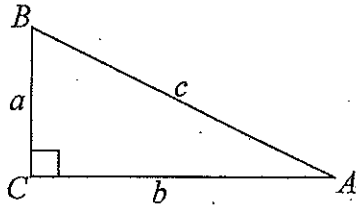
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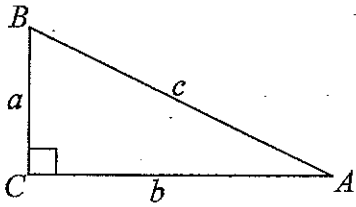
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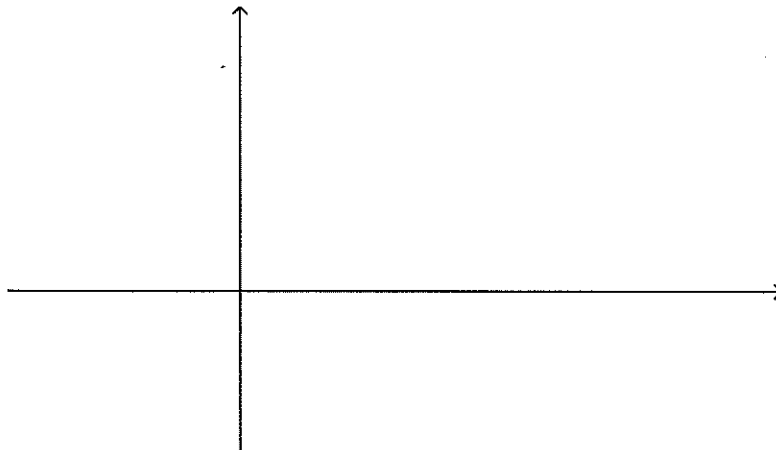
PS: _____

Start: _____

End: _____

Int: _____

VS: _____



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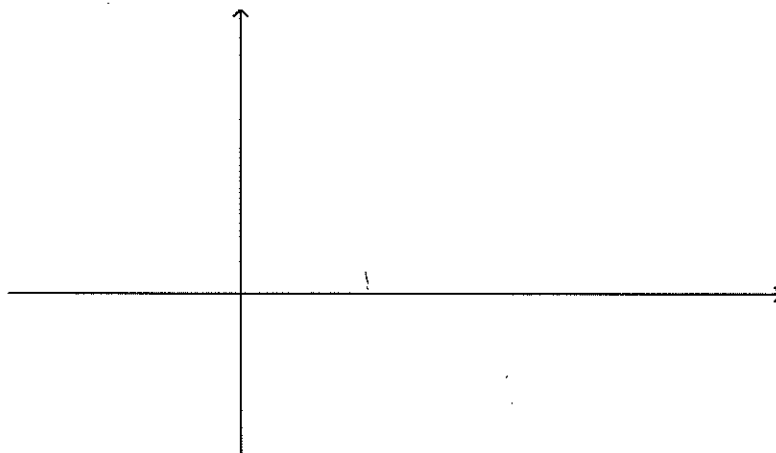
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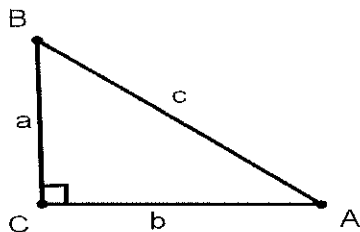
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distance: _____

bearing: _____