Pre-Calculus
REVIEW: Unit F (ch 4) Part 2

Name Key

FORMULAS		
$A = \frac{1}{2}ab\sin C$	$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$	$c^2 = a^2 + b^2 - 2ab\cos C$

1. Which of the following is an equation of the sine function with period $\frac{\pi}{2}$, phase shift left π, and vertical shift 1?

$+\pi$ $+1$

~~A)~~ $y = \sin\left(4x - \frac{\pi}{4}\right) + 1$

~~B)~~ $y = \sin(4x - 4\pi) + 1$

~~C)~~ $y = \sin\left(\frac{x}{4} - \pi\right) + 1$

D) $y = \sin(4x + 4\pi) + 1$ FACTOR!

$y = \sin 4(x + \pi) + 1$

$P = \frac{2\pi}{b}$

$\frac{\pi}{2} = \frac{2\pi}{b}$

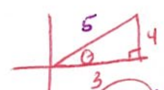
$b = \frac{2\pi}{\frac{\pi}{2}}$

$b = 4$

2. Find the exact value of $\cos\left(\tan^{-1}\frac{4}{3}\right)$. $\frac{O}{A}$

not on U.C.

only Quads 1+4



$\cos\theta = \frac{3}{5}$ $\frac{A}{H}$

3. State the amplitude, period, and all transformations of $y = -2\sin(4x + \pi) + 1$.

FACTOR!

2 $P = \frac{2\pi}{4}$ $P = \frac{\pi}{2}$

$-2\sin 4\left(x + \frac{\pi}{4}\right) + 1$

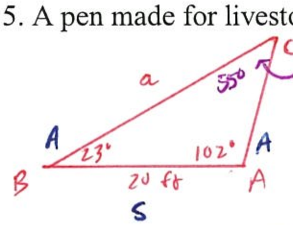
- x-axis reflection
- V.S
- H.C
- L $\pi/4$
- Up 1

4. Find $\arcsin\left(-\frac{\sqrt{3}}{2}\right)$, if it exists.

Q1 + Q4 ; on U.C.

A $-\frac{\pi}{6}$ B $-\frac{\pi}{3}$ ~~C $\frac{2\pi}{3}$~~ D does not exist

5. A pen made for livestock is constructed as triangle ABC with $m\angle A = 102°$, $m\angle B = 23°$, and $c = 20$ feet. Find a.



$180° - 23° - 102°$

$\frac{\sin 55°}{20} = \frac{\sin 102°}{a}$

$.04\ldots = \frac{\sin 102°}{a}$ Don't round until the end!

$a = 23.9$ ft

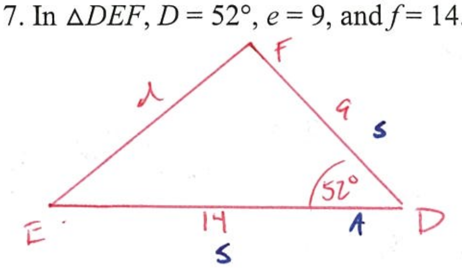
NO SSA!

6. Which of the following is a vertical asymptote for the graph of $y = \tan x$?

Use U.C.

A) $x = \frac{\pi}{2}$ B) $x = \pi$ C) $x = 3\pi$ D) $x = 0$

7. In $\triangle DEF$, $D = 52°$, $e = 9$, and $f = 14$. Find d.

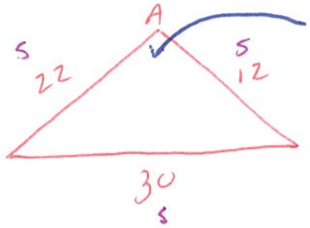


$d^2 = (9)^2 + (14)^2 - [2(9)(14)\cos 52°]$ Degree mode!

$\sqrt{d^2} = \sqrt{121.85\ldots}$

$\boxed{d = 11.0}$

8. James is designing a triangular stage for his band to perform on. The dimensions of the triangle are 12 feet, 22 feet, and 30 feet. What is the area of the stage?



Must find largest 1st w/ SSS

$30^2 = 22^2 + 12^2 - [2(22)(12)\cos A]$

$900 = 484 + 144 - 528\cos A$

ORDER OF OPERATIONS!

$900 = 628 - 528\cos A$

$-628 \quad -628$

$272 = -528\cos A$

$\frac{272}{-528} = \frac{-528\cos A}{-528}$

$-.515\ldots = \cos A$

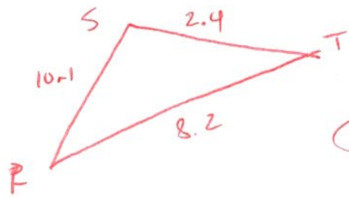
$\cos^{-1}(.515\ldots) = \angle A$

$\angle A = 121°$

$A = \frac{1}{2}(22)(12)\sin 121°$

$= 113\ ft^2$

9. In ΔRST, $r = 2.4$ in., $s = 8.2$ in., and $t = 10.1$ in. Find $m\angle S$.



SAME!

$10.1^2 = 2.4^2 + 8.2^2 - (2(2.4)(8.2))\cos T$

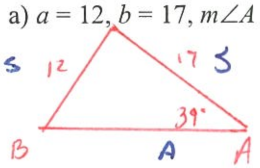
$\angle T = 137.5°$

$\frac{\sin 137.5°}{10.1} = \frac{\sin S}{8.2}$

$\boxed{\angle S = 33°}$

10. Use the given information to determine how many triangles exist, if any.

a) $a = 12$, $b = 17$, $m\angle A = 39°$



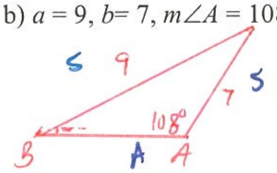
$\frac{\sin 39°}{12} = \frac{\sin B}{17}$

$\angle B = 63°$

$180° - 63° = 117°$

Room for 1 more ∠ so 2

b) $a = 9$, $b = 7$, $m\angle A = 108°$



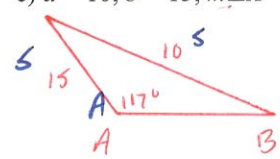
$\frac{\sin 108}{9} = \frac{\sin B}{7}$

$\angle B = 48°$

$180° - 48° = 132°$

TOO BIG so 1

c) $a = 10$, $b = 15$, $m\angle A = 117°$

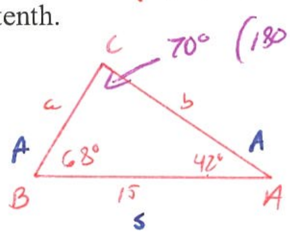


None. Not proportional.

Also... $\frac{\sin 117°}{10} = \frac{\sin B}{15}$

"Domain error" is interpreted as none

11. A case for displaying a large flag is triangle ABC with $m\angle A = 42°$, $m\angle B = 68°$, and $c = 15$ feet. Find a to the nearest tenth.

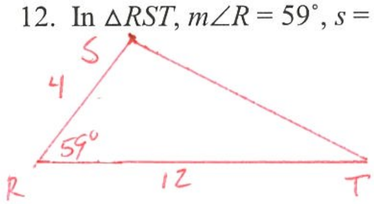


$\frac{\sin 70°}{15} = \frac{\sin 42°}{a}$

$a = 10.7$ ft

SAS!

12. In ΔRST, $m\angle R = 59°$, $s = 12$ in., and $t = 4$ in. Find the area of ΔRST to the nearest square inch.



$A = \frac{1}{2}(4)(12)\sin 59°$

$21\ in^2$

Locate the vertical asymptote for each of the following functions:

13. $y = \sec(x - \pi)$

(or $-\pi/2$)

$x - \pi = \frac{\pi}{2}$ | $x - \pi = \frac{3\pi}{2}$

$x = \frac{3\pi}{2}$ $x = \frac{5\pi}{2}$ or $\frac{3\pi}{2}$ and $\frac{\pi}{2}$

14. $y = \csc 2x + 3$

$2x = 0$ | $2x = \pi$

$x = 0$ $x = \frac{\pi}{2}$

15. $y = \cot\frac{x}{4}$

$\frac{x}{4} = 0$ | $\frac{x}{4} = \pi$

$x = 0$ $x = 4\pi$

16. $y = \tan(3x + \frac{\pi}{2})$

(or $-\frac{\pi}{2}$)

OR $x = 0$ and $x = -\frac{\pi}{3}$

$3x + \frac{\pi}{2} = \frac{\pi}{2}$ | $3x + \frac{\pi}{2} = \frac{3\pi}{2}$

$-\frac{\pi}{2} \quad -\frac{\pi}{2}$ | $-\frac{\pi}{2} \quad -\frac{\pi}{2}$

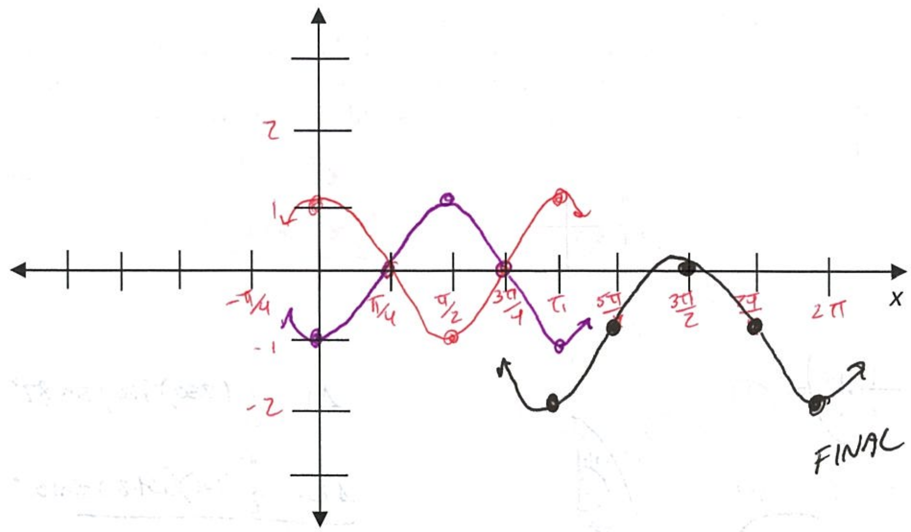
$x = 0$ | $\frac{3x}{3} = \frac{\pi}{3}$ $x = \pi/3$

$y = -\cos 2(x - \pi) - 1$

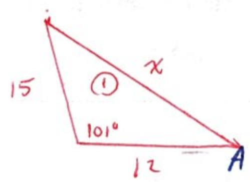
17. Graph $y = -\cos(2x - 2\pi) - 1$

$a = -1$ R π
$b = 2$ Down 1
$P = \pi$
$Sc = \pi/4$ •x by $\frac{1}{2}$ •y by (−1) $x + \pi$ $y - 1$

Original	*a* / *b* shift	*h* / *k* shift
$(0, 1)$	$(0, -1)$	$(\pi, -2)$
$(\frac{\pi}{2}, 0)$	$(\frac{\pi}{4}, 0)$	$(\frac{5\pi}{4}, -1)$
$(\pi, -1)$	$(\frac{\pi}{2}, 1)$	$(\frac{3\pi}{2}, 0)$
$(\frac{3\pi}{2}, 0)$	$(\frac{3\pi}{4}, 0)$	$(\frac{7\pi}{4}, -1)$
$(2\pi, 1)$	$(\pi, -1)$	$(2\pi, -2)$



18. Find the area of the quadrilateral. Throughout the problem, round side lengths to the nearest tenth, angle measures to the nearest degree, and each area to the nearest square foot.

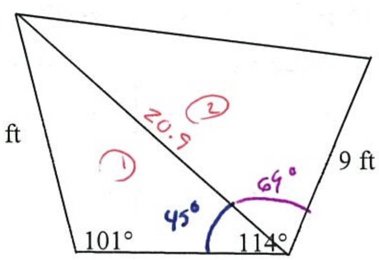


$x^2 = 15^2 + 12^2 - (2(15)(12)\cos 101°)$

$x = 20.9$

$\frac{\sin A}{15} = \frac{\sin 101°}{20.9}$

$\angle A = 45°$



Area = 176 ft²

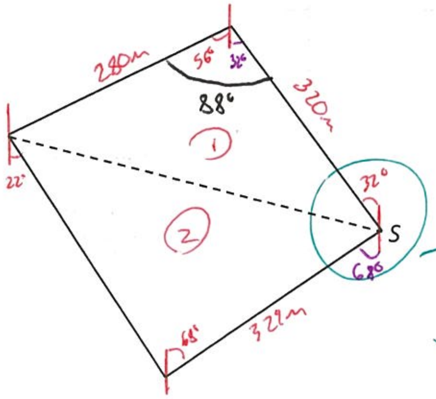
Area Δ1 + Area of Δ2

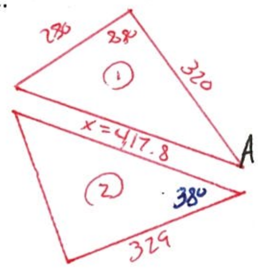
$\frac{1}{2}(15)(12)\sin 101 + \frac{1}{2}(20.9)(9)\sin 69°$

19. Starting from Simpson's Road, proceed N32°W for 320 m, then turn S56°W for 280 m to the old oak tree, then turn S22°E until Mulberry Lane is reached, and finally turn N68°E 329 m along Mulberry Lane back to the starting point. Find the area of the land. Throughout the problem, round side lengths to the nearest tenth, angle measures to the nearest degree, and each area to the nearest square foot.

$x^2 = 320^2 + 280^2 - (2(320)(280)\cos 88°)$

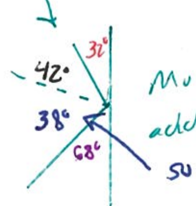
$x = 417.8$





$\frac{\sin A}{280} = \frac{\sin 38°}{417.8}$

$\angle A = 42°$



Must all add to 180°

Area

Δ1 + Δ2

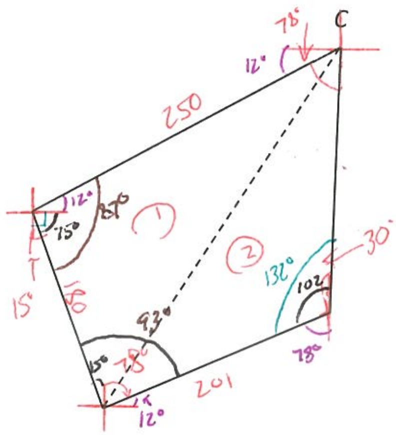
$\frac{1}{2}(320)(280)\sin 88° + \frac{1}{2}(417.8)(329)\sin 38°$

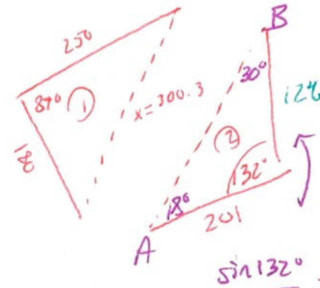
87,086 m²

20. From the Southeast corner of the cemetery on Burnham Road, proceed S78°W for 250 m along the southern boundary of the cemetery until a granite post is reached, then S15°E for 180 m to Allard Road, then N78°E along Allard Road for 201 m until it intersects Burnham Road, and finally N30°E along Burnham Road back to the starting point. Find the area of the land. Throughout the problem, round side lengths to the nearest tenth, angle measures to the nearest degree, and each area to the nearest square foot.

$x^2 = 250^2 + 180^2 - (2 \cdot 250 \cdot 180 \cdot \cos 87°)$

$x = 300.3$





$\Delta 1: \frac{1}{2}(250)(180)\sin 87°$

$+$

$\Delta 2: \frac{1}{2}(201)(124.8)\sin 132°$

$\boxed{31,790\ m^2}$

$\frac{\sin 132°}{300.3} = \frac{\sin B}{201}$

$\angle B = 30°$

So $\angle A = 18°$

$\frac{\sin 18°}{a} = \frac{\sin 132°}{300.3}$

$a = 124.8$

Section (SKILLS)	4.4 Graphing Sine & Cosine	4.5 Graphing other trig functions	4.6 Inverse Trig Functions	4.7 Law of Sines & Cosines
Concept				
Example:				
Concept				
Example:				
Concept				
Example:				
Concept				
Example:				