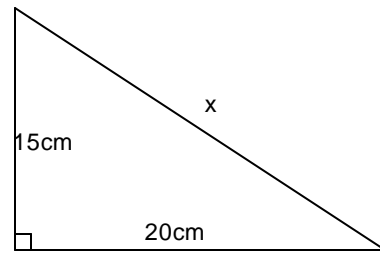


## Math 2204 Mid-year Exam Review

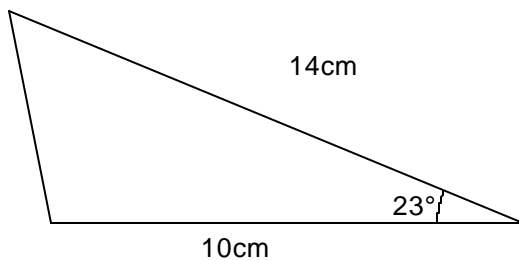
Name: \_\_\_\_\_

1. What is the value of x in the following diagram?

X=25

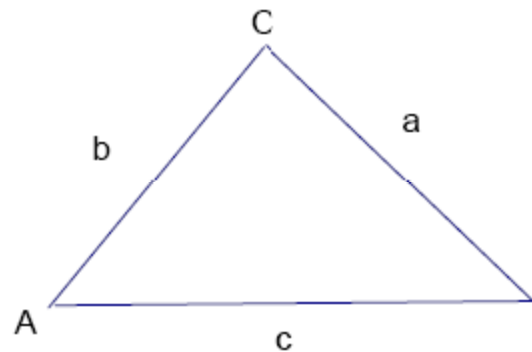


2. What is the area of this triangle?  $27.4\text{cm}^2$



3. Write the Sine Law and Cosine Law that could be used to solve for angle C.

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



4. What is  $\cos^{-1}(1/3)$  to the nearest degree?  
 $70.5^\circ$

5. Name 3 points that lie on the plane:  $2x - y + z = 0$   $(0,0,0)$   $(1,2,0)$   $(0,1,1)$ ...

6. Give 2 equations that are equivalent to  $x+2y-6z=9$   $2x+4y-12z=18$   $-3x-6y+18z=-27$

7. What is the value of the determinant:  $\begin{bmatrix} -5 & 2 \\ -3 & 10 \end{bmatrix}$   $-44$

8. What is the z-intercept of the following plane?  $5x - 3y + 4z = 40$   $(0,0,10)$

9. What is the solution for the following system of equations: 
$$\begin{cases} x = 5 \\ y - \frac{6}{5}x = 4 \\ x = -2y + z + 4 \end{cases}$$
  
 $(5,10,21)$

10. What is the coefficient matrix for the system: 
$$\begin{cases} 4x = y + 4 \\ -y + x = -z \\ 3x - z = 4y - 1 \end{cases}$$

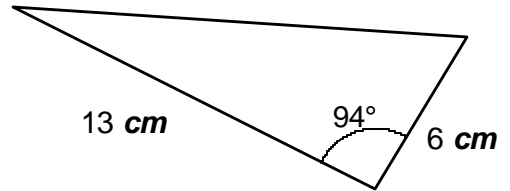
$$\begin{bmatrix} 4 & -1 & 0 \\ 1 & -1 & 1 \\ 3 & -4 & -1 \end{bmatrix}$$

11. Jill has to decide between two jobs in the mall. Job 1 pays \$400 a week plus 10% commission on sales. Job 2 pays \$250 a week plus 20% commission on sales. Which job is better and when?  $\text{Job 1 better before } \$1500 \text{ of sales, Job 2 better after } \$1500$

12. If a system of 3 equations in three variable has a solution, what does that solution look like graphically?  $\text{A single point in 3-D Space}$

13. If A represents any matrix, then using matrix multiplication the product of  $A \times I$  would give you \_\_\_\_\_  $A$

14. What is the area of the triangle shown?  
 **$77.8\text{cm}^2$**



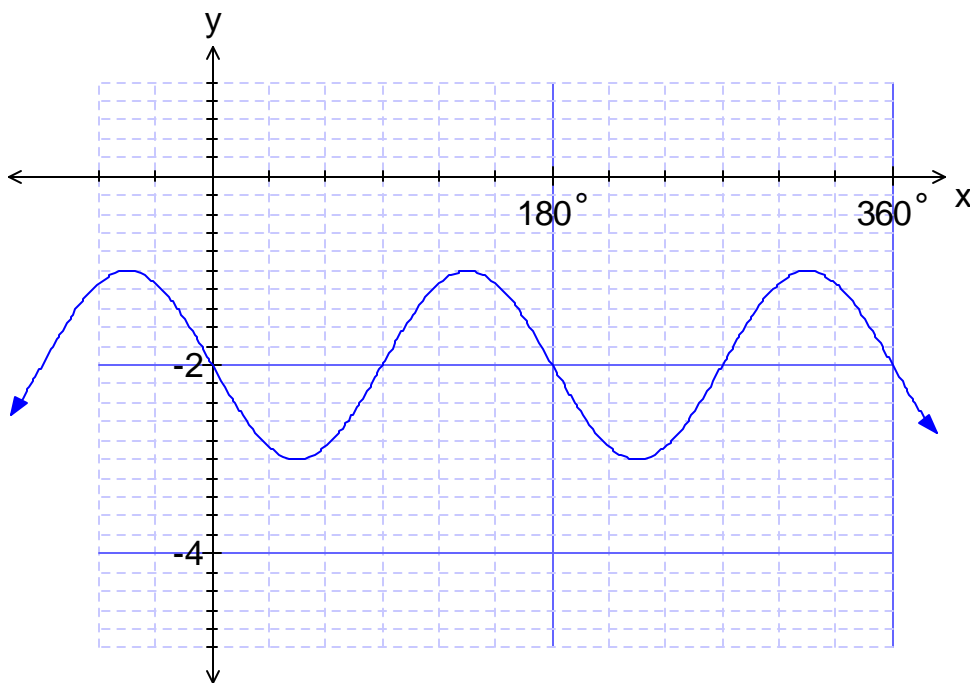
15. If  $\sin\theta = 0.5$ , what are the two possible values for  $\theta$ ?  
 **$30^\circ$  or  $150^\circ$**

16. Write the mapping rule for the equation:  $-\frac{1}{2}(y-3) = \sin 90(x-2)$

$$(x, y) \rightarrow \left(\frac{1}{90}x + 2, -2y + 3\right)$$

17. A Ferris wheel with a diameter 18 m is 1m above the ground as it rotates. A graph of height vs. time as the wheel rotates will be periodic. What is the equation of the sinusoidal axis for this graph?  **$y=10$**

18. What choices are possible for the horizontal translation for the following graph if it is a transformation of the graph of  $y = \sin x$ ? **H.T. of  $90$  or  $270$ , or with a reflection in the x-axis:  $0, 180, 360$**



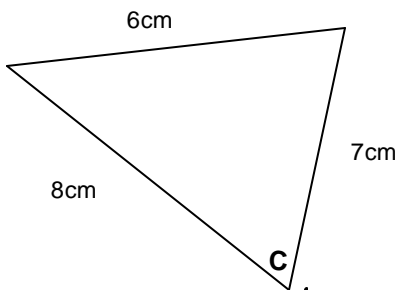
19. For the graph in #18, what is the horizontal stretch factor?  **$\frac{1}{2}$**

20. Describe the transformations from  $y = \sin x$  for the equation  $-\frac{1}{3}(y+3) = \sin \frac{1}{3}(x-2)$

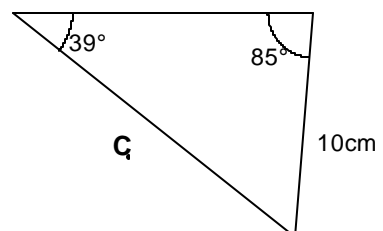
**A reflection in the x-axis, a vertical stretch of 3, a horizontal stretch of 3, a vertical translation of -3 and a horizontal translation of 2.**

21. What is the amplitude of the graph of the equation,  $-3(y-3) = \sin(x-30)$ ?  **$1/3$**

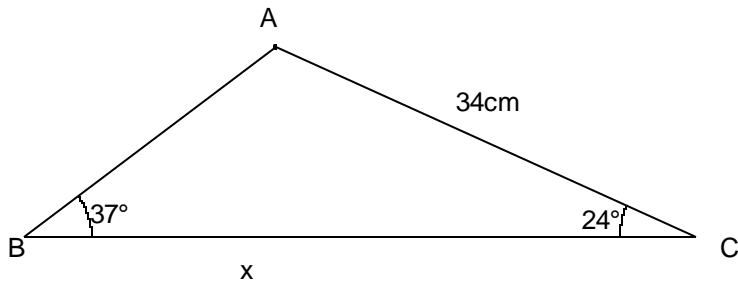
22. What is the solution for  $\angle C$ ?  **$46.6^\circ$**



23. Calculate C in the following triangle  **$15.8\text{cm}$**



24. Solve for x. **49.4cm**

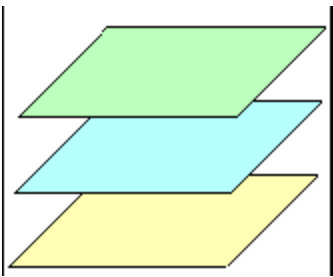


25. Given  $\triangle XYZ$  with  $\angle X = 43^\circ$ ;  $x=16$  and  $y=20$ , find  $\angle Y$ .  **$58.5^\circ$  or  $121.5^\circ$**

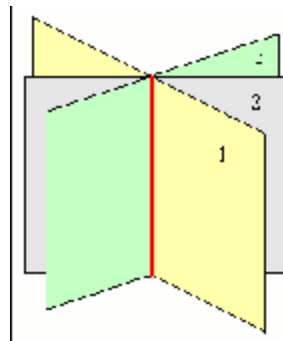
26. A phone company charges a base fee of \$20.00 per month plus an additional charge of 15 cents for every long distance minute. Write an equation to represent this situation:  **$C=0.15m+20$**

27. Which of the following diagrams illustrates a system of equations where there is just one solution? **C**

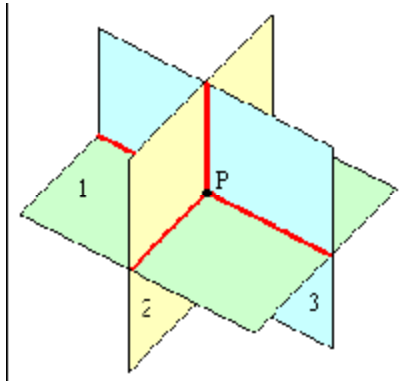
A.



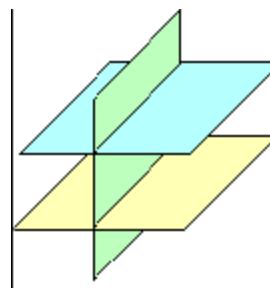
B.



C.



D.

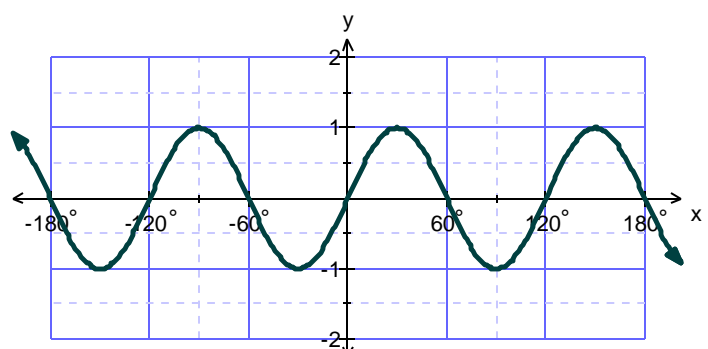


28. Write the system of equations that correspond to the matrix equation:

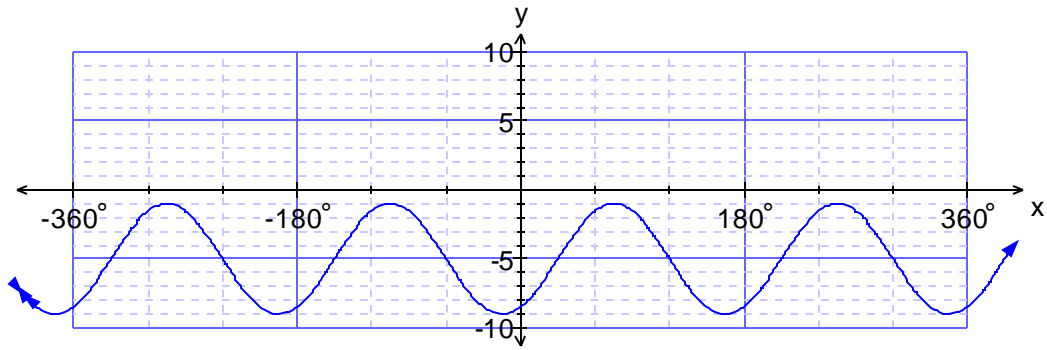
$$\begin{bmatrix} 1 & 4 & 2 \\ 1 & 1 & 0 \\ 2 & -3 & 4 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 13 \\ 0 \\ -2 \end{bmatrix}$$

$$\begin{aligned} x + 4y + 2z &= 13 \\ x + y &= 0 \\ 2x - 3y + 4z &= -2 \end{aligned}$$

29. What is the period of the graph shown?  **$120^\circ$**



30. What is the equation of the sinusoidal axis of the graph below?  $y=-5$



31. Solve the following system of equations by elimination **or** substitution.  $(-2,3,1)$

$$-3x + 2y - 6z = 6$$

$$5x + 7y - 5z = 6$$

$$x + 4y - 2z = 8$$

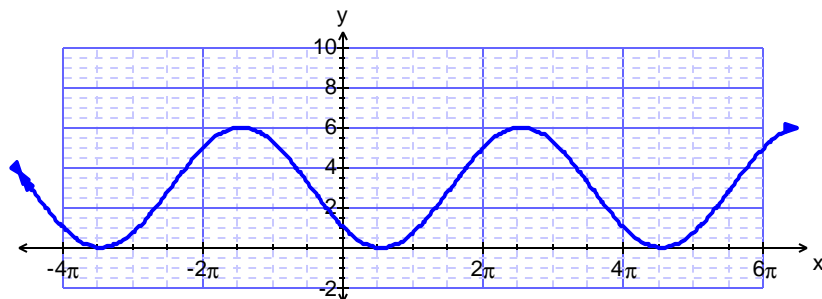
32. Telus charges \$20 a month plus \$0.15 per minute. Bell charges \$30 on the first visit plus \$0.1 per minute. Determine when both companies cost the same. **At 200min.**

33. Complete the table for the following transformations of sine and cosine.

	$2(y - 1) = \sin \frac{1}{3}(x + 30)$	$-\frac{1}{2}y = \sin 2(x - 45)$
Vertical Stretch	$\frac{1}{2}$	2
Vertical Translation	1	0
Amplitude	$\frac{1}{2}$	2
Equation of Sinusoidal Axis	$y=1$	$y=0$
Period	$1080^\circ$	$180^\circ$
Horizontal Translation	$-30^\circ$	$45^\circ$
Horizontal Stretch	3	$\frac{1}{2}$
Mapping Rule	$(x,y) \rightarrow (3x-30, \frac{1}{2}y+1)$	$(x,y) \rightarrow (\frac{1}{2}x+45, -2y)$

34. a) Using a method of your choice, graph the following function:

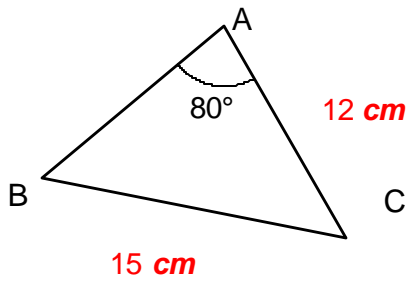
$$\frac{1}{3}(y - 3) = \sin \frac{1}{2}(x - 30^\circ)$$



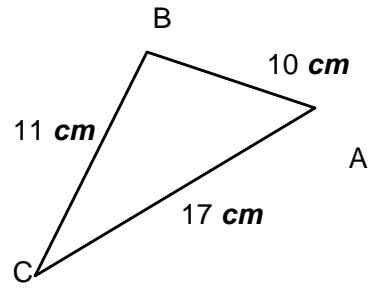
b) What are the domain and range for the above function? **Domain:  $\{x|x \in \mathbf{R}\}$**   
**Range:  $\{y|0 \leq y \leq 6, y \in \mathbf{R}\}$**

35. Find each missing measure:

a) Find  $\angle B$ .  $51.98^\circ$  (reject  $128^\circ$ )



b) Find  $\angle A$ .  $38^\circ$



36. Find the inverse of the following matrix:

$$\begin{bmatrix} 5 & -4 \\ -3 & 2 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -2 \\ 3 & 5 \\ -\frac{1}{2} & -\frac{5}{2} \end{bmatrix}$$