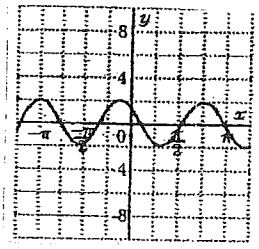
Math 12 **TRIGONOMETRIC FUNCTIONS REVIEW** Name: _____

1. The graph of y = cos x is transformed to y = acos(x – c) + d by a vertical compression by a factor of ½ and a translation 3 units up. The new equation is :

   _____

2. What would be a possible phase shift for the graph shown if we consider the graph to be a sine function of the form y = asin(x – c)?



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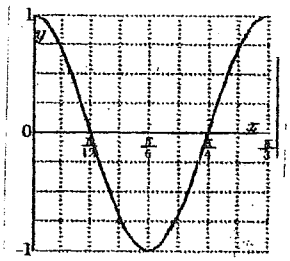
3. Determine the range of the function $y = 3\sin\left(x+\frac{\pi}{4}\right) + 1$ _____

4. The graph y = cosx is transformed to y = acosb(x – c) + d by a horizontal expansion by a factor of 3 and a translation of $\frac{\pi}{4}$ units to the left. The new equation is: _____

5. What is the equation of the graph shown?



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6. Find the phase shift and period for the function $y = 6\cos 8\left(x-\frac{\pi}{4}\right)$-2. _____

7. Write an equation for a cosine function with amplitude of 3, a period of 2, a phase shift of -2, and a vertical displacement of 5.

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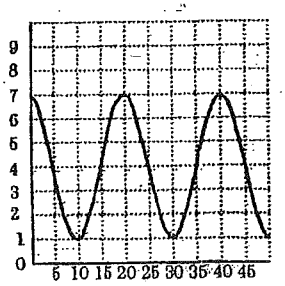
8. Write the equation of the function shown in the form: $y = a\cos\frac{2\pi}{p}x + b$



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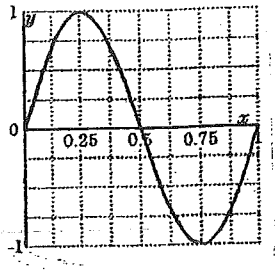
9. From the given diagram, find p and write the equation of the function in the form $y = \sin\frac{2\pi}{p}x$.



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10. For what value(s) of t does a minimum occur for the following function?

$y = 7\sin 2\pi\frac{(t-1)}{3} - 4$ _____

11. At a seaport, the depth of the water, h metres, at a time t hours, during a certain day is given by

$h = 3.1\sin 2\pi\frac{(t-4)}{12.4} + 6.7$

What is the maximum depth of water? _____

12. A Ferris wheel has a radius of 42 m. Its center is 43 m above the ground. It rotates once every 80s. Supppose you get on the bottom at t = 0. Write an equation that expresses your height as a function of elapsed time.

_____

13. What are the equations of the asymptotes for the function $y = \tan\frac{2\pi}{8}x$ where $0 \leq x \leq 8$.

_____

14. What is the period of the function $y = 5\sec 0.50x$? _____

15. If $y = f(x)$ has a period of 12, then what is the period of $y = f(3x)$? _____

16. Solve for t for the nearest tenth, where $0 \leq t \leq \pi$

$4.3\sin\left(\frac{2\pi}{14.8}(t+1.7)\right) - 1.4 = 2.1$ _____

17. A ferris wheel of radius 8.9 m rotates once each 136 seconds. If the bottom of the ferris wheel is 1.2 m above the ground and the ride starts from the bottom:

(a) find the cosine equation to describe the height of the ferris wheel, y metres above the ground, as a function of the time, t seconds after the ride starts.

(b) Find the height of the ferris wheel 3 minutes after the ride starts.

(c) Find the first time the ferris wheel reaches a height of 5 m (to the nearest hundredth of a second).

18. The first high tide depth of 7.8 m at a buoy in a harbour occurs at 3:30 am, and the first low tide depth of 3.6 m occurs at 9:45 am.

(a) Find a cosine equation to describe the depth of the water, y metres, as a function of number of hours from midnight.

(b) Find the depth of the water at 4:40 pm, to the nearest tenth of a meter.(2 marks)

(c) What time will the water depth reach 6.0 m for the first time after noon?(2 marks)

19. For the following, state
(a) amplitude (b) phase shift (c) period (d) vertical displacement
(e) maximum value and where it occurs (find the general equation) (f) minimum value and where it occurs (find the general equation) (g) sketch the graph for 3 cycles (0.5 marks each, graphs = 1 mark)

(i) $y = 4\sin 2x - 1$

(a) _____

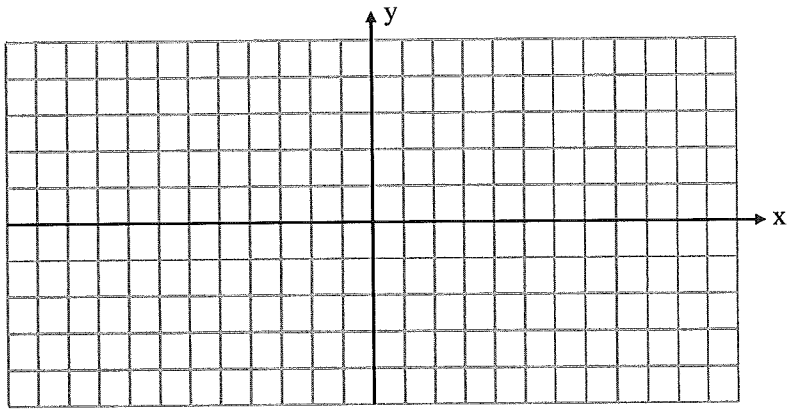
(b) _____

(c) _____

(d) _____

(e) _____

(f) _____



(ii) $y = -3\cos 2\left(x - \frac{\pi}{4}\right) + 1$

(a) _____

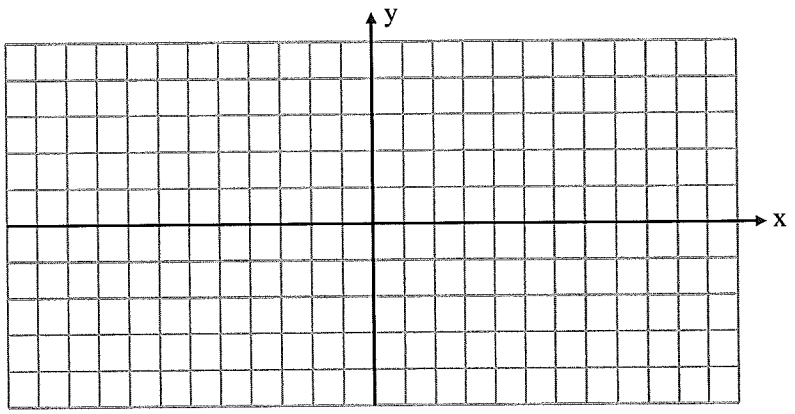
(b) _____

(c) _____

(d) _____

(e) _____

(f) _____



(iii) $y = 3.5\cos 2\pi\left(\frac{x-4}{7}\right) + 5.8$

(a) _____

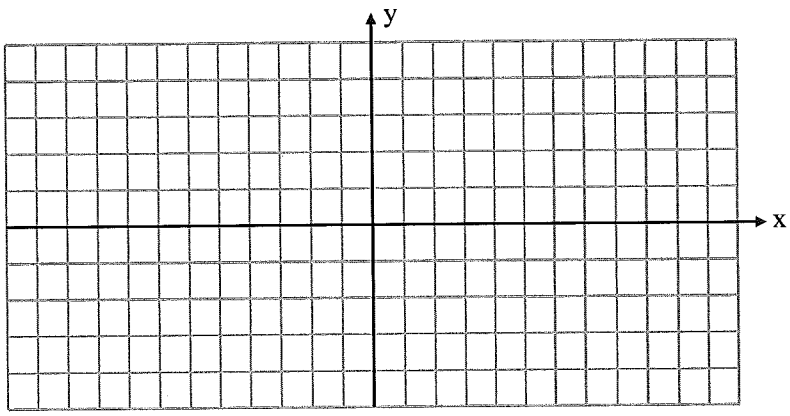
(b) _____

(c) _____

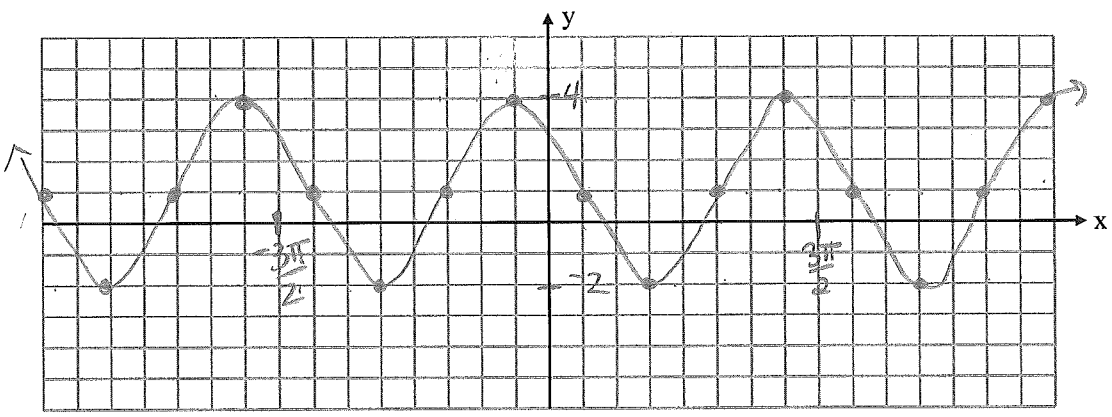
(d) _____

(e) _____

(f) _____



(20) (a) Find 2 sine equations (one with a positive phase shift, and one with a negative phase shift) to describe the following graph.



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