

# Pre-Calculus 12 Chapter 5

## Practice Test - KEY

1. (a) Quadrant II  
(b) quadrant II  
(c) quadrant III  
(d) Quadrant II.
  
2. (a) 0.35  
(b) -3.23  
(c)  $-100.27^\circ$   
(d)  $75^\circ$
  
3. (a) ~~See graph~~ 0.467  
(b) ~~See graph~~  $40^\circ$   
(c) ~~See graph~~ 3.28  
(d) ~~See graph~~  $255^\circ$

4. (a)  $(\frac{-\sqrt{3}}{2}, \frac{1}{2})$   
(b)  $(\frac{-\sqrt{3}}{2}, -\frac{1}{2})$   
(c) (0, 1)  
(d)  $(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$   
(e)  $(-\frac{1}{2}, \frac{\sqrt{3}}{2})$   
(f)  $(\frac{1}{2}, -\frac{\sqrt{3}}{2})$

5. (a)  $P\left(\frac{\pi}{2}\right)$  and  $P\left(-\frac{3\pi}{2}\right)$   
 (b)  $P\left(\frac{11\pi}{6}\right)$  and  $P\left(-\frac{\pi}{6}\right)$   
 (c)  $P\left(\frac{3\pi}{4}\right)$  and  $P\left(-\frac{5\pi}{4}\right)$   
 (d)  $P\left(\frac{2\pi}{3}\right)$  and  $P\left(-\frac{4\pi}{3}\right)$

6.  $\sin \theta = \frac{2\sqrt{2}}{3}$ ,  $\tan \theta = 2\sqrt{2}$ ,  $\sec \theta = 3$ ,

$\csc \theta = \frac{3}{2\sqrt{2}}$  or  $\frac{3\sqrt{2}}{4}$ ,  $\cot \theta = \frac{1}{2\sqrt{2}}$  or  $\frac{\sqrt{2}}{4}$

7. (a) 1                      (b)  $-\frac{\sqrt{2}}{2}$   
 (c)  $\sqrt{3}$                     (d)  $-\frac{2\sqrt{3}}{3}$   
 (e) 0                        (f)  $-\frac{2\sqrt{3}}{3}$

- 8. (a)  $y = 3 \cos 2x$   
 (b)  $y = 4 \cos \frac{12}{5}x$   
 (c)  $y = \frac{1}{2} \cos \frac{1}{2}x$   
 (d)  $y = \frac{3}{4} \cos 12x$

9. (a)  $y = 8 \sin 2x$   
 (b)  $y = 0.4 \sin 6x$   
 (c)  $y = \frac{3}{2} \sin \frac{1}{2}x$   
 (d)  $y = 2 \sin 3x$

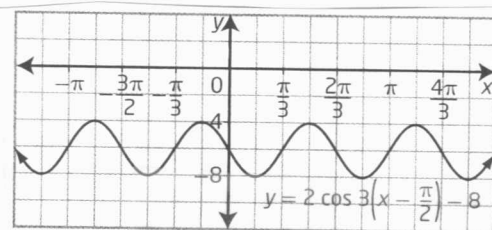
10. (a) Amplitude is 2

Period is  $\frac{2\pi}{3}$

phase shift is  $\frac{\pi}{2}$  units right

Vertical displacement is 8 units down.

See graph



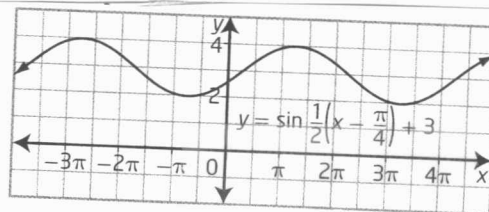
(b) Amplitude is 1

period is  $4\pi$

phase shift is  $\frac{\pi}{4}$  units right

vertical displacement is 3 units up

See graph



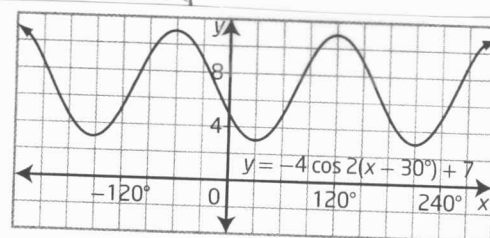
(c) Amplitude is 4

Period is  $180^\circ$

phase shift is  $30^\circ$  right.

vertical displacement is 7 units up.

See graph



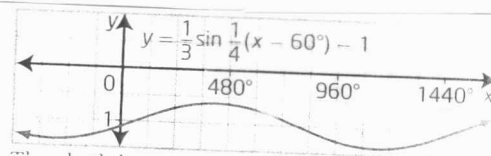
(d) Amplitude is  $\frac{1}{3}$

period is  $1440^\circ$

phase shift is  $60^\circ$  right

vertical displacement is 1 unit down

See graph



$$11. (a) y = 3 \sin 2(x - 45^\circ) + 1$$

$$y = -3 \cos 2x + 1$$

$$(b) y = 2 \sin 2x - 1$$

$$y = 2 \cos 2(x - 45^\circ) - 1$$

$$(c) y = 2 \sin 2(x - \frac{\pi}{4}) - 1$$

$$y = -2 \cos 2x - 1$$

$$(d) y = 3 \sin \frac{1}{2}(x - \frac{\pi}{2}) + 1$$

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

$$12. (a) y = 4 \sin 2(x - \frac{\pi}{3}) - 5$$

$$(b) y = \frac{1}{2} \cos \frac{1}{2}(x + \frac{\pi}{6}) + 1$$

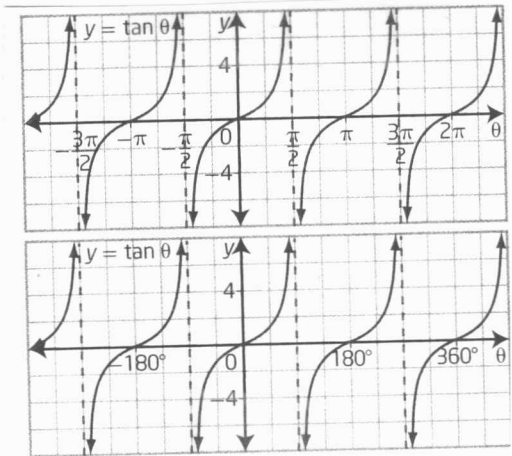
$$(c) y = \frac{2}{3} \sin \frac{2}{3}x - 5$$

13. (a) vertically stretched by a factor of 3 about the  $x$ -axis, horizontally stretched by a factor of  $\frac{1}{2}$  about the  $y$ -axis, translated  $\frac{\pi}{3}$  units right and 6 units down

(b) vertically stretched by a factor of 2 about the  $x$ -axis, reflected in the  $x$ -axis, horizontally stretched by a factor of 2 about the  $y$ -axis, translated  $\frac{\pi}{4}$  units left and 3 units down.

(c) vertically stretched by a factor of  $\frac{3}{4}$  about the x-axis, horizontally stretched by a factor of  $\frac{1}{2}$  about the y-axis, translated  $30^\circ$  right and 10 units up.

(d) reflected in the x-axis, horizontally stretched by a factor of  $\frac{1}{2}$  about the y-axis, translated  $45^\circ$  left and 8 units down.



14. (a) see graph

(b) i) domain  $x \neq -\frac{3\pi}{2}, -\frac{\pi}{2}, \frac{\pi}{2}, \frac{3\pi}{2}$

ii) range  $y \in \mathbb{R}$

iii) y-intercept = 0

iv) x-intercepts:  $-2\pi, -\pi, 0, \pi, 2\pi$

v) asymptotes:  $x = -\frac{3\pi}{2}, -\frac{\pi}{2}, \frac{\pi}{2}, \frac{3\pi}{2}$

15. (a)  $L = -3.7 \cos \frac{2\pi}{365} (t+10) + 12$

(b) approximately 12.8 h of daylight.

16. (a) approximately 53 sunspots

(b) around the year 2007

(c) around the year 2003