

Math 111, answers to review problems

Multiple choice.

1d

2a

3a

4e(246 degrees)

5b

6c

7d

8e

9a

10d

11b

12a

13c

14a

15b

16a

17a

18b

19b

20c

21a

22a

23c

24b

25e(4.91ft)

26c

27e(t/m)

28b

29c

30c

31a

32a

33c

34e(-4, - $\sqrt{65}$)

35c

36c

37c

38c

39c

40e(4)

41a

42c

43e(2/3 right)

44d

45d

46c

47e(2pi/3)

48a

49d

50c

51a

52d

53d

54c

55b

56b

Partial credit

2. $x = 7.28$ cm, $y = 47.67$ cm

3. $x = 6.45$ cm, $\theta = 57.19^\circ$

4. $x = 8.31$ cm, $\alpha = 27.92^\circ$

5. $\sin x = \frac{-\sqrt{5}}{3}$, $\csc x = \frac{-3}{\sqrt{5}}$, $\tan x = \frac{-\sqrt{5}}{2}$

6. a) On the unit circle (centered at the origin) start at the point (1,0) and travel along the circle x units (clockwise, if x is positive). Stop at the point (a,b). By definition, $\sin x = b$.

After traveling one complete cycle around the circle, the values of b will repeat in the same order, so $\sin x$ is periodic.

b) On the unit circle, etc. $\tan x = b/a$.

As a approaches 0, b/a increases or decreases without bound.

The value of a is 0 at $x = \frac{\pi}{2}, \frac{3\pi}{2}$ and $2k\pi$ plus these values

(k any integer). These give us the x values of the vertical asymptotes.

c) On the unit circle, etc. $\cos x = a$.

As long as we stay on the unit circle, the horizontal coordinate (a) will stay between -1 and 1, inclusive.

7. $\cos(2x) = \cos(x+x) = (\cos x)(\cos x) - (\sin x)(\sin x) = \cos^2 x - \sin^2 x$.

8.,9. $\frac{(\sqrt{3})-1}{2\sqrt{2}}$

10. $x = 1.49, 3.72, 6.70, 9.01$ (approximately)

11. $x = -5.89, 9.82, 25.53, 41.24$ (approximately)

12. $x = .96, 5.11$ (app)

13. $a = -1/2, b = \sqrt{3}/2$

14. $a = -\sqrt{3}/2, b = -1/2$

15. $a = b = -1/\sqrt{2}$

16. a) $y = 2 + 4 \cos((\pi/4)(x-6))$ others possible

b) $y = 200 + 100 \sin(5\pi x)$ others possible

17a) $-\pi/6$

b) .5

c) 1

d) $\sqrt{1-x^2}$

e) $\frac{x}{\sqrt{1-x^2}}$

18a) $y = 4 + 2 \cos((\pi/2)x)$ others possible

b) $y = \tan(.5x)$ others possible

c) $y = -7 - 3 \cos(\pi x)$ others possible

19a) 24

b) 6, 14, 22 others possible

c) 4, 8, 12 others possible

d) $y = 21 + 3 \sin((\pi/4)(x-4))$ others possible

20 all angles are in degrees

a) $A = 44.42, B = 57.12, C = 7.46$

b) $A = 7.44, B = 14.06, C = 158.57$

c) $A = 39.37, B = 62.63, c = 7.71$ ft

d) $A = 44.78, C = 110.22, c = 13.32$ m and $A = 135.22, C = 19.78, c = 4$. m

e) $A = 2.55, C = 116.45, c = 9.37$ cm

f) $C = 90, a = 3.86$ ft, $b = 4.6$ ft

21b), c) $x = 2$ (app), (QII), $x = 4.3$ (app), QIII

22 b), c) $x = 3.9$, (QIII), $x = 5.5$, (QIV)

23a) 16, 8, 4 others possible

b) 16. Two average values are at least $\frac{1}{2}$ a period apart. These two are 8 units apart, so the largest possible period is $2(8) = 16$.