MATH 1316 MyLab Math Mid-Term Exam Study Sheet

Learning and practice has occured using the student resources and graded assignments in this course. When studying math you should not study in order, practice using the eText and MLM HW assignments. If you can work the questions without your notes correctly then you are ready for an exam, otherwise seek help and ask questions. MLM exams have 12 to 20 questions.

**NOTE: This study sheet may reflect some exam questions, however, this study sheet may not reflet every type of question that may be included on the exam.*

Find the exact value of the expression. Do not use a calculator.

1. $\tan^{-1}\left[\tan\left(\frac{5\pi}{7}\right)\right]$

2. $\sin^{-1}\left[\sin\left(\frac{3\pi}{5}\right)\right]$

3. $\sec\left(\tan^{-1}\frac{\sqrt{3}}{3}\right)$

4. $\cos\left(\sin^{-1}\frac{1}{4}\right)$

5. $\cos^{-1}\left[\cos\left(-\frac{3\pi}{5}\right)\right]$

6. $\cos 120° \tan 60°$

7. $\cos^{-1}\left(\sin\frac{7\pi}{6}\right)$

8. $\sin 330° \sin 270°$

Graph the function. Show at least one period.

9. $y = -4\sin\left(3x + \frac{\pi}{2}\right)$

10. $y = \frac{7}{2}\cos\left(-\frac{1}{2}x\right)$

Write the equation of a sine function that has the given characteristics.

11. Amplitude: 4
    Period: π
    Phase Shift: – 5

Draw the angle.

12. $-120°$

Name the quadrant in which the angle θ lies.

13. $\cot\theta < 0, \quad \cos\theta > 0$

14. $\tan\theta < 0, \quad \sin\theta < 0$

15. $\csc\theta > 0, \quad \sec\theta > 0$

Solve the equation. Give a general formula for all the solutions.

16. $\cos(2\theta) = \frac{\sqrt{2}}{2}$

17. $\csc\frac{\theta}{3} = \frac{2\sqrt{3}}{3}$

Convert the angle in degrees to radians. Express the answer as multiple of π.

18. $87°$

A point on the terminal side of an angle θ is given. Find the exact value of the indicated trigonometric function of θ.

19. $(-5, 12)$ Find $\cos\theta$.

20. $(-4, -1)$ Find $\sec\theta$.

21. $(5, -4)$ Find $\tan\theta$.

22. $(2, -3)$ Find $\cot\theta$.

23. $(-5, -12)$ Find $\sin\theta$.

24. $(-2, -1)$ Find $\csc\theta$.

Use a calculator to find the value of the expression rounded to two decimal places.

25. $\sin^{-1}\left(-\frac{2}{3}\right)$

26. $\cos^{-1}\left(-\frac{\sqrt{2}}{3}\right)$

Convert the angle to a decimal in degrees. Round the answer to two decimal places.

27. 301°39'25"

28. $\cos\left[2\sin^{-1}\left(-\frac{5}{13}\right)\right]$

Use the information given about the angle θ, $0 \le \theta \le 2\pi$, to find the exact value of the indicated trigonometric function.

29. $\cos\theta = -\frac{3}{5}, \quad \pi < \theta < \frac{3\pi}{2}$ Find $\cos\frac{\theta}{2}$.

30. $\sec\theta = -\frac{5}{3}, \quad \frac{\pi}{2} < \theta < \pi$ Find $\sin\frac{\theta}{2}$.

Find the exact value of the indicated trigonometric function of θ. Do not use a calculator.

31. $\cos\theta = \frac{7}{25}, \quad \frac{3\pi}{2} < \theta < 2\pi$ Find $\cot\theta$.

32. $\cos\theta = \frac{8}{9}, \quad \tan\theta < 0$ Find $\sin\theta$.

33. $\sin\theta = -\frac{2}{5}, \quad \tan\theta > 0$ Find $\sec\theta$.

34. $\sin\theta = \frac{1}{6}, \quad \sec\theta < 0$ Find $\cos\theta$ and $\tan\theta$.

35. $\cot\theta = -\frac{3}{2}, \quad \cos\theta < 0$ Find $\csc\theta$.

Solve the equation on the interval $0 \le \theta < 2\pi$.

36. $\cot\left(2\theta - \frac{\pi}{2}\right) = 1$

37. $\sin^2\theta - \cos^2\theta = 0$

Convert the angle to D° M' S" form. Round the answer to the nearest second.

38. 168.19°

Find the exact solution of the equation.

39. $-\sin^{-1}(4x) = \frac{\pi}{4}$

Solve the problem.

40. An object is traveling around a circle with a radius of 20 meters. If in 10 seconds a central angle of $\frac{1}{5}$ radian is swept out, what is the linear speed of the object?

41. For the equation $y = -\frac{1}{2}\sin(4x + 3\pi)$, identify (i) the amplitude, (ii) the phase shift, and (iii) the period.

42. For the equation $y = -\frac{1}{2}\cos(2x - 2\pi)$, identify (i) the amplitude, (ii) the phase shift, and (iii) the period.

43. If $\tan\theta = \frac{7}{24}$, and $\pi < \theta < \frac{3\pi}{2}$, then find $\tan 2\theta$.

44. A pick–up truck is fitted with new tires which have a diameter of 43 inches. How fast will the pick–up truck be moving when the wheels are rotating at 380 revolutions per minute? Express the answer in miles per hour rounded to the nearest whole number.

45. If friction is ignored, the time t (in seconds) required for a block to slide down an inclined plane is given by the formula

$$t = \sqrt{\frac{2a}{g\sin\theta\cos\theta}}$$

where a is the length (in feet) of the base and $g \approx 32$ feet per second per second is the acceleration of gravity. How long does it take a block to slide down an inclined plane with base $a = 12$ when $\theta = 45°$? If necessary, round the answer to the nearest tenth of a second.

Use the Half–angle Formulas to find the exact value of the trigonometric function.

46. $\cos\frac{5\pi}{12}$

Establish the identity.

47. $1 + \sec^2 x \sin^2 x = \sec^2 x$

48. $\cos x \csc x \tan x = 1$

49. $\frac{\cot^2 x}{\csc x - 1} = \frac{1 + \sin x}{\sin x}$

50. $-\tan^2 x + \sec^2 x = \sec^2 x \cos^2 x$

51. $\frac{\sin x}{\csc x - 1} + \frac{\sin x}{\csc x + 1} = 2\tan^2 x$

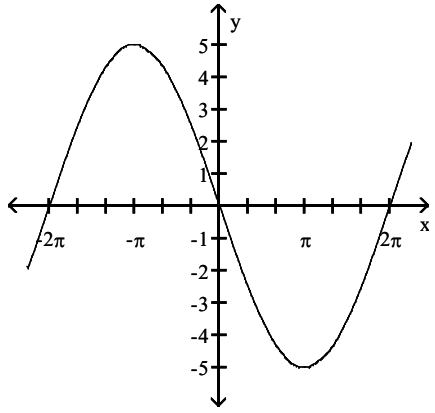
Use the information given about the angle θ, $0 \le \theta \le 2\pi$, to find the exact value of the indicated trigonometric function.

52. $\tan\theta = \frac{21}{20}, \quad \pi < \theta < \frac{3\pi}{2}$ Find $\sin(2\theta)$.

53. $\csc\theta = -\frac{3}{2}, \quad \tan\theta > 0$ Find $\cos(2\theta)$.

Find an equation for the graph.

54.



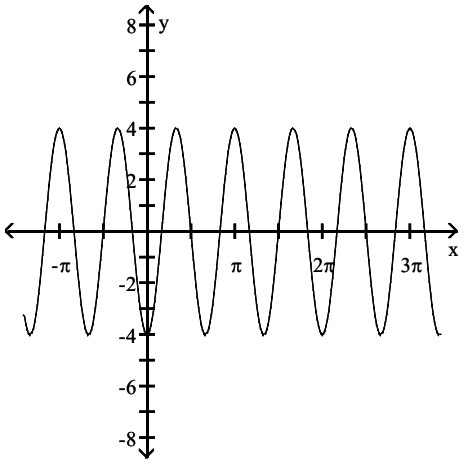
Find the exact value under the given conditions.

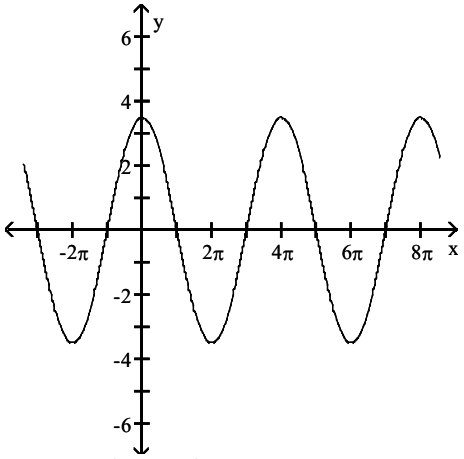
55. $\sin\alpha = \frac{12}{13}, \ \frac{\pi}{2} < \alpha < \pi; \quad \cos\beta = \frac{4}{5}, \ 0 < \beta < \frac{\pi}{2}$ Find $\sin(\alpha - \beta)$.

56. $\sin\alpha = -\frac{4}{5}, \ \pi < \alpha < \frac{3\pi}{2}; \quad \tan\beta = -\frac{2\sqrt{21}}{21}, \ \frac{\pi}{2} < \beta < \pi$ Find $\cos(\alpha + \beta)$.

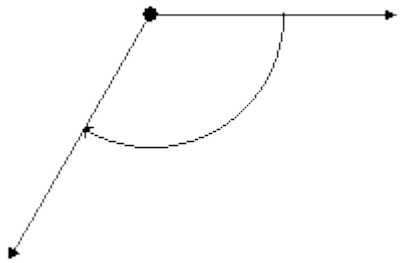
57. $\cos\alpha = -\frac{5}{13}, \ \frac{\pi}{2} < \alpha < \pi; \quad \sin\beta = \frac{15}{17}, \ \frac{\pi}{2} < \alpha < \pi$ Find $\tan(\alpha + \beta)$.

Answer Key
Testname: MATH 1316 MLM MID-TERM EXAM STUDY SHEET

1. $-\frac{2\pi}{7}$
2. $\frac{2\pi}{5}$
3. $\frac{2\sqrt{3}}{3}$
4. $\frac{\sqrt{15}}{4}$
5. $\frac{3\pi}{5}$
6. $-\frac{\sqrt{3}}{2}$
7. $\frac{2\pi}{3}$
8. $\frac{1}{2}$
9. 

10. 

11. $y = 4 \sin (2x + 10)$

12. 

13. IV
14. IV
15. I
16. $\theta = \frac{\pi}{8} + k\pi$, $\theta = \frac{7\pi}{8} + k\pi$
17. $\theta = \pi + 6k\pi$, $\theta = 2\pi + 6k\pi$
18. $\frac{29\pi}{60}$
19. $-\frac{5}{13}$
20. $-\frac{\sqrt{17}}{4}$
21. $-\frac{4}{5}$
22. $-\frac{2}{3}$
23. $-\frac{12}{13}$
24. $-\sqrt{5}$
25. -0.73
26. 2.06
27. 301.66°
28. $\frac{119}{169}$
29. $-\frac{\sqrt{5}}{5}$
30. $\frac{2\sqrt{5}}{5}$
31. $-\frac{7}{24}$
32. $-\frac{\sqrt{17}}{9}$
33. $-\frac{5\sqrt{21}}{21}$
34. $\cos\theta = -\frac{\sqrt{35}}{6}$, $\tan\theta = -\frac{\sqrt{35}}{35}$

35. $\frac{\sqrt{13}}{2}$

36. $\frac{3\pi}{8}, \frac{7\pi}{8}, \frac{11\pi}{8}$, and $\frac{15\pi}{8}$

37. $\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$

38. 168°11'24"

39. $x = -\frac{\sqrt{2}}{8}$

40. $\frac{2}{5}$ m/sec

41. (i) $\frac{1}{2}$ (ii) $-\frac{3\pi}{4}$ (iii) $\frac{\pi}{2}$

42. (i) $\frac{1}{2}$ (ii) π (iii) π

43. $\frac{336}{527}$

44. 49 mph

45. 1.2 sec

46. $\frac{1}{2}\sqrt{2-\sqrt{3}}$

47. $1 + \sec^2 x \sin^2 x = 1 + \frac{\sin^2 x}{\cos^2 x} = 1 + \tan^2 x = \sec^2 x.$

48. $\cos x \csc x \tan x = (\cos x)\left(\frac{1}{\sin x}\right)\left(\frac{\sin x}{\cos x}\right) = 1.$

49. $\frac{\cot^2 x}{\csc x - 1} = \frac{\csc^2 x - 1}{\csc x - 1} = \frac{(\csc x - 1)(\csc x + 1)}{\csc x - 1} = \csc x + 1 = \frac{1 + \sin x}{\sin x}.$

50. $-\tan^2 x + \sec^2 x = -\frac{\sin^2 x}{\cos^2 x} + \frac{1}{\cos^2 x} = \frac{1}{\cos^2 x}(-\sin^2 x + 1) = \sec^2 x \cos^2 x.$

51. $\frac{\sin x}{\csc x - 1} + \frac{\sin x}{\csc x + 1} = \frac{(\csc x + 1)\sin x + (\csc x - 1)\sin x}{\csc^2 x - 1} = \frac{1 + \sin x + 1 - \sin x}{\cot^2 t} = 2\tan^2 x.$

52. $\frac{840}{841}$

53. $\frac{1}{9}$

54. $y = -5 \sin\left(\frac{1}{2}x\right)$

55. $\frac{63}{65}$

56. $\frac{8 + 3\sqrt{21}}{25}$

57. $\frac{171}{140}$