

Use your *notes* and your *homework* from each section to study for the exam. Study all of your *formulas*. Do not limit your reviewing to only these problems.

Determine  $f^{-1}(x)$  for each.

1.  $f(x) = 3x - 1$

2.  $f(x) = \frac{1}{2}x + 7$

3.  $f(x) = \frac{2}{x}$

Evaluate each for  $f(x) = x - 3$  and  $g(x) = x^2 - 4$ .

4.  $(f+g)(x)$

5.  $(f-g)(x)$

6.  $(f \cdot g)(x)$

7.  $\left(\frac{f}{g}\right)(x)$

8.  $(f \circ g)(x)$

9.  $(g \circ f)(x)$

Find the domain and the range in set and interval notation.

10.  $y = \sqrt{x-2}$

11.  $y = |x-2|$

12.  $y = \frac{1}{x-2}$

13.  $y = x-2$

14.  $y = \frac{1}{\sqrt{x-2}}$  Domain only

15.  $y = \frac{1}{\sqrt{4-x^2}}$  Domain only

How will each graph change if at all?

16. If  $y = f(x)$  is changed to  $y = -f(x)$ .

18. If  $y = f(x)$  is changed to  $x = f(y)$ .

17. If  $y = f(x)$  is changed to  $y = f(-x)$ .

19. If  $y = f(x)$  is changed to  $y = 2f(x)$ .

$$20. \text{Graph } f(x) = \begin{cases} x+2, & x < 5 \\ x, & x = 5 \\ \sqrt{x-1}, & x > 5 \end{cases}$$

21. Find  $f(10)$  from #20

22. Find  $f(-7)$  from #20

The circular blade of a saw has a diameter of 8.2 inches and rotates 1620 revolutions per minute.

23) Find the angular speed in radians per second. Leave in **exact value**.

24) Find the linear speed of the saw teeth, in feet per second, as they contact the wood being cut.

Round final answer to the **nearest thousandth**.

25) Rewrite each complex number into trigonometric form. a)  $5 - 5i$  b)  $-2\sqrt{3} - 2i$

26) Find the indicated value of the complex number  $\left[2\left(\cos \frac{4\pi}{15} + i \sin \frac{4\pi}{15}\right)\right]^5$

27) Find the area of triangle ABC, where  $b = 3$  cm,  $c = 8$  cm, and  $\angle A = 45^\circ$ .

28) In  $\triangle ABC$ ,  $a = 11$ ,  $b = 9$ ,  $c = 6$ . Find  $\cos B$ .

29. Find the central angle of a circle with radius 10 inches and intersecting an arc of 30 inches. (give the angle to the nearest degree).

30. Find the radius of a circle with a central angle of 3.2 and intercepting an arc of 12 inches. (to the nearest tenth)

Determine one positive and one negative coterminal angle to each.

31.  $-50^\circ$

32.  $\frac{-5\pi}{7}$

33.  $\frac{2\pi}{9}$

Determine the coordinates on the unit circle of each angle given below. (exact answers!)

34.  $\frac{2\pi}{3}$

35.  $\frac{7\pi}{4}$

36.  $\frac{7\pi}{6}$

Evaluate each. (exact answers!)

37.  $\sin \frac{-7\pi}{3}$

38.  $\cos \frac{4\pi}{3}$

39.  $\sin \frac{11\pi}{4}$

40.  $\cos \frac{13\pi}{6}$

Determine the reference angle for each given angle.

41.  $368^\circ$

42.  $500^\circ$

43.  $280^\circ$

Evaluate each. (exact answers!)

44.  $\sec(\tan^{-1} 5)$

45a.  $\cos(\csc^{-1} 2)$

45b.  $\sin(\tan^{-1} -3)$

Evaluate each. (angles should be given in radians!)

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

47.  $\cos^{-1}\left(\frac{-1}{2}\right)$

48.  $\sin^{-1}\left(\frac{-\sqrt{2}}{2}\right)$

Convert each to radians. (leave answers in terms of  $\pi$ ).

49.  $35^\circ$

50.  $160^\circ$

Convert each to degrees.

51.  $\frac{4\pi}{3}$

52.  $\frac{7\pi}{6}$

Determine the quadrant in which theta terminates in.

53.  $\sin \theta < 0$  and  $\cos \theta > 0$

54.  $\tan \theta < 0$  and  $\cos \theta < 0$

Answer each as asked.

55. The terminal side of an angle,  $x$  (in standard position) contains the point  $(-3,4)$ , then determine the  $\sec x$ .

56. The terminal side of an angle,  $x$  (in standard position) contains the point  $(-1,-5)$ , then determine the  $\tan x$ .

57. Give the three Pythagorean identities.

Simplify each.

58.  $\csc x \sin\left(\frac{\pi}{2} - x\right)$

59.  $\frac{1 + \tan^2 \theta}{\sin^2 \theta - 1}$

60.  $\frac{\sin \theta}{1 + \cos \theta} + \frac{1 + \cos \theta}{\sin \theta}$

Prove each. You must show all steps!

61.  $\sec \theta - \sin \theta \tan \theta = \cos \theta$

62.  $\frac{\cot A(1 + \tan^2 A)}{\tan A} = \csc^2 A$

Solve each.

63.  $2 \cos x \sin x - \sin x = 0$  for  $0 \leq x < 2\pi$

64.  $\sin \frac{x}{4} = \frac{\sqrt{3}}{2}$  for  $0 \leq x < 2\pi$

65.  $2 \sin \theta - \cos \theta = 0$  for  $0 \leq \theta < 360^\circ$

66.  $2 \sin^2 x - \sin x - 1 = 0$  for  $0 \leq x < 2\pi$

Determine the amplitude and period of each.

67.  $y = 3 \sin 2x$

68.  $y = \frac{1}{2} \cos 3x$

69.  $y = 4 \sin \frac{x}{3}$

Graph each of the following.

70.  $y = 3 - 2 \sin \frac{1}{2}\left(x - \frac{\pi}{2}\right)$

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

Fill in the blank for each.

72.  $\sin 48^\circ = \cos$  \_\_\_\_\_

73.  $\cos 38^\circ = \sin$  \_\_\_\_\_

74.  $\tan 82^\circ = \cot$  \_\_\_\_\_

75. Simplify each completely.
- A)  $\cos(x + \pi)$       B)  $\cos(x - \pi)$       C)  $\sin(x + \pi)$       D)  $\sin(x - \pi)$
76. Determine the exact value of each.
- A)  $\cos 75^\circ$       B)  $\sin 75^\circ$       C)  $\cos 15^\circ$       D)  $\sin 15^\circ$
77. Simplify each as much as possible.
- A)  $2\cos 3A \sin 3A$       B)  $1 - 2\sin^2 \frac{\pi}{8}$       C)  $2\cos^2 \frac{\pi}{12} - 1$       D)  $2\cos \frac{x}{2} \sin \frac{x}{2}$
78. Solve each for:  $0 \leq x < 2\pi$
- A)  $\cos 2x - 1 = \sin x$       B)  $\cos 2x = \cos x + 2$       C)  $2\cos x + \sin 2x = 0$

79) In  $\triangle RST$ ,  $\angle T = 38^\circ$ ,  $\angle R = 67^\circ$ , and  $r = 28.3$ ; find the length of  $s$ .

80) Find the standard form of the complex number:  $5\left(\cos \frac{4\pi}{3} + i \sin \frac{4\pi}{3}\right)$ .

ANSWERS:

1.  $y = \frac{x+1}{3}$

2.  $y = 2x - 14$

3.  $y = \frac{2}{x}$

4.  $x^2 + x - 7$

5.  $-x^2 + x + 1$

6.  $x^3 - 3x^2 - 4x + 12$

7.  $\frac{x-3}{x^2-4}$

8.  $x^2 - 7$

9.  $x^2 - 6x + 5$

10.  $\begin{cases} D: \{x|x \geq 2\} \text{ or } [2, \infty) \\ R: \{y|y \geq 0\} \text{ or } [0, \infty) \end{cases}$

11.  $\begin{cases} D: \{x|x \in \mathbb{R}\} \text{ or } (-\infty, \infty) \\ R: \{y|y \geq 0\} \text{ or } [0, \infty) \end{cases}$

12.  $\begin{cases} D: \{x|x \neq 2\} \text{ or } (-\infty, 2) \cup (2, \infty) \\ R: \{y|y \neq 0\} \text{ or } (-\infty, 0) \cup (0, \infty) \end{cases}$

13.  $\begin{cases} D: \{x|x \in \mathbb{R}\} \text{ or } (-\infty, \infty) \\ R: \{y|y \in \mathbb{R}\} \text{ or } (-\infty, \infty) \end{cases}$

14.  $\begin{cases} D: \{x|x > 2\} \text{ or } (2, \infty) \\ R: \{y|y > 0\} \text{ or } (0, \infty) \end{cases}$

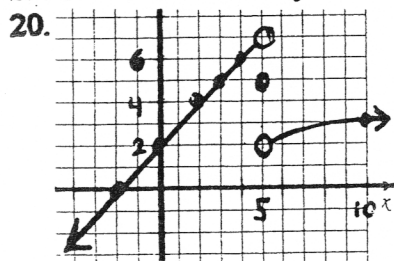
15a.  $D: \{x|-2 < x < 2\} \text{ or } (-2, 2)$

16. Reflect in x-axis

17. Reflect in y-axis

18. Reflect in  $y = x$  line

19. Stretched vertically



21.  $f(10) = 3$

22.  $f(-7) = -5$

23)  $54\pi \text{ rad/sec}$

24)  $57.962 \text{ ft/sec}$

25) a)  $5\sqrt{2}(\cos \frac{7\pi}{4} + i \sin \frac{7\pi}{4})$  b)  $4(\cos \frac{7\pi}{6} + i \sin \frac{7\pi}{6})$

26)  $-16 - 16\sqrt{3}i$  27)  $6\sqrt{2} \text{ cm}^2$  28)  $\cos B = \frac{19}{33}$

29.  $172^\circ$

30. 3.8

31.  $310^\circ, -410^\circ$

32.  $\frac{9\pi}{7}, \frac{-19\pi}{7}$

33.  $\frac{20\pi}{9}, \frac{-16\pi}{9}$

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

35.  $(\frac{\sqrt{2}}{2}, \frac{-\sqrt{2}}{2})$

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

37.  $\frac{-\sqrt{3}}{2}$

38.  $\frac{-1}{2}$

39.  $\frac{\sqrt{2}}{2}$

40.  $\frac{\sqrt{3}}{2}$

41.  $8^\circ$

42.  $40^\circ$

43.  $80^\circ$

44.  $\sqrt{26}$

45a.  $\frac{\sqrt{3}}{2}$

45b.  $\frac{-3\sqrt{10}}{10}$

46.  $\frac{\pi}{3}$

49.  $\frac{7\pi}{36}$

47.  $\frac{2\pi}{3}$

50.  $\frac{8\pi}{9}$

48.  $\frac{-\pi}{4}$

51.  $240^\circ$   
52.  $210^\circ$

53. quad. four

54. quad. two

55.  $\frac{-5}{3}$

56. 5

57. in your notes & the text p. 280

58.  $\cot x$

59.  $-\sec^4 \theta$

60.  $2 \csc \theta$

61. proof

62. proof

63.  $0, \pi, \frac{\pi}{3}, \frac{5\pi}{3}$

64.  $\frac{4\pi}{3}$

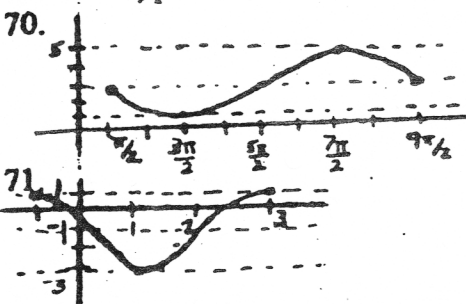
65.  $26.6^\circ, 206.6^\circ$

66.  $\frac{7\pi}{6}, \frac{11\pi}{6}, \frac{\pi}{2}$

67.  $A = 3, \text{ per} = \pi$

68.  $A = \frac{1}{2}, \text{ per} = \frac{2\pi}{3}$

69.  $A = 4, \text{ per} = 6\pi$



72.  $\cos 42^\circ$

73.  $\sin 52^\circ$

74.  $\cot 8^\circ$

75. A)  $-\cos x$  B)  $-\cos x$  C)  $-\sin x$  D)  $-\sin x$

76. A)  $\frac{\sqrt{6}-\sqrt{2}}{4}$  B)  $\frac{\sqrt{6}+\sqrt{2}}{4}$  C)  $\frac{\sqrt{6}+\sqrt{2}}{4}$  D)  $\frac{\sqrt{6}-\sqrt{2}}{4}$

77. A)  $\sin 6A$  B)  $\frac{\sqrt{2}}{2}$  C)  $\frac{\sqrt{3}}{2}$  D)  $\sin x$

78. A)  $0, \pi, \frac{7\pi}{6}, \frac{11\pi}{6}$  B)  $\pi$  C)  $\frac{\pi}{2}, \frac{3\pi}{2}$

79)  $s = \frac{28.3 \sin 75^\circ}{\sin 67^\circ}$

80)  $-\frac{5}{2} - \frac{5\sqrt{3}}{2}i$