Chapter 1: Precalculus Review

1. (Sec 1.1)
   Find the smallest and the largest values of x that satisfy each of the following inequalities:
   A) $|3x-7|\le 8$
   B) $|2x-5|\le 13$
   Ans: A) $x_{\min}=-\frac{1}{3}, x_{\max}=5$
   B) $x_{\min}=-4, x_{\max}=9$

2. (Sec 1.1)
   Suppose that $f(x)$ is even and $g(x)$ is odd. Determine whether the following functions are even, odd, or neither:
   A) $f(x)+\cos(g(x))$
   B) $f(x)-g(x)$
   C) $f(x)^3+g(x)^2$
   D) $\dfrac{f(x)g(x)}{1+f(x)g(x)^2}$
   Ans: A) Even
   B) Neither
   C) Even
   D) Odd

3. (Sec 1.1)
   What are the smallest and largest values of x satisfying $|x-5|\le 4$ and $|x-4|>2$?
   Ans: Smallest: 1, largest: 9

4. (Sec 1.1)
   Find the greatest and smallest values of (x) such that x satisfies the inequalities
   $|2x-5|\le 7$ and $|x-1|\ge \frac{1}{2}$.
   Ans: $x_{\min}=-1$ $x_{\max}=6$

5. (Sec 1.1)
State whether the following functions are even, odd, or neither:
A) $\sin(x^2+1)$
B) $\sin(x^3+x)$
C) $\dfrac{1}{1-(x-2)^2}$
D) $\sin(\cos x^3)$
Ans: A) Even
B) Odd
C) Neither
D) Even

6. (Sec 1.1)
Find the radius of the circle with center $(-2,1)$ passing through $(0,2)$.
Ans: $\sqrt{5}$

7. (Sec 1.1)
Suppose that $|2x-3|\le 5$. What are the minimum and maximum possible values of $|3x-7|$?
Ans: Minimum 0, maximum 10

8. (Sec 1.1)
Complete the statement:
if $|2x-1|<2$ and $|3-x|<5$ then,
A) $\left|x-\frac{1}{2}\right|<1$
B) $|3x-4|<7$
C) $\left|x-\frac{1}{2}\right|>1$
D) $|x-4|>1$
E) $|x-4|<1$
Ans: A

9. (Sec 1.1)
Find the greatest and smallest values of $|x|$ such that x satisfies the inequalities $|3x-1|\le 14$ and $|x+1|\ge 2$.
Ans: Minimum 1, maximum 5

10. (Sec 1.1)
Find the minimum and maximum values of $|6x-1|$ if $|4x+1| \le 3$.
Ans: Minimum 0, maximum 7

11. (Sec 1.1)
State whether the following functions are even, odd or neither:
A) $\frac{\cos x}{1+x^2}$
B) $\frac{x^3}{\sqrt{1+\cos x}}$
C) $x^3 + x + 1$
D) $\cos(x-1)$
Ans: A) Even
B) Odd
C) Neither
D) Neither

12. (Sec 1.1)
Find the interval over which the function $f(x) = \frac{1}{|x+2|}$ is increasing.
Ans: $(-\infty, -2]$

13. (Sec 1.1)
Find the greatest and the smallest values of $|x|$ such that x satisfies the inequalities $|x-2| \le 4$ and $|x-2| \ge 3$.
Ans: 6, 1

14. (Sec 1.1)
Complete the statement: if $|x-2| < \frac{3}{4}$ and $|2x+1| < 5$ then which of the following must be true:
A) $|8x-13| > 3$.
B) $|8x-13| < 3$.
C) $|8x+13| < 3$.
D) $|8x-3| > 13$.
E) $|3x+8| < 13$
Ans: B

15. (Sec 1.1)
Find the minimum and maximum values of $|3x+2|$ for x satisfying $|2x-1| \le 5$ and $|x-1| \ge 1$.
Ans: Min = 0, max = 11

16. (Sec 1.1)
Determine whether the following functions are even, odd or neither:
A) $y = 1+\sin^2 x$
B) $y = x+\dfrac{1}{x}$
C) $y = 2^{x^2-1}$
D) $y = \dfrac{1}{x^3+x^2+1}$
Ans: A) Even
B) Odd
C) Even
D) Neither

17. (Sec 1.1)
Find the interval over which the function $f(x) = \dfrac{1}{x^2+1}$ is increasing.
Ans: $(-\infty, 0]$

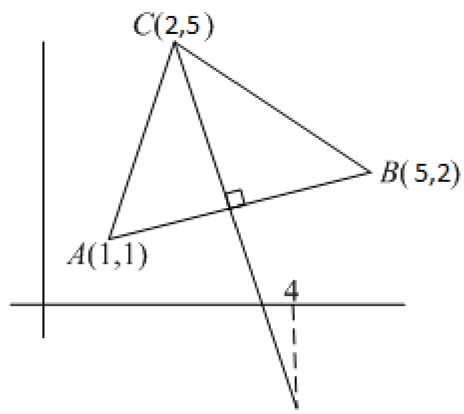
18. (Sec 1.1)
Find an equation of the circle passing through $(2,7)$ and whose center is located at the midpoint of the line segment joining $(3,-5)$ and $(-11,3)$.
Ans: $(x+4)^2+(y+1)^2=100$

19. (Sec 1.1)
Find domain and range of the function $f(x) = \dfrac{1}{\sqrt{x^2-2}}$.
Ans: Domain: $\left(-\infty,-\sqrt{2}\right)\cup\left(\sqrt{2},\infty\right)$
Range: $\left(0,\infty\right)$

20. (Sec 1.2)
Find the maximum value of $|x^2+6x-7|$ for $|x+3| \le 4$.
Ans: 16

21. (Sec 1.2)
Find the point on the line $y = 2x + 1$ closest to the point $(1,1)$. What is the distance between the two points?
Ans: $\left(\frac{1}{5}, \frac{7}{5}\right)$, $\frac{2\sqrt{5}}{5}$

22. (Sec 1.2)
Referring to the figure, find the equation of the line containing the altitude from Point C to side AB of the triangle. What is the y-coordinate of the point on this line with $x = 4$?



Ans: -3

23. (Sec 1.2)
What is the distance between the maximum point on the parabola $y = -x^2 + 2x + 1$ and the minimum point on the parabola $y = x^2 + 6x + 7$.
Ans: $\sqrt{32} = 4\sqrt{2}$

24. (Sec 1.2)
Find the maximum value of $\left|x^2 - 4x - 5\right|$ for $\left|x - 2\right| \le 3$.
Ans: 9

25. (Sec 1.2)
Find the point of intersection of the following lines:
The line parallel to $x - 2y = 5$ and passing through the midpoint of the segment connecting the points $(1,5)$ and $(3,3)$.
The line perpendicular to $2x - y = 5$ and passing through $(0,1)$.
Ans: $(-2, 2)$

26. (Sec 1.2)
Find the point on the line $y = x + 1$ that is closest to the point $(1,1)$. What is the distance between the two points?
Ans: $\left(\frac{1}{2}, \frac{3}{2}\right), \frac{1}{\sqrt{2}}$

27. (Sec 1.2)
What is the maximum value of $\left|x^2 + x - 6\right|$ if $|x+1| < 3$
Ans: $\frac{25}{4}$

28. (Sec 1.2)
Find an equation of the line perpendicular to $x + 2y + 1 = 0$ and passing through $(-2,1)$. What is the y-coordinate of the point on this line with $x = -6$?
Ans: -7

29. (Sec 1.2)
A line is perpendicular to $2x + y - 7 = 0$ and passes through $(4,6)$. Find the $y-$coordinate of the point on the line where $x = -8$.
Ans: 0

30. (Sec 1.2)
Find the constants a and b of the line $ax + by = 1$ with x-intercept at $x = \frac{1}{6}$, and which is perpendicular to the line $x + 3y = 7$.
Ans: $a = 6,\ b = -2$

31. (Sec 1.2)
Find the point on the line $y = x + 2$ closest to the point $(1,5)$.
Ans: (2,4)

32. (Sec 1.2)
What is the maximum possible value of $\left|5 + 4x - x^2\right|$ if $|x - 2| < 3$?
Ans: 9

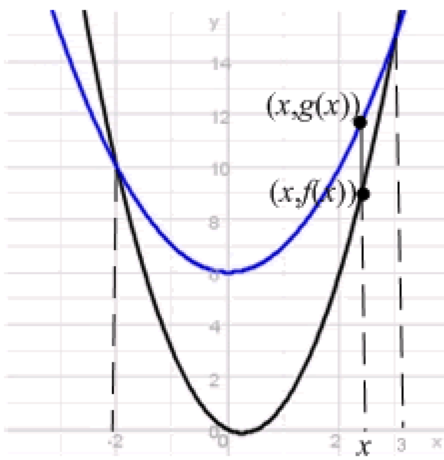
33. (Sec 1.2)
For which values of c does the parabola $x^2 - 6cx + (3c-1)^2$ have no real roots?
Ans: $c < \frac{1}{6}$

34. (Sec 1.2)
What is the maximum possible value of $\left|x^2+2x-8\right|$ for $\left|x+1\right|\le 3$?
Ans: 9

35. (Sec 1.2)
Find the point of intersection of the following lines:
The line of slope 2 passing through the midpoint of the segment joining the points $(1,1)$ and $(3,7)$.
The line perpendicular to $x+3y=7$ and passing through $(0,3)$.
Ans: $(-3,-6)$

36. (Sec 1.2)
Complete the square and find the maximum value of $f(x)=\dfrac{1}{x^2+2x+2}$.
Ans: 1

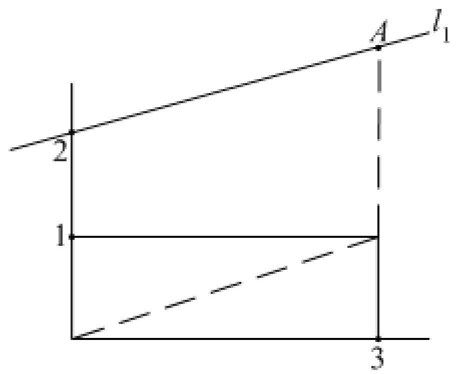
37. (Sec 1.2)
Let $f(x)=2x^2-x$, $g(x)=x^2+6$. Find the value of x such that the points $(x, f(x))$ and $(x, g(x))$ are farthest for $-2<x<3$.



Ans: $x=\dfrac{1}{2}$

38. (Sec 1.2)
Find the point on the line $y=3x-10$ closest to the origin. What is the distance between the two points?
Ans: $(3,-1)$, $\sqrt{10}$

39. (Sec 1.2)
The line l_1 in the figure is parallel to the diagonal of the rectangle.
Find the y-coordinate of A.



Ans: 3

40. (Sec 1.2)
Find x such that $(x, 4)$ lies on the line of slope $m = -3$ through the point $\left(-1, \dfrac{23}{2}\right)$.

Ans: $x = \dfrac{3}{2}$

41. (Sec 1.3)
Let $f(x) = \dfrac{1}{2-x}$ and $g(x) = \sin x$. Calculate the composite functions $f \circ g$ and $g \circ f$ and determine their domains.

A) $(f \circ g)(x) = \dfrac{1}{2-\sin x}, \{x : 0 \le x \le \pi\},\ (g \circ f)(x) = \sin\left(\dfrac{1}{2-x}\right), \{x : x < 2\}$

B) $(f \circ g)(x) = \dfrac{1}{2-\sin x}, R,\ (g \circ f)(x) = \sin\left(\dfrac{1}{2-x}\right), \{x : x \ne 2\}$

C) $(f \circ g)(x) = \sin\left(\dfrac{1}{2-x}\right), \{x : x \ne 2\},\ (g \circ f)(x) = \dfrac{1}{2-\sin x}, R$

D) $(f \circ g)(x) = \dfrac{1}{2-\sin x}, R,\ (g \circ f)(x) = \dfrac{1}{\sin(2-x)},\ \{x : x \ne 2\}$

E) $(f \circ g)(x) = \dfrac{1}{2-\sin x}, R,\ (g \circ f)(x) = \sin\left(\dfrac{1}{2-x}\right), R$

Ans: B

42. (Sec 1.3)

Let $f(x) = \frac{1}{x}$ and $g(x) = \frac{x^2 + 2x + c^2}{x^2 + 1}$.

Find all values of c so that the domain of $f \circ g$ is all R.

Ans: $c > 1, c < -1$

43. (Sec 1.3)

The domain and the range of the function $y = \frac{1}{1 + \sqrt{1 - x^2}}$ are:

A) Domain $\{x : x \le 1\}$ Range: $\left\{x : \frac{1}{2} \le x \le 1\right\}$

B) Domain: $\{x : x > 0\}$ Range: $\{x : -1 \le x \le 1\}$

C) Domain $\{x : -1 \le x \le 1\}$ Range: R

D) Domain $\{x : -1 \le x \le 1\}$ Range: $\left\{x : \frac{1}{2} \le x \le 1\right\}$

E) Domain: R Range: $\{x : -1 \le x \le 1\}$

Ans: D

44. (Sec 1.3)

The domain and range of the function $f(x) = \sin\sqrt{\pi^2 - x^2}$ are:

A) Domain: $\{x : -\pi \le x \le \pi\}$ Range: $\{x : 0 \le x \le 1\}$

B) Domain: $\{x : -\pi \le x \le \pi\}$ Range: $\{x : -1 \le x \le 1\}$

C) Domain: $\{x : x \le \pi \text{ or } x \ge \pi\}$ Range: $\{x : -1 \le x \le 1\}$

D) Domain: R Range: $\{x : 0 \le x \le 1\}$

E) Domain: $\{x : -1 \le x \le 1\}$ Range: $\{x : -\pi \le x \le \pi\}$

Ans: A

45. (Sec 1.3)

Given $f(x)=\sqrt{\dfrac{x}{1-x}}$ and $g(x)=x^2$. Calculate the composite functions $f\circ g$ and $g\circ f$ and determine their domains.

A) $(f\circ g)(x)=\dfrac{x}{\sqrt{1-x^2}},\quad \{x:-1<x<1\},(g\circ f)(x)=\dfrac{x}{1-x}\quad \{x:-1<x<1\}$

B) $(f\circ g)(x)=\dfrac{x}{1-x},\quad \{x:x\neq 1\},(g\circ f)(x)=\dfrac{|x|}{\sqrt{1-x^2}}\quad \{x:-1<x<1\}$

C) $(f\circ g)(x)=\dfrac{\sqrt{x}}{1-\sqrt{x}},\quad \{x:0\le x<1\},(g\circ f)(x)=\left|\dfrac{x}{1-x}\right|\quad \{x:x\neq 1\}$

D) $(f\circ g)(x)=\dfrac{|x|}{\sqrt{1-x^2}},\quad \{x:-1<x<1\},(g\circ f)(x)=\dfrac{x}{1-x}\quad \{x:0\le x<1\}$

E) $(f\circ g)(x)=\dfrac{|x|}{\sqrt{1-x^2}},\quad \{x:x\neq 1\},(g\circ f)(x)=\dfrac{x}{1-x}\{x:-1<x<1\}$

Ans: D

46. (Sec 1.3)

Let $f(x)=\dfrac{1}{\sqrt{x}}$ and $g(x)=x^2-cx+(2c-3)$. Find all values of c such that the domain of $f\circ g$ is all R.

Ans: $2<c<6$

47. (Sec 1.3)

Let $f(x)=\sqrt{1-x^2}$ and $\mathrm{g}(x)=\sin x$.

Calculate the composite functions $f\circ g$ and $g\circ f$ and determine their domains.

A) $(f\circ g)(x)=\cos x,\ R;\quad (\mathrm{g}\circ f)(x)=\sin\sqrt{1-x^2},\ \{x:-1\le x\le 1\}$

B) $(f\circ g)(x)=|\cos x|,\ R;\quad (\mathrm{g}\circ f)(x)=\sin^2\sqrt{1-x},\ \{x:\mathrm{x}<1\}$

C) $(f\circ g)(x)=|\cos x|,\ R;\quad (\mathrm{g}\circ f)(x)=\sin\sqrt{1-x^2},\ \{x:-1\le x\le 1\}$

D) $(f\circ g)(x)=\sqrt{1-\sin x},\ R;\quad (\mathrm{g}\circ f)(x)=\sin^2\sqrt{1-x},\ \{x:\mathrm{x}<1\}$

E) $(f\circ g)(x)=|\cos x|,\ \{x:-1\le x\le 1\};\quad (\mathrm{g}\circ f)(x)=\sin\sqrt{1-x^2},\ R$

Ans: C

48. (Sec 1.3)

Let $f(x)=\sqrt{x+1}$ and $g(x)=x^2+2cx$. Find all values of c such that the domain of $f\circ g$ is all R.

Ans: $-1\le c\le 1$

49. (Sec 1.3)

The domain and range of $f(x)=\sqrt{1+\sin\left(\frac{1}{\sqrt{x}}\right)}$ are:

A) Domain: $\left\{x : \frac{1}{\pi} < x\right\}$ Range: $\left\{x : 0 \le x \le \sqrt{2}\right\}$

B) Domain: $\{x : x > 0\}$ Range: $\left\{x : 0 \le x \le \sqrt{2}\right\}$

C) Domain: $\left\{x : \frac{2}{\pi} < x\right\}$ Range: $\left\{x : 1 \le x \le \sqrt{2}\right\}$

D) Domain: $\{x : x \ne 0\}$ Range: $\{x : 0 \le x\}$

E) Domain: $\left\{x : 0 \le x \le \sqrt{2}\right\}$ Range: $\{x : x \ne 0\}$

Ans: B

50. (Sec 1.3)

Let $f(x)=\frac{1}{1+|x|}$ and $g(x)=x^{-3}$. Compute the composite functions $f \circ g$ and $g \circ f$ and determine their domains.

A) $(f \circ g)(x)=\frac{1}{1+|x|^{-3}}$, $\{x : x \ne 0,-1\}$; $(g \circ f)(x)=(1+|x|)^3$, R

B) $(f \circ g)(x)=\frac{|x|^3}{|x|^3+1}$, $\{x : x \ne -1\}$; $(g \circ f)(x)=(1+|x|)^3$, R

C) $(f \circ g)(x)=\frac{1}{1+|x|^{-3}}$, $\{x : x \ne 0,-1\}$; $(g \circ f)(x)=1+|x|^3$, R

D) $(f \circ g)(x)=\frac{|x|^3}{|x|^3+1}$, $\{x : x \ne -1\}$; $(g \circ f)(x)=(1+|x|)^3$, $\{x : x \ne 1\}$

E) $(f \circ g)(x)=\frac{1}{1+|x|^{-3}}$, R; $(g \circ f)(x)=(1+|x|)^3$, $\{x : x \ne 0,-1\}$

Ans: A

51. (Sec 1.3)

Let $f(x)=\frac{1}{\sqrt{x+1}}$ and $g(x)=x^2+2cx+8$.

Find all values of c such that the domain of $f \circ g$ is all of R.

Ans: $-3 < c < 3$

52. (Sec 1.3)

The domain and range of $y = \dfrac{1}{2 - \sin x}$ are:

A) Domain: R Range: $\left\{ x : \dfrac{1}{3} \le x \le 1 \right\}$

B) Domain: $\left\{ x : \dfrac{1}{3} \le x \le 1 \right\}$ Range: R

C) Domain: $\left\{ x : 0 \le x \le \dfrac{\pi}{2} \right\}$ Range: R

D) Domain: R Range: R

E) Domain: $\left\{ x : 0 \le x \le \dfrac{\pi}{2} \right\}$ Range: $\left\{ x : \dfrac{1}{3} \le x \le 1 \right\}$

Ans: A

53. (Sec 1.3)

Let $f(x) = \dfrac{5}{x^2 + 2}$ and $g(x) = x^{-3}$. Calculate the composite function $f \circ g$ and determine its domain and range.

Ans: $\left(f \circ g \right)(x) = \dfrac{5}{x^{-6} + 2}$

Domain: $\{ x : x \ne 0 \}$

Range: $\left\{ y : 0 < y < \dfrac{5}{2} \right\}$

54. (Sec 1.3)

Let $f(x) = 2\sec x$ and $g(x) = x^2 + \dfrac{\pi}{2}$. Calculate the composite functions $f \circ g$ and $g \circ f$ and determine their domains.

Ans: $\left(f \circ g \right)(x) = 2\sec\left(x^2 + \dfrac{\pi}{2} \right)$

Domain: $\left\{ x : x \ne \pm\sqrt{n\pi} \text{ where } n \text{ is any nonnegative integer} \right\}$

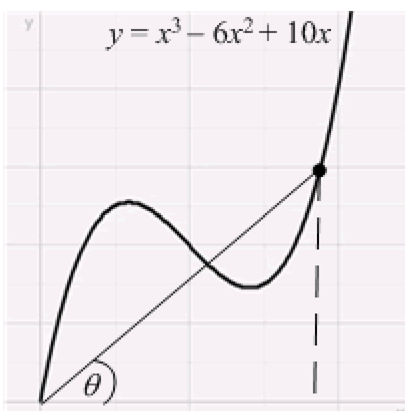
$\left(g \circ f \right)(x) = 4\sec^2 x + \dfrac{\pi}{2}$

Domain: $\left\{ x : x \ne \pm\dfrac{(2n+1)\pi}{2} \text{ where } n \text{ is any integer} \right\}$

55. (Sec 1.4)
Find $\cos\theta$, $\tan\theta$, and $\sin\theta$ if $\sec\theta = 3$ and θ is acute.
Ans: $\cos\theta = \frac{1}{3}, \tan\theta = \sqrt{8}, \sin\theta = \frac{\sqrt{8}}{3}$

56. (Sec 1.4)
Solve the following equation for x if $0 \le x < 2\pi$:
$\sin 2x + \cos\left(x - \frac{\pi}{2}\right) = 0$.
Ans: $0, \frac{2\pi}{3}, \pi, \frac{4\pi}{3}$

57. (Sec 1.4)
Find the minimum value of the angle θ between the segment joining a point on the graph of $y = x^3 - 6x^2 + 10x$ with the origin, and the x-axis for $x \ge 0$.



Ans: $\theta = \frac{\pi}{4}$

58. (Sec 1.4)
Solve the following equation for x if $0 \le x < 2\pi$:
$2\sin\left(x + \frac{\pi}{3}\right) - \sin x = \frac{\sqrt{6}}{2}$.
Ans: $x = \frac{\pi}{4}, \frac{7\pi}{4}$

59. (Sec 1.4)

Find $\sin\theta$, $\sec\theta$, and $\tan\theta$ if $\csc\theta = 2$ and $0 < \theta < \frac{\pi}{2}$.

Ans: $\sin\theta = \frac{1}{2}, \sec\theta = \frac{2}{\sqrt{3}}, \tan\theta = \frac{1}{\sqrt{3}}$

60. (Sec 1.4)

Solve the following equation for x if $0 \le x < 2\pi$: $\cos 2x + 3\sin\left(\frac{\pi}{2} - x\right) = 1$.

Ans: $\frac{\pi}{3}, \frac{5\pi}{3}$

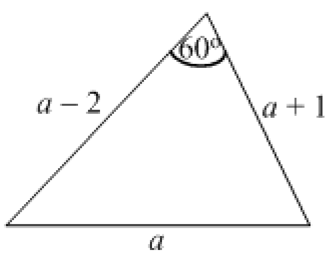
61. (Sec 1.4)

Find the points of intersection of the graphs of $y = \cos 2x$ and $y = 2\cos^2 x - \sin 4x$ for $0 \le x \le 2\pi$.

Ans: $\frac{\pi}{8}, \frac{5\pi}{8}, \frac{9\pi}{8}, \frac{13\pi}{8}$

62. (Sec 1.4)

Referring to the figure, find the value of a.



Ans: $a = 7$

63. (Sec 1.4)

Find $\cos\theta$ and $\tan\theta$ if $\sin\theta = \frac{4}{5}$ and $\frac{\pi}{2} \le \theta < \pi$.

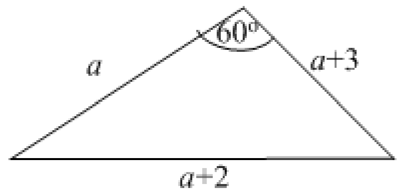
Ans: $\cos\theta = -\frac{3}{5}$, $\tan\theta = -\frac{4}{3}$

64. (Sec 1.4)

Find $\cos\theta$, $\sec\theta$, and $\tan\theta$ if $\sin\theta = \frac{1}{3}$ and θ is acute.

Ans: $\cos\theta = \frac{2\sqrt{2}}{3}$, $\sec\theta = \frac{3}{2\sqrt{2}}$, $\tan\theta = \frac{1}{2\sqrt{2}}$

65. (Sec 1.4)
Referring to the figure, compute the value of a.



Ans: $a = 5$

66. (Sec 1.4)
Solve the following equation for x if $0 \le x < 2\pi$:

$2\cos 2x + 4\sin(x - \frac{\pi}{2}) + 3 = 0$.

Ans: $\frac{\pi}{3}, \frac{5\pi}{3}$

67. (Sec 1.4)
Find the points of intersection of the graphs of $y = \cos x$ and $y = 1 - \sin\frac{x}{2}$ for $0 \le x < 2\pi$.

Ans: $(0,1)$, $\left(\frac{\pi}{3}, \frac{1}{2}\right), \left(\frac{5\pi}{3}, \frac{1}{2}\right)$

68. (Sec 1.4)
Find the points where the graphs of $y = \cos 2x$ and $y = 2 - 3\sin x$ intersect for $0 \le x \le \pi$.

Ans: $\left(\frac{\pi}{6}, \frac{1}{2}\right), \left(\frac{5\pi}{6}, \frac{1}{2}\right), \left(\frac{\pi}{2}, -1\right)$ $x = \frac{\pi}{6},\ \frac{\pi}{2},\ \frac{5\pi}{6}$

69. (Sec 1.4)
Find $\tan\theta$, $\cos\theta$, and $\sin\theta$ if $\sec\theta = 2$ and θ is acute.

Ans: $\tan\theta = \sqrt{3}, \quad \cos\theta = \frac{1}{2}, \quad \sin\theta = \frac{\sqrt{3}}{2}$

70. (Sec 1.4)
Solve the following equation for x if $0 \le \theta \le \pi$: $\tan^2\theta - 4\sin^2\theta = 0$.

Ans: $\theta = 0,\ \frac{\pi}{3},\ \frac{2\pi}{3},\ \pi$

71. (Sec 1.4)
Find the points of intersection of the two graphs $y = \sin 2x$ and $y = 2\cos^2 x$ for $0 \le x < 2\pi$.
Ans: $\left(\frac{\pi}{2}, 0\right)$, $\left(\frac{\pi}{4}, 1\right)$, $\left(\frac{5\pi}{4}, 1\right)$, $\left(\frac{3\pi}{2}, 0\right)$

72. (Sec 1.4)
Use the addition formula to compute $\cos\left(\frac{5\pi}{12}\right)$ exactly.
Ans: $\cos\left(\frac{5\pi}{12}\right) = \frac{\sqrt{2}}{4}\left(\sqrt{3} - 1\right)$

73. (Sec 1.4)
Find $\csc\theta$ if $\cot\theta = \frac{1}{3}$ and $\cos\theta < 0$.
Ans: $\csc\theta = -\frac{\sqrt{10}}{3}$

74. (Sec 1.5)
Find all vertical and horizontal asymptotes for the function $f(x) = \frac{3x^2 + 2x - 8}{x^2 + 4x - 12}$.
Ans: Vertical asymptotes: $x = 2$, $x = -6$
Horizontal asymptote: $y = 3$

75. (Sec 1.5)
Find the set of solutions to the inequality $\left(6x^2 - 12\right)\left(2x^2 - 18\right) > 0$.
Ans: $(-\infty, -3) \cup \left(-\sqrt{2}, \sqrt{2}\right) \cup (3, \infty)$