CALCULUS ASSESSMENT REVIEW

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1. Introduction and Topics

The purpose of these notes is to give an idea of what to expect on the Calculus Readiness Assessment for Math 135 and Math 140. It should be stressed that everything contained herein should essentially be review. While there are some practice problems for each of the major sections, if you find yourself struggling, you should consider either reviewing precalculus more thoroughly, or signing up for a lower level course, *e.g.* Math 110 or Math 130. The problems given here are similar in style and complexity to those on the assessment, but this should not be treated as a comprehensive list.

(1) Polynomials and Rational Expressions
- polynomial algebra: addition, subtraction and multiplication
- polynomial factoring
- symbolic fraction computation
- simplifying complex fractions

(2) Equations and Inequalities
- solving linear equations
- solving quadratic equations: factoring and quadratic formula
- solving a word problem: read the problem; introduce a variable and state what the variable represents; establish an equation and solve the equation.
- $|x| = k \Leftrightarrow x = k or x = -k$(two solutions!)
- solving an inequality: change into the standard form; solve the equation and use the zeros to set up the intervals; check the sign in each interval and select the correct answer.

(3) Basic Analytical Geometry
- coordinate system
- formulas for midpoint, slope and distance
- equation of a line: point-slope, slope-intercept and general form

- graph of a parabola: vertex, x and y-intercepts
- equation of a circle with the center (a, b) and radius r: $(x-a)^2 + (y-b)^2 = r^2$

(4) Functions and Their Graphs

- definition of a function
- domain of a function: where the function is well-de?ned
- evaluation of a function
- basic operations and composition of two functions
- computing di!erence quotients
- graphs of basic functions: $y = ax + b$, $|x|$, x^2, x^3, $\sqrt{x}$
- transformations of a basic graph: vertical and horizontal shifts
- inverse function $f^{-1}(x)$: existence and how to find it
- graph of a rational function: using vertical and horizontal asymptotes

(5) Radical Expressions

- basic operation laws and $\sqrt[n]{a} = a^{1/n}$
- rationalizing the denominator by using the conjugate: $(\sqrt{a} + \sqrt{b})(\sqrt{a} - \sqrt{b}) = a - b$

(6) Exponential and Logarithmic Functions

- graphs of $y = b^x$ and $y = \log_b x$
- properties of logarithm:
  - Product Rule: $\log_b(MN) = \log_b M + \log_b N$
  - Quotient Rule: $\log_b(M/N) = \log_b M + \log_b N$
  - Power Rule: $\log_b M^k == k \log_b M$
  - Base Change Formula: $\log_b x = \ln x / \ln b$

(7) Trigonometry

- degree and radian angle measures
- right triangle trigonometry for an angle $0 < \theta < \pi/2$
- coordinate trigonometry for general angles: $\sin\theta = y/r$, $\cos\theta = x/r$ with $r = \sqrt{x^2 + y^2}$.
- special angle values and unit circle
- graphs of $\sin x$, $\cos x$, $\tan x$, $\cot x$ and their variations: period, phase shift, amplitudes and asymptotes
- inverse trigonometric values
- basic trigonometric identities
- sum, difference and double angle formulas
- solving a triangle: the laws of sines and cosines

2. Powers and Roots

Facts to review:

- For $x \geq 0$, $\sqrt{x^2} = x$; for $x < 0$, $\sqrt{x^2} = |x|$.
- For any x, $\sqrt[3]{x^3} = x$
- $x^m x^n = x^{m+n}$
- $(x^m)^n = x^{mn}$
- $x^{-1} = \frac{1}{x}$
- $x^{\frac{1}{n}} = \sqrt[n]{x}$.

Practice Problems

(1) $(-2)^3$ is equal to

(A) -8 (B) 8 (C) $\frac{1}{8}$ (D) $-\frac{1}{8}$ (E) none of these

(2) $\sqrt{(-4)^2}$ is equal to

(A) -4 (B) 2 (C) 4 (D) -2 (E) none of these

(3) $\sqrt{27}$ is equal to

(A) 9 (B) $5 + \sqrt{2}$ (C) $3\sqrt{3}$ (D) $9\sqrt{3}$ (E) $\left(\sqrt{3}\right)^4$

(4) $\sqrt{200} =$

(A) $10\sqrt{2}$ (B) 20 (C) $10\sqrt{20}$ (D) $20\sqrt{10}$ (E) none of these

(5) $\sqrt{50x^8y^{12}} =$

(A) $25x^4y^6$ (B) $25x^8y^{12}$ (C) $5\sqrt{2}x^4y^6$ (D) $5\sqrt{2}x^6y^{10}$ (E) $5x^4y^6$

3. Lines, Linear and Quadratic Equations

Facts to review:

- Slope-intercept form of a line: $y = mx + b$, where m is the slope and b is the y-intercept.
- Point-slope form of an equation: $y - y_0 = m(x - x_0)$ where m is the slope and (x_0, y_0) is a point on the line.
- To solve $ax + b = cx + d$, isolate x on one side of the equation.
- To solve $ax^2 + bx + c = 0$, either factor (if possible) or use the quadratic equation:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}.$$

Practice Problems

(1) The line with equation $3x - 5y = 15$ has slope

(A) -3 (B) $\frac{5}{3}$ (C) $-\frac{5}{3}$ (D) $\frac{3}{5}$ (E) $\frac{-3}{5}$

(2) A line through $(2, -5)$ and $(6, -1)$ has slope

(A) $-\frac{6}{4}$ (B) 1 (C) $\frac{6}{4}$ (D) -1 (E) none of these

(3) A horizontal line through $(4, 5)$ has equation

(A) $y = 4$ (B) $x = 4$ (C) $y = 5$ (D) $x = 5$ (E) none of these

(4) A line through $(1, 6)$ and $(7, 2)$ has equation

(A) $y = \frac{1}{2}x + 7$ (B) $y = -\frac{2}{3}x + \frac{20}{3}$ (C) $y = \frac{2}{3}x + \frac{20}{3}$ (D) $y = -\frac{2}{3}x + \frac{15}{3}$ (E) $y = \frac{2}{3}x + \frac{15}{3}$

(5) Find the equation of the line with slope $3/5$ and y-intercept $(0, -5)$.

(A) $y = \frac{3}{5}x - 3$ (B) $y = \frac{5}{3}x - 3$ (C) $y = \frac{3}{5}x + 5$ (D) $y = \frac{3}{5}x - 5$ (E) none of these

(6) Solve: $x^2 + 5x - 6 = 0$.

(A) $1, 6$ (B) $-1, 6$ (C) $2, 3$ (D) $-2, -3$ (E) $1, -6$

(7) Solve: $x^2 + 6x - 5 = 0$.

(A) $\frac{6 \pm \sqrt{56}}{2}$ (B) $\frac{6 \pm \sqrt{16}}{2}$ (C) $\frac{-6 \pm \sqrt{56}}{2}$ (D) $(-5, -1)$ (E) $\frac{-6 \pm \sqrt{26}}{2}$

(8) Let k be a constant. The solution of the equation $2x + 7 = kx - 4$ is

(A) $\frac{4}{k-2}$ (B) $\frac{2x-11}{k}$ (C) $\frac{kx-11}{2}$ (D) $\frac{11}{k-2}$ (E) none of these

4. Functions

Facts to review:

- Function composition, $f \circ g(x) = f(g(x))$.
- Inverse function: $g(x) = f^{-1}(x)$ if and only if $f(g(x)) = x$ and $g(f(x)) = x$.

Practice Problems

(1) If $f(x) = 10 - x$ and $g(x) = x - x^2$, find the value of $f(g(-3))$.

(A) 4 (B) 42 (C) 98 (D) 22 (E) -2

(2) If $f(x) = 2x - 1$, find the value of x such that $f(f(x)) = 9$.

(A) 2 (B) 3 (C) 4 (D) 5 (E) 6

(3) If $f(x) = 4x - 9$ and $f(x) = 9$, what is x?

(A) 0 (B) $-\frac{1}{4}$ (C) -1 (D) $\frac{9}{2}$ (E) $\frac{4}{9}$

(4) If $f(x) = x^2 + 1$ and $g(x) = (x + 1)^2$, then $f(g(x)) =$

(A) $2x^2 + 2x + 1$ (B)$x^4 + 4x^2 + 4$ (C) $x^4 + 2x^3 + 2x^2 + 2x + 1$

(D) $x^4 + 4x^3 + 6x^2 + 4x + 2$ (E) none of these

(5) If $f(x) = x^2 + 1$ and $g(x) = (x + 1)^2$, then $g(f(x)) =$

(A) $2x^2 + 2x + 1$ (B)$x^4 + 4x^2 + 4$ (C) $x^4 + 2x^3 + 2x^2 + 2x + 1$

(D) $x^4 + 4x^3 + 6x^2 + 4x + 2$ (E) none of these

(6) If $f(x) = x^2$, then $\frac{f(x+h)-f(x)}{h} =$

(A) 0 (B) h (C) $2x$ (D) $2x + h$ (E) xh

(7) If $f(x) = 3x + 5$, then $f^{-1}(x) =$

(A) $\frac{1}{3x+5}$ (B) $\frac{1}{3}x + 5$ (C)$\frac{1}{3}x - \frac{5}{3}$ (D) $\frac{1}{3}x - 5$ (E) none of these

(8) If $f(x) = x^3 - 1$, then $f^{-1}(x)$ is

(A) $-x^3 + 1$ (B) $\frac{1}{x^3-1}$ (C) $\sqrt[3]{x+1}$ (D) $\sqrt[3]{x-1}$ (E) none of these

5. Polynomial and Rational Functions

Facts to review:

- A polynomial is a function of the form $p(x) = a_n x^n + a_{n-1}x^{n-1} + \cdots a_1 x + a_0$. The degree of $p(x)$ is n, the highest power of x.
- Rational functions are functions of the form $R(x) = \frac{p(x)}{q(x)}$ where $p(x)$ and $q(x)$ are polynomials.
- To add rational functions, use a common denominator: $\dfrac{p(x)}{q(x)} + \dfrac{r(x)}{s(x)} = \dfrac{p(x)s(x) + r(x)q(x)}{s(x)q(x)}$, possibly simplifying when done.
- To multiply, multiply numerators and denominators: $\dfrac{p(x)}{q(x)} \times \dfrac{r(x)}{s(x)} = \dfrac{p(x)r(x)}{q(x)s(x)}$.
- A rational function, $R(x) = p(x)/q(x)$ has a horizontal asymptote if degree $p(x) \leq$ degree $q(x)$.
- A rational function *may* have a vertical asymptote where $q(x) = 0$.

Practice Problems

(1) Expand: $(x-2)(x+3)(x^2-1)$.

(A) $x^2 + 2x$ (B) $x^3 - 3x^2 + 2x - 1$ (C) $x^4 - x^3 + 7x^2 + x - 6$

(D)$x^4 + 6$ (E) $x^4 + x^3 - 7x^2 - x + 6$

(2) Find all real zeros of the polynomial $p(x) = (x-2)^2(x+5)(x^2+1)$.

(A) $x = 2$ (B)$x = 2, -5$ (C)$x = -5$ (D) $x = -2, 5$ (E) $x = 2, -5, -1$

(3) Combine: $\frac{x}{x-1} - \frac{4}{x}$

(A) $\frac{x^2-4x+4}{(x-1)x}$ (B) $\frac{x^2-4x-4}{(x-1)x}$ (C) $\frac{x^2-4x+1}{x(x-1)}$ (D) $\frac{x^2-4x-1}{x(x-1)}$ (E) $\frac{-4}{x-1}$

(4) Combine: $x + \frac{x}{x-1}$

(A) $x - 1$ (B) $\frac{2x}{x-1}$ (C) 0 (D) $\frac{x^2+x-1}{x-1}$ (E) $\frac{x^2}{x-1}$

(5) Solve: $\frac{x}{x+6} = \frac{5}{3}$

(A) $\frac{-15}{4}$ (B) -15 (C) 15 (D) $\frac{-15}{4}$ (E) 10

(6) Solve: $\frac{x}{2} - 5 = -12 - \frac{2}{3}x$

(A) -21 (B) $\frac{-102}{7}$ (C) -6 (D) $\frac{-42}{5}$ (E) 6

(7) Simplify: $\frac{8+\frac{1}{x}}{4+\frac{1}{x}}$

(A) $2x+1$ (B) $\frac{2x+1}{x+1}$ (C) $\frac{8x+1}{4x+1}$ (D) 2 (E) $2+\frac{1}{x^2}$

(8) Let $R(x) = \dfrac{x^2-1}{x^3+1}$. What is the horizontal asymptote of $R(x)$?

(A) $y=1$ (B) $y=0$ (C) $x=1$ (D) $x=0$ (E) none of these

(9) Let $R(x) = \dfrac{x^2-1}{x^3+1}$. What is the vertical asymptote of $R(x)$?

(A) $y=1$ (B) $y=0$ (C) $x=1$ (D) $x=0$ (E) none of these

(10) Let $S(x) = \dfrac{x^2-1}{2x^2+1}$. What is the horizontal asymptote of $S(x)$?

(A) $x=\frac{1}{2}$ (B) $y=\frac{1}{2}$ (C) $y=2$ (D) $x=0$ (E) none of these

(11) If $f(x) = \frac{x+1}{(x-2)(x^2-1)}$, its graph will have

(A) one horizontal and three vertical asymptotes

(B) one horizontal and two vertical asymptotes

(C) one horizontal and one vertical asymptotes

(D) zero horizontal and one vertical asymptotes

(E) zero horizontal and two vertical asymptotes

6. Geometry

Facts to review:

- Pythagorean Theorem $c^2 = a^2 + b^2$
- Area of a rectangle, $length \times width$
- Area of a triangle, $\frac{1}{2}\, base \times height$
- Area of a circle, $\pi(radius)^2$
- Circumference of a circle, $2\pi r$
- Distance between two points, $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Practice Problems

(1) The diagonal of a square is $\sqrt{72}$. The side is

(A) 6 (B) $3\sqrt{2}$ (C) $6\sqrt{2}$ (D) $3\sqrt{3}$ (E) none of these

(2) Numerically, the area of a circle is four times its circumference. Its radius is

(A) 4 (B) 4π (C) 8 (D) $\sqrt{8}$ (E) $\sqrt{8\pi}$

(3) The length of a rectangle is twice its width. Numerically, its area is equal to the length of its diagonal. Its width is

(A) $\frac{2}{3}$ (B) 1 (C) $\frac{4}{5}$ (D) $\frac{\sqrt{5}}{2}$ (E) $\frac{\sqrt{3}}{2}$

(4) What is the distance between $(3, 4)$ and $(2, 1)$?

(A) $\sqrt{10}$ (B) 10 (C) $\sqrt{50}$ (D) 50 (E) none of these

(5) What is the distance between $(3, -1)$ and $(-2, -4)$?

(A) $\sqrt{26}$ (B) 9 (C) $\sqrt{34}$ (D) $\sqrt{17}$ (E) none of these

7. Inequalities

Facts to review:

- Open and closed intervals
- $|x| \leq a$ has solution set $[-a, a]$; $|x| < a$ has solution set $(-a, a)$.
- $|x| \geq a$ has solution set $(-\infty, -a] \cup [a, \infty)$; $|x| > a$ has solution set $(-\infty, -a) \cup (a, \infty)$
- Polynomials can only change sign at a root.
- Rational functions can only change sign at a root or at an asymptote.

Practice Problems

(1) Solve: $2x + 5 \leq 3x - 4$.

(A)$(-\infty, -9]$ (B) $[9, \infty)$ (C) $[-9, 9]$ (D) $(-9, 9)$ (E) none of these

(2) Solve: $x^2 - 5x + 4 > 0$.

(A) $(-\infty, 1) \cup (4, \infty)$ (B) $(1, 4)$ (C) $(-\infty, 1] \cup [4, \infty)$ (D) $[1, 4]$ (E) none of these

(3) Solve: $\dfrac{x+1}{x+3} < 2$.

(A)$(-5, -3)$ (B) $(-\infty, -5) \cup (-3, \infty)$ (C) $(-5, \infty)$ (D)$(-\infty, 5)$ (E) none of these

(4) Solve: $|x - 4| \leq 5$.

(A) $[-1, 1]$ (B) $[-9, 9]$ (C) $[-1, 9]$ (D) $[-1, -9]$ (E)$[-9, 1]$

(5) For $|x - 3| \leq 7$, which of the following is not a solution?

(A) -3 (B) 10 (C) 8 (D) -10 (E) 3

(6) Solve: $|x - 2| \geq 5$

(A) $[7, \infty)$ (B) $(-\infty, -3] \cup [7, \infty)$ (C) $(-\infty, -3]$ (D) $[-3, 7]$ (E)$(-\infty, -3) \cup (7, \infty)$

8. Exponentials and Logs

Facts to review:

- If $b > 1$, then $b^x \to 0$ as $x \to -\infty$ and $b^x \to \infty$ as $x \to \infty$.
- If $0 < b < 1$, then $b^x \to \infty$ as $x \to -\infty$ and $b^x \to 0$ as $x \to \infty$.
- $\log_b(x)$ is the inverse of b^x; $\log_b(b^x) = x$ and $b^{\log_b(x)} = x$.
- $\log_b(xy) = \log_b(x) + \log_b(y)$
- $\log_b(\frac{x}{y}) = \log_b(x) - \log_b(y)$
- $\log_b(x^y) = y \log_b(x)$

Practice Problems

(1) What is the exact value of $\log_2(\frac{1}{8})$?

(A) -8 (B) 2 (C) -7 (D) 3 (E) -3

(2) If $\log_2(a) = 4$, $\log_2(b) = \frac{1}{2}$, and $\log_2(c) = 3$ then $\log_2\left(\frac{a^2b^3}{c^4}\right)$ is

(A) $-\frac{5}{2}$ (B) 2 (C) $\frac{7}{2}$ (D) -2 (E) $\frac{11}{2}$

(3) Solve: $9^x = 27$

(A) $x = \frac{3}{2}$ (B) $x = \frac{2}{3}$ (C) $x = \sqrt{9}$ (D) $x = \frac{1}{3}$ (E) none of these

(4) Solve: $5^{2x+3} = 3^{x-1}$

(A) $\frac{\log(3)+3\log(5)}{\log(3)-2\log(5)}$ (B) $\frac{\log(3)-2\log(5)}{\log(3)+3\log(5)}$ (C) $\frac{\log(5)-3\log(5)}{\log(3)+4\log(2)}$ (D) $\frac{\log(5)-2\log(5)}{\log(5)+3\log(5)}$ (E) none of these

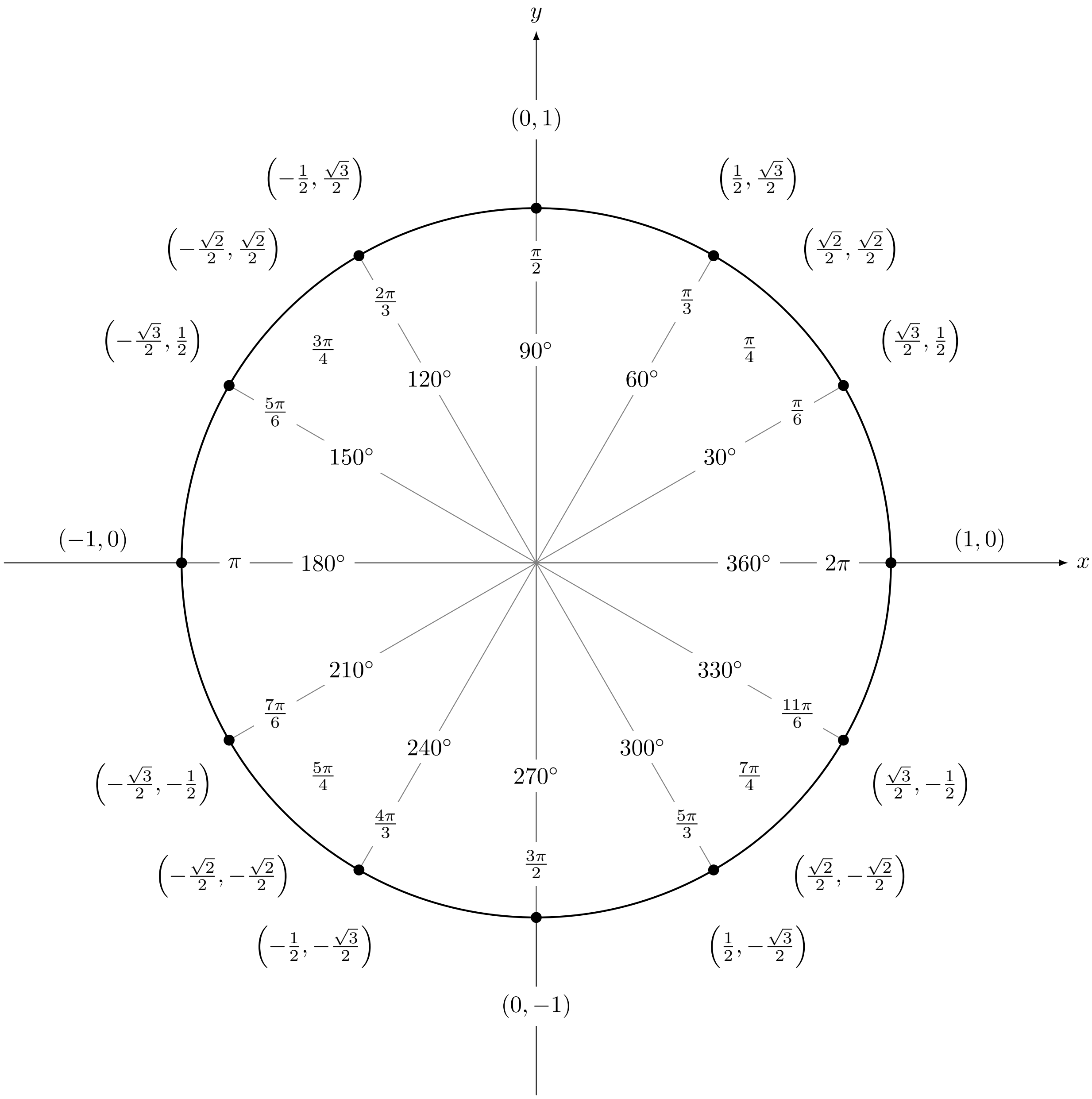
(5) Solve: $\log x + \log(x - 15) = 2$.

(A) 5 (B) -5 (C) -5, 20 (D) 20 (E) -1

9. Trigonometry

Facts to review:

- Unit circle – angle in degrees and radians, its cosine and its sine.
- If (x, y) is the point on the circle at the end of a radius forming an angle θ with the positive x-axis, then $x = \cos\theta$ and $y = \sin\theta$.
- Pythagorean identities:
  - $\sin^2\theta + \cos^2\theta = 1$
  - $1 + \cot^2\theta = \csc^2\theta$
  - $\tan^2\theta + 1 = \sec^2\theta$
- Sum and Difference Identities
  - $\sin(\alpha \pm \beta) = \sin\alpha\cos\beta \pm \sin\beta\cos\alpha$
  - $\cos(\alpha \pm \beta) = \cos\alpha\cos\beta \mp \sin\alpha\sin\beta$
- Double angle Identities
  - $\sin 2\theta = 2\sin\theta\cos\theta$
  - $\cos 2\theta = \cos^2\theta - \sin^2\theta$
- Arc cosine: $\cos^{-1}(x)$ is the angle θ, $0 \leq \theta \leq \pi$ with $\cos(\theta) = x$.
- Arc sine: $\sin^{-1}(x)$ is the angle θ, $-\frac{\pi}{2} \leq \theta \leq \frac{\pi}{2}$ with $\sin(\theta) = x$.
- Arc tangent: $\tan^{-1}(x)$ is the angle θ, $-\frac{\pi}{2} < \theta < \frac{\pi}{2}$ with $\tan(\theta) = x$.
- Graphs of $y = A\sin(Bx + C) + D$ and $y = A\cos(Bx + C) + D$



y
x
$(0,1)$
$(1,0)$
$(-1,0)$
$(0,-1)$
$\left(\frac{1}{2},\frac{\sqrt{3}}{2}\right)$
$\left(\frac{\sqrt{2}}{2},\frac{\sqrt{2}}{2}\right)$
$\left(\frac{\sqrt{3}}{2},\frac{1}{2}\right)$
$\left(-\frac{1}{2},\frac{\sqrt{3}}{2}\right)$
$\left(-\frac{\sqrt{2}}{2},\frac{\sqrt{2}}{2}\right)$
$\left(-\frac{\sqrt{3}}{2},\frac{1}{2}\right)$
$\left(-\frac{\sqrt{3}}{2},-\frac{1}{2}\right)$
$\left(-\frac{\sqrt{2}}{2},-\frac{\sqrt{2}}{2}\right)$
$\left(-\frac{1}{2},-\frac{\sqrt{3}}{2}\right)$
$\left(\frac{1}{2},-\frac{\sqrt{3}}{2}\right)$
$\left(\frac{\sqrt{2}}{2},-\frac{\sqrt{2}}{2}\right)$
$\left(\frac{\sqrt{3}}{2},-\frac{1}{2}\right)$
$\frac{\pi}{2}$ $90°$
$\frac{\pi}{3}$ $60°$
$\frac{\pi}{4}$
$\frac{\pi}{6}$ $30°$
2π $360°$
$\frac{2\pi}{3}$ $120°$
$\frac{3\pi}{4}$
$\frac{5\pi}{6}$ $150°$
π $180°$
$\frac{7\pi}{6}$ $210°$
$\frac{5\pi}{4}$
$\frac{4\pi}{3}$ $240°$
$\frac{3\pi}{2}$ $270°$
$\frac{5\pi}{3}$ $300°$
$\frac{7\pi}{4}$
$\frac{11\pi}{6}$ $330°$

Practice Problems

(1) The exact value of $\cos(\pi/4)$ is:

(A) $\frac{\sqrt{2}}{2}$ (B) $\frac{1}{2}$ (C) $\frac{\sqrt{3}}{2}$ (D) $-\frac{\sqrt{2}}{2}$ (E) $-\frac{\sqrt{3}}{2}$

(2) The exact value of $\sin(5\pi/3)$ is

(A) $\frac{\sqrt{2}}{2}$ (B) $\frac{1}{2}$ (C) $\frac{\sqrt{3}}{2}$ (D) $-\frac{\sqrt{2}}{2}$ (E) $-\frac{\sqrt{3}}{2}$

(3) The exact value of $\tan(-2\pi/3)$

(A) $\frac{1}{\sqrt{3}}$ (B) 1 (C) $\sqrt{3}$ (D) $-\frac{\sqrt{2}}{2}$ (E) $-\frac{1}{\sqrt{3}}$

(4) If θ is in the first quadrant and $\cos(\theta) = \frac{1}{4}$, then $\sin(\theta)$ is

(A) $\frac{\sqrt{3}}{4}$ (B) $\frac{3}{4}$ (C) $\frac{\sqrt{3}}{2}$ (D) 4 (E) none of these

(5) If $\sin\alpha = \frac{2}{3}$ and $\cos\alpha > 0$, then $\sin 2\alpha$ is:

(A) $\frac{\sqrt{3}}{5}$ (B) $\frac{\sqrt{5}}{3}$ (C) $\frac{4}{3}$ (D) $\frac{4\sqrt{5}}{9}$ (E) none of these

(6) The exact value of $\sin^{-1}(\frac{1}{2})$ is:

(A) $\frac{\pi}{3}$ (B) $\frac{\pi}{6}$ (C) $\frac{\pi}{4}$ (D) 2 (E) none of these

(7) The exact value of $\cos^{-1}(\frac{1}{2})$ is:

(A) $\frac{\pi}{3}$ (B) $\frac{\pi}{6}$ (C) $\frac{\pi}{4}$ (D) 2 (E) none of these

(8) $\sin x \tan x + \cos x =$

(A) $\tan x$ (B) $\csc x$ (C) $\sec x$ (D) $\csc x$ (E) $\sin x$

(9) $\dfrac{\cos^2 x - \sin^2 x}{1 - \tan^2 x} =$

(A) $\cos^2 x$ (B) $\sin^2 x$ (C) $\sec^2 x$ (D) $\csc^2 x$ (E) $\sin^2 x$

(10) $\frac{1}{1+\cos\theta} + \frac{1}{1-\cos\theta} =$

(A) $2\cos^2\theta$ (B) $2\sin^2\theta$ (C) $2\tan^2\theta$ (D) $2\csc^2\theta$ (E) $2\cot^2\theta$

(11) Find the exact value of $\sin 30° - \sin 45° \cos 45°$.

(A) 0 (B) 1/2 (C) 1 (D) 2 (E) no solution

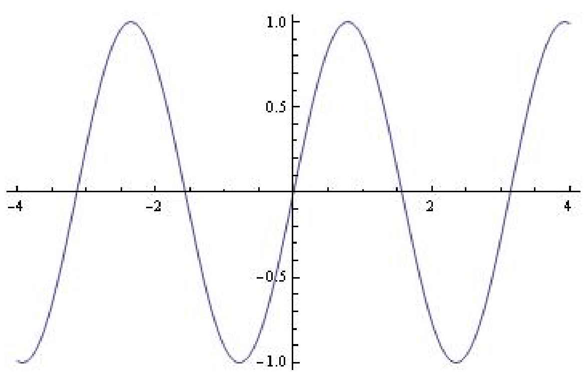
(12) The period and phase shift of $f(x) = 2\cos(3x + \pi/2)$ is

(A) $2\pi/3, -\pi/6$ (B) $2\pi/3, \pi/6$ (C) $\pi/3, \pi/2$ (D) $2\pi, -\pi/2$ (E) $2\pi/3, -\pi/2$

(13) If $\sin\alpha = 1, \cos\beta > 0, \sin\beta = 1/2$, then $\sin(\alpha + \beta)$ is

(A) 1/2 (B) $2/\sqrt{3}$ (C) 2/3 (D) 3/2 (E) $\sqrt{3}/2$

(14) The graph below best represents which function?



(A) $2\sin(2x)$ (B) $\sin(2x)$ (C) $\cos(x/2)$ (D) $\frac{1}{2}\cos x$ (E) $2\cos(x/2)$

10. Answers to Practice Problems

Section 2
(1) A
(2) C
(3) C
(4) A
(5) C

Section 3
(1) D
(2) B
(3) C
(4) B
(5) D
(6) E
(7) C
(8) D

Section 4
(1) D
(2) B
(3) D
(4) D
(5) B
(6) D
(7) C
(8) C

Section 5
(1) E
(2) B
(3) A
(4) E
(5) B
(6) C
(7) C
(8) B
(9) E
(10) B
(11) B

Section 6
(1) A
(2) C
(3) E
(4) A
(5) C

Section 7
(1) B
(2) A
(3) D
(4) C
(5) D
(6) B

Section 8
(1) E
(2) A
(3) A
(4) D
(5) D

Section 9
(1) A
(2) E
(3) C
(4) E
(5) D
(6) B
(7) A
(8) C
(9) A
(10) D
(11) A
(12) A
(13) E
(14) B