

Review Problems

- Solve each of the following equations.
 - $\cos x \sin x = \sin x$
 - $\sin x = -\sin^2 x$
 - $2 = 2 \sin^2 x + \cos x$
- Solve each of the following equations.
 - $\log_3(5x - 1) = 2$
 - $3 \log_5(2x - 1) + 5 = 4$
 - $3^{3x+8} = 7$
 - $10^{-5x} = 5$
 - $\log_2(3x + 7) = -2$
 - $\frac{1}{3} \ln(2x - 1) - 4 = -2$
 - $e^{2x+1} = 10$
- Find the domain for each of the following functions.
 - $f(x) = \frac{1}{\sin x - 1}$
 - $f(x) = \log_2(5x - x^2)$
 - $f(x) = \tan x$
- Find all angles β so that twice β is coterminal with 120° . Express your answer
 - in degrees
 - in radians
 - Find all coterminal angles β such that $-500^\circ < \beta < 500^\circ$.
- Simplify each of the following. (i.e. write it in terms of trigonometric functions of α .)
 - $\sin(90^\circ - \alpha)$
 - $\sin(180^\circ - \alpha)$
 - $\sin(-\alpha)$
 - $\sin(\alpha + 180^\circ)$
 - $\cos(90^\circ - \alpha)$
 - $\cos(180^\circ - \alpha)$
 - $\cos(-\alpha)$
 - $\cos(\alpha + 180^\circ)$
 - $\tan(-\alpha)$
 - $\tan(90^\circ - \alpha)$
 - $\tan(\alpha + 180^\circ)$
 - $\tan(180^\circ - \alpha)$
- Find the exact value of $\cos x$ if $\sin x = \frac{2}{5}$.
- Find the exact value of $\sin x$ if $\cot x = -2$ and x is not in the second quarter.
- Find the first element and common difference in the arithmetic sequence where $a_7 = -14$ and $s_7 = -14$.
- The first element in an arithmetic sequence is 100. Find the common difference if s_{25} is 64 times a_{26} .
- Graph each of the following pairs of functions in the same coordinate system.
 - $f(x) = x^2$
 $g(x) = (x + 4)^2$
 - $f(x) = x^3$
 $g(x) = x^3 - 5$
 - $f(x) = \frac{1}{x}$
 $g(x) = \frac{3}{x}$
 - $f(x) = \sqrt{x}$
 $g(x) = 3 + \sqrt{x + 4}$

Answers

1. a) $x = k \cdot 180^\circ$ where $k \in \mathbb{Z}$ $x = k\pi$ where $k \in \mathbb{Z}$
 b) $x = k \cdot 180^\circ$ or $x = -90^\circ + k \cdot 360^\circ$ where $k \in \mathbb{Z}$ $x = k\pi$ or $x = -\frac{\pi}{2} + 2k\pi$ where $k \in \mathbb{Z}$
 c) $x = \pm 60^\circ + k \cdot 360^\circ$ or $x = 90^\circ + k \cdot 180^\circ$ where $k \in \mathbb{Z}$
 $x = \pm \frac{\pi}{3} + 2k\pi$ or $x = \frac{\pi}{2} + k\pi$ where $k \in \mathbb{Z}$
2. a) 2 b) $-\frac{9}{4}$ c) $\frac{1}{2}(5^{-1/3} + 1)$ d) $\frac{1}{2}e^6 + \frac{1}{2}$ e) $\frac{1}{3}(-8 + \log_3 7)$ f) $\frac{1}{2}(-1 + \ln 10)$
 g) $-\frac{1}{5} \log_{10} 5$
3. a) $x \neq \frac{\pi}{2} + 2k\pi$ where $k \in \mathbb{Z}$ b) $0 < x < 5$ c) $x \neq \frac{\pi}{2} + k\pi$ where $k \in \mathbb{Z}$
4. a) $60^\circ + k \cdot 180^\circ$ where $k = 0, 1, -1, 2, -2, 3, -3, \dots$
 b) $\frac{\pi}{3} + k\pi$ where $k = 0, 1, -1, 2, -2, 3, -3, \dots$ c) $-480^\circ, -300^\circ, -120^\circ, 60^\circ, 240^\circ, 420^\circ$
5. a) $\cos \alpha$ b) $\sin \alpha$ c) $-\sin \alpha$ d) $-\sin \alpha$ e) $\sin \alpha$ f) $-\cos \alpha$ g) $\cos \alpha$
 h) $-\cos \alpha$ i) $\cot \alpha$ j) $-\tan \alpha$ k) $-\tan \alpha$ l) $\tan \alpha$
6. $\pm \frac{\sqrt{21}}{5}$
7. $-\frac{1}{\sqrt{5}} = -\frac{\sqrt{5}}{5}$
8. $a = 10, d = -4$
9. -3
10. a) $f(x) = x^2$ b) $f(x) = x^3$ c) $f(x) = \frac{1}{x}$ d) $f(x) = \sqrt{x}$
 $g(x) = (x + 4)^2$ $g(x) = x^3 - 5$ $g(x) = \frac{3}{x}$ $g(x) = 3 + \sqrt{x + 4}$

