

King Fahd University of Petroleum and Minerals
Faculty of Science - Per-Year Math Program
Math 002 - Term 072
Review Questions 4.2 – 6.4

Question1 $\log_2 5 = x$ and $\log_2 3 = y$, write $\log_{\sqrt{2}} 300$ in terms of x and y .

ANS: $4x + 2y + 4$

Question2 If $W\left(\frac{-25\pi}{6}\right) = (x, y)$. Find $x - y$

ANS: $\frac{1}{2}(\sqrt{3} + 1)$

Question 3 The graph of $y = 5 \csc \frac{\pi x}{2}$ on $(-4, 0)$ is decreasing on which interval?

ANS: $(-3, -2) \cup (-2, -1)$

Question 4 The graph of $y = \log_3 |x + 3|$ lies above the x -axis over which interval?

ANS: $(-\infty, -4) \cup (-2, \infty)$

Question 5 Find the number of x intercepts of the graph of $y = 3 \cot(2x)$ on

$\left(\frac{-3\pi}{2}, \frac{3\pi}{2}\right)$ **ANS:** 6

Question 6 $\sin \alpha = \frac{3}{5}$, $\frac{\pi}{2} < \alpha < \pi$, $\cos \beta = \frac{-12}{13}$, $\pi < \beta < \frac{3\pi}{2}$. Find $\tan(\alpha - \beta)$

ANS: $\frac{-56}{33}$

Question 7 Evaluate $\sec(-300^\circ) + \tan\left(\frac{3\pi}{4}\right) + \sin 210^\circ$

ANS: $\frac{1}{2}$

Question 8 Evaluate $\tan 105^\circ$

ANS: $\frac{1+\sqrt{3}}{1-\sqrt{3}}$

Question 9 $\sin 40^\circ + \cos 40^\circ = k \sin \beta$. Find k and β

ANS: $k = \sqrt{2}$, $\beta = 85^\circ$

Question 10 If $f(x) = -\sin 2x + \sqrt{3} \cos 2x$ can be written as $f(x) = k \sin(bx + \alpha)$ Find the phase shift of $f(x)$.

ANS: $\frac{-\pi}{3}$

Question 11 Evaluate $\sin\left(\frac{3\pi}{2} + \alpha\right) \cos(\pi - \beta) + \cos\left(\frac{\pi}{2} - \beta\right) \sin \beta$

ANS: 1

Question 12 $\csc \theta = -\frac{5}{3}$, $\pi < \theta < \frac{3\pi}{2}$. Find $\tan \frac{\theta}{2}$

ANS: -3

Question 13 Solve $4^x - 2(2^x) = 8$

ANS: $x = 2$

Question 14 Find the value of $\csc\left(-\frac{17\pi}{6}\right)$

ANS: -2

Question 15 Find the maximum value of $y = -2 - 3\sin\left(2x + \frac{2\pi}{3}\right)$

Question 16 The graph of $y = -2\sin(3x)$ on $[0, 2\pi]$ intersects the line $y = \frac{3}{2}$
At how many points?

ANS: 6

Question 17 If α is the complementary of $26^{\circ}25'21''$, $\beta = 32^{\circ}31'41''$. Find
 $\alpha + \beta$

ANS: $96^{\circ}6'20''$

Question 18 Solve the equation $\log(-x - 2) + \log(1 - x) = 1$

Question 19 Verify the Identity: $\frac{\sin^2 x + \tan^2 x + \cos^2 x}{\csc^2 x - 1} = \tan^2 x \sec^2 x$

Question 20 Evaluate $\frac{1 - \tan 29^{\circ} \cot 59^{\circ}}{\tan 29^{\circ} + \cot 59^{\circ}}$ **ANS:** $\frac{1}{\sqrt{3}}$

Question 21 $\tan \alpha = \frac{4}{3}$, $\tan \beta = \frac{-12}{13}$, $\alpha, \beta \in \text{Quad}(III)$. Find the value of
 $\cos\left(\frac{\pi}{2} - \alpha + \beta\right)$. **ANS:** $\frac{33}{65}$

Question 22 Find the range of $y = 1 - 4\sin 2x \cos 2x \sin 4x$. **ANS:** $[-1, 1]$

Question 23 $\cos 110^{\circ} =$

ANS: $-\sqrt{\frac{1 - \cos 40^{\circ}}{2}}$