

You may keep this page of questions. Turn in your answers with all of your work on the pink paper and gold paper. You are **NOT** allowed to use calculators on questions #1 – 12. Work these questions on the pink paper. After you have finished these first twelve questions, turn in the first part of the exam and receive gold paper to use for the last three questions.

(1) 10 Points. If θ is an angle in standard position whose terminal side passes through the point $(-5, 4)$, sketch a graph showing θ and find values for the six trigonometric functions at θ .

(2) 10 Points. Find an equation for the straight line which passes through the points $(-2, -1)$ and $(5, 3)$. Express your final answer in the form $Ax + By = C$ where A, B and C are integers and $A \geq 0$.

(3) 10 Points. Find $f^{-1}(x)$ if $f(x) = \frac{7x}{4-x}$.

(4) 10 Points. Find the standard parametric representation for the circle $x^2 + y^2 = 9$.

(5) 12 Points. Sketch a graph of the equation $y = -3 + 2|x + 5|$. Mark scales on axes! Find coordinates for all intercepts.

(6) 14 Points. Sketch a graph of the equation $y = 5 - 2\cos(3x)$. Mark scales on the coordinate axes!

(7) 14 Points. Sketch a graph of the equation $\frac{y^2}{9} - \frac{x^2}{25} = 1$. Find the coordinates for the vertices and the foci.

(8) 15 Points. Given that $\log_b(2) = 2.208$, $\log_b(3) = 3.500$, $\log_b(5) = 5.128$ and $\log_b(7) = 6.200$, use these (and laws of logarithms) to compute

$$(a) \log_b(18) \quad (b) \log_b\left(\sqrt{\frac{7}{5}}\right) \quad (c) \log_b\left(1 + \frac{3}{2}\right)^{100}.$$

(9) 15 Points. Find exact values, in radians, for all solutions of the equation $\cos(3x) = -\sqrt{3}/2$.

(10) 20 Points. Find exact values for the following:

(a) $\cos\left(\frac{5\pi}{6}\right)$ (b) $\sin^{-1}\left(\frac{1}{2}\right)$ (c) $\cos\left(\frac{\pi}{3} - \frac{\pi}{4}\right)$ (d) $\sin\left(\frac{1}{2}\tan^{-1}(-3)\right)$

(11) 10 Points. Express $\sin(7t) - \sin(3t)$ as a product.

(12) 16 Points. Use basic trigonometric identities and algebra to verify that

$$\frac{3\sin^2 t + 7\cos t - 5}{4 - \cos^2 t} = \frac{3\cos t - 1}{\cos t + 2} \quad \text{is an identity.}$$

Your proof needs to be **logically** correct as well as algebraically correct and trigonometrically correct.

Turn in your work and answers for the first twelve questions and any remaining pink paper before continuing.

(13) 10 Points. Solve $11^x = 29$. Find both an **exact** answer and a decimal approximation accurate to the nearest thousandth.

(14) 20 Points. Use your calculator to approximate each of the following. Round appropriately. Use **radian** mode when evaluating inverse trigonometric functions.

(a) $\sin(4.358)$ (b) $\tan^{-1}(-1.823)$ (c) $\sec^{-1}(1.52)$ (d) $\log_{3.1155}(184.18)$

(15) 14 Points. Solve triangle ABC if $\beta = 27.41^\circ$, $a = 431.8\text{m}$ and $c = 207.5\text{m}$. Show how you found the missing values.