Pre-Calculus FINAL EXAM Review DO THIS ON OWN PAPER!

1st Six Weeks:

MATCHING.

1. Which of the following are functions?
   A. \( y = 2x^3 - 1 \)
   B. \( y = 3x^2 - 1 \)
   C. \( x - 3y^2 = 7 \)

2. Which of the following are NOT functions?

3. Which of the following are one-to-one functions?

\[
\begin{align*}
A. \quad & y = 2x^3 - 1 \\
B. \quad & y = 3x^2 - 1 \\
C. \quad & x - 3y^2 = 7 \\
D. \quad & \begin{array}{c}
\begin{array}{c}
\text{Graph}
\end{array}
\end{array}
\end{align*}
\]

State the domain and range in interval notation.

4. [Graph]

5. [Graph]

6. \( y = \sqrt{x - 5} \)

Graph \( f(x) \), \( g(x) \), and \( h(x) \) on the same graph. State the transformation(s) & stretch or shrink.

7. \( f(x) = x^3 \)
8. \( f(x) = \lceil x \rceil \)
9. \( f(x) = x^2 \)
   \( g(x) = f(x + 2) \)
   \( g(x) = f(x) - 2 \)
   \( g(x) = -2f(x) + 1 \)
   \( h(x) = 2f(x) \)
   \( h(x) = f(2x) \)

Graph.

10. \( f(x) = \begin{cases} 
|x| + 2, & x \geq 0 \\
-x^2 - 1, & -2 \leq x < 0 \\
x, & x < -2 
\end{cases} \)

Evaluate each function or composite and simplify.

\[
\begin{align*}
& f(x) = 2x + 3 & g(x) = x^2 - x & h(x) = 5x + 1 & t(x) = \begin{cases} 
3x^2 - 1, & x > -1 \\
4 - x, & x \leq -1 
\end{cases} & s(x) = \lfloor x - 5 \rfloor \\
& g(-2) & (f \circ g)(-1) & (g - h)(x) & (h \circ g)(x) \\
& t(-2) & t(4) & s(8.2) & s(1.5)
\end{align*}
\]
19. Evaluate the graphs at the given values.

A. \((f + g)(1)\)  
B. \((g - f)(0)\)  
C. \((f \cdot g)(-1)\)  
D. \((f \circ g)(-2)\)  
E. \((g \circ f)(2)\)

20. State the inverse function of each of the following...

A. \(f(x) = 5 - 2x\)  
B. \(f(x) = 2x^3 - 1\)

Given the set of data for \(f(x)\), state the domain and range of \(f^{-1}(x)\).

<table>
<thead>
<tr>
<th>(x)</th>
<th>-3</th>
<th>0</th>
<th>2</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>(y)</td>
<td>3</td>
<td>-2</td>
<td>-5</td>
<td>-11</td>
</tr>
</tbody>
</table>

22. Are the functions even, odd, or neither? State the symmetry (x-axis, y-axis, or origin).

A. \(f(x) = x^2 - 1\)  
B. \(f(x) = |x| + 1\)  
C. \(f(x) = 3x^3 - x\)  
D. \(f(x) = x^4 - x^3 + 1\)

23. Write the equations of the graphs and state the transformation(s).

24.  


A. State the intervals where \(f(x)\) is increasing, decreasing, and constant.

B. Graph \(g(x) = f(x - 1) + 2\).

26. Find the measure of the angle in degrees of a \(\frac{5}{12}\) counterclockwise rotation.

27. In which quadrant does an angle of \(-790^\circ\) terminate?

28. In which quadrant does an angle of \(1350^\circ\) terminate?

29. In which quadrant does an angle of \(\theta\) terminate?

30. Find an angle co-terminal with \(\theta\).

31. Find an angle co-terminal with \(\theta\).
32. Express 80°25'45" in decimal degrees (to the nearest hundredth).

33. Express 785° in radians.

34. Express \( \frac{11\pi}{9} \) in degrees.

Find the exact value for each indicated trig. function, if the point \((3,-5)\) lies on the terminal side of \(\theta\).

35. \(\sin \theta\)  
36. \(\sec \theta\)  
37. \(\tan \theta\)  
38. \(\cot \theta\)

39. If \(\cos \theta = -\frac{2}{5}\) and \(\theta\) is in Quadrant III, then find \(\csc \theta\).

Which quadrant would \(\theta\) terminate, given...

40. \(\sin \theta > 0\) and \(\cot \theta < 0\)
41. \(\cos \theta < 0\) and \(\tan \theta > 0\)
42. Find the reference angle for each of the following...

A. \(-310°\)  
B. \(264°\)  
C. \(\frac{10\pi}{7}\)  
D. \(\frac{5\pi}{6}\)

43. \(\sec 135°\)
44. \(\tan \pi\)
45. \(\tan \frac{4\pi}{3}\)
46. \(\sin (-90°)\)
47. \(\csc 270°\)
48. \(\cot \frac{7\pi}{6}\)
49. \(\cos \frac{3\pi}{2}\)
50. \(\sin 330°\)

Use a calculator to find the values of...

51. \(\sec \frac{3\pi}{5}\)
52. \(\csc 27.8°\)
53. \(\cot \frac{11\pi}{8}\)

2nd Six Weeks:

54. Given \(y = -\cos \left(2x + \frac{\pi}{2}\right) + 3\), find...

A. amplitude  
B. period length  
C. phase shift  
D. vertical shift  
E. symmetric to y-axis?  
F. symmetric to x-axis?

55. Given \(y = 2\sin \left(3x - \frac{\pi}{2}\right) - 1\), find...

A. amplitude  
B. period length  
C. vertical shift  
D. phase shift

56. Given \(y = -3\tan (4x - \pi) + 2\), find...

A. amplitude  
B. period length  
C. vertical shift  
D. phase shift

Write the equation for these graphs...

57. each x-axis tick mark = \(\pi/2\)  
58. each x-axis tick mark = \(\pi/2\)  
59. each x-axis tick mark = \(\pi/4\)  
60. each x-axis tick mark = \(\pi/2\)
61. Find the co-function for each of the following...

A. \( \sin 34^\circ \)  
B. \( \csc 75^\circ \)  
C. \( \tan \frac{\pi}{5} \)  
D. \( \cos \frac{3\pi}{7} \)

Find \( \theta \) to the nearest degree where \( 0^\circ \leq \theta < 90^\circ \).

62. \( \tan \theta = 0.4378 \)
63. \( \sec \theta = 2.1569 \)

64. \( \sec K \)
65. \( \tan L \)
66. \( \cot K \)

67. \( y = \sin^{-1}x \)
68. \( y = \cot^{-1}x \)

69. Evaluate each of the following.

A. \( \tan^{-1}(\sqrt{3}) \)
B. \( \sin^{-1}\left(-\frac{\sqrt{2}}{2}\right) \)
C. \( \arccot(-1) \)
D. \( \arccsc\left(\frac{2\sqrt{3}}{3}\right) \)

70. The angle of depression from the top of a cliff 350 meters high to the foundation of a house is \( 42.5^\circ \). To the nearest tenth of a meter, how far is the home form the foot of the cliff?

71. A 15-foot ladder is leaning against a house. The ladder reaches 11 feet up the side of the house. Find the angle that the ladder makes with the ground.

For each expression in column I, give the letter of the expression in column 2 it may be equated with to form an identity.

<table>
<thead>
<tr>
<th>Column I</th>
<th>Column II</th>
</tr>
</thead>
<tbody>
<tr>
<td>72 ( \frac{\cos \theta}{\sin \theta} )</td>
<td>A. ( 1 + \cot^2 \theta )</td>
</tr>
<tr>
<td>73 ( \sin^2 \theta )</td>
<td>B. ( 1 - \cos^2 \theta )</td>
</tr>
<tr>
<td>74 ( \tan \theta )</td>
<td>C. ( \cot^2 \theta )</td>
</tr>
<tr>
<td>75 ( \frac{1}{\cos^2 \theta} )</td>
<td>D. ( \cot \theta )</td>
</tr>
<tr>
<td>76 ( \frac{1}{\tan^2 \theta} )</td>
<td>E. ( \frac{\sin \theta}{\cos \theta} )</td>
</tr>
<tr>
<td>77 ( \csc^2 \theta )</td>
<td>F. ( \sec^2 \theta )</td>
</tr>
</tbody>
</table>
Match each expression in Column I to its equivalent “match” in column II.

<table>
<thead>
<tr>
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<th>Column II</th>
</tr>
</thead>
<tbody>
<tr>
<td>78. ( \sin \theta \cdot \sec \theta )</td>
<td>A. ( \tan \theta )</td>
</tr>
<tr>
<td>79. ( \tan \theta \cdot \csc \theta \cdot \cot \theta )</td>
<td>B. ( \cot \theta )</td>
</tr>
<tr>
<td>80. ( (1 - \cos^2 \theta)(-\csc^2 \theta) )</td>
<td>C. 1</td>
</tr>
<tr>
<td>81. ( \sec \theta \cdot \frac{\sin \theta}{\cot \theta} )</td>
<td>D. -1</td>
</tr>
<tr>
<td></td>
<td>E. ( \sec \theta )</td>
</tr>
</tbody>
</table>

3rd Six Weeks:

Find the exact value of each of the following. Express answers in simplest radical form.

82. \( \cos 75^\circ \)  
83. \( \tan \frac{\pi}{12} \)  
84. \( \sin \frac{11\pi}{12} \)

85. Suppose \( \sin \alpha = \frac{5}{13} \) and \( \cos \beta = \frac{8}{17} \), with \( 90^\circ < \alpha < 180^\circ \) and \( 0^\circ < \beta < 90^\circ \). Evaluate...

A. \( \sin (\alpha + \beta) \)  
B. \( \cos (\alpha - \beta) \)  
C. \( \tan (\alpha + \beta) \)

86. Given \( \cos \alpha = -\frac{3}{5} \) with \( \pi < \alpha < \frac{3\pi}{2} \), express the following in simplest radical form.

A. \( \sin 2\alpha \)  
B. \( \cos 2\alpha \)  
C. \( \tan 2\alpha \)

Solve.

87. \( 8 + \csc x = 2, \; 0^\circ \leq x < 360^\circ \)  
88. \( \tan \theta + \sqrt{3} = 0, \; 0 \leq x < 2\pi \)

89. How many possible triangles?

A. \( \angle B = 92^\circ, \; b = 12, \; \text{and} \; c = 14 \)  
B. \( \angle C = 75^\circ, \; a = 6, \; \text{and} \; c = 10 \)  
C. \( \angle B = 55^\circ, \; b = 7, \; \text{and} \; a = 8 \)

90. Solve the triangle.

91. Solve the triangle.

92. Solve the triangle.

93. Find the area of the triangles.

94. Find the area of the triangles.