Part 1

1121 Unit 10 Additional Questions

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TRIGCOMP1.tex
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Exercise **1** *Consider the following functions:*
$f(x) = \dfrac{1}{x-2}$ *and* $g(x) = \sin(x)$
Use these functions to complete the statements below:

(a) *Domain of* $f(x)$ *is* $(\boxed{-\infty}, \boxed{2}) \cup (\boxed{2}, \boxed{\infty})$

(b) *Range of* $f(x)$ *is* $(\boxed{-\infty}, \boxed{0}) \cup (\boxed{0}, \boxed{\infty})$

(c) *Domain of* $g(x)$ *is* $(\boxed{-\infty}, \boxed{\infty})$

(d) *Range of* $g(x)$ *is* $[\boxed{-1}, \boxed{1}]$

(e) $f(g(x)) = \boxed{\dfrac{1}{\sin(x) - 2}}$

(f) *Domain of* $f(g(x))$ *is* $(\boxed{-\infty}, \boxed{\infty})$

(g) *Range of* $f(g(x))$ *is* $[\boxed{-1}, \boxed{-\dfrac{1}{3}}]$

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TRIGCOMP2.tex
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Exercise **2** *Consider the following functions:*
$f(x) = \dfrac{1}{x}$, $g(x) = \sin(x)$, *and* $h(x) = \cos(x)$
Use these functions to complete the statements below:

(a) *Domain of* $f(x)$ *is* $(\boxed{-\infty}, \boxed{0}) \cup (\boxed{0}, \boxed{\infty})$

(b) *Range of* $f(x)$ *is* $(\boxed{-\infty}, \boxed{0}) \cup (\boxed{0}, \boxed{\infty})$

(c) *Domain of* $g(x)$ *is* $(\boxed{-\infty}, \boxed{\infty})$

(d) *Range of* $g(x)$ *is* $[\boxed{-1}, \boxed{1}]$

(e) *Domain of* $h(x)$ *is* $(\boxed{-\infty}, \boxed{\infty})$

(f) *Range of* $h(x)$ *is* $[\boxed{-1}, \boxed{1}]$

(g) $g(h(x)) = \boxed{\sin(\cos(x))}$

(h) *Domain of* $g(h(x))$ *is* $(\boxed{-\infty}, \boxed{\infty})$

(i) *Range of $g(h(x))$ is* $[\,\boxed{\sin(-1)}\,,\,\boxed{\sin(1)}\,]$

Hint: The answer may contain a "non-famous" trigonometric value that can be left in terms of $\sin$*.*

(j) $h(g(x)) = \boxed{\cos(\sin(x))}$

(k) *Domain of $h(g(x))$ is* $(\,\boxed{-\infty}\,,\,\boxed{\infty}\,)$

(l) *Range of $h(g(x))$ is* $[\,\boxed{\cos(1)}\,,\,\boxed{1}\,]$

Hint: The answer may contain a "non-famous" trigonometric value that can be left in terms of $\cos$*.*

(m) $f(h(g(x))) = \boxed{\dfrac{1}{\cos(\sin(x))}}$

(n) *Domain of $f(h(g(x)))$ is* $(\,\boxed{-\infty}\,,\,\boxed{\infty}\,)$

(o) *Range of $f(h(g(x)))$ is* $[\,\boxed{1}\,,\,\boxed{\dfrac{1}{\cos(1)}}\,]$

Hint: The answer may contain a "non-famous" trigonometric value that can be left in terms of $\cos$*.*

TRIGCOMP3.tex

Exercise   3 *Consider the following functions:*

$f(x) = \dfrac{1}{x^2 - 1}$ *and* $g(x) = \cos(x)$

Use these functions to complete the statements below:

(a) *Domain of $f(x)$ is* $(\,\boxed{-\infty}\,,\,\boxed{-1}\,) \cup (\,\boxed{-1}\,,\,\boxed{1}\,) \cup (\,\boxed{1}\,,\,\boxed{\infty}\,)$

(b) *Range of $f(x)$ is* $(\,\boxed{-\infty}\,,\,\boxed{-1}\,] \cup (\,\boxed{0}\,,\,\boxed{\infty}\,)$

(c) *Domain of $g(x)$ is* $(\,\boxed{-\infty}\,,\,\boxed{\infty}\,)$

(d) *Range of $g(x)$ is* $[\,\boxed{-1}\,,\,\boxed{1}\,]$

(e) $f(g(x)) = \boxed{\dfrac{1}{(\cos(x))^2 - 1}}$

(f) *Domain of $f(g(x))$ contains all real numbers except for when* $x = k\boxed{\pi}$*, where k is an integer.*

(g) *Range of $f(g(x))$ is* $(\,\boxed{-\infty}\,,\,\boxed{-1}\,]$

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TRIGEQ4.tex
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Exercise 4 *Select all values within $[0, 2\pi)$ that satisfy the following equation:*
$2\tan(x) - \sec(x) = 0$

Select All Correct Answers:

(a) 0

(b) $\dfrac{\pi}{6}$ ✓

(c) $\dfrac{\pi}{4}$

(d) $\dfrac{\pi}{3}$

(e) $\dfrac{\pi}{2}$

(f) $\dfrac{2\pi}{3}$

(g) $\dfrac{3\pi}{4}$

(h) $\dfrac{5\pi}{6}$ ✓

(i) π

(j) $\dfrac{7\pi}{6}$

(k) $\dfrac{5\pi}{4}$

(l) $\dfrac{4\pi}{3}$

(m) $\dfrac{3\pi}{2}$

(n) $\dfrac{5\pi}{3}$

(o) $\dfrac{7\pi}{4}$

(p) $\dfrac{11\pi}{6}$

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TRIGEQ5.tex
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Exercise 5 *Select all values within $[0, 2\pi)$ that satisfy the following equation:*
$\sin(2x) = -\sin(-x)$

Select All Correct Answers:

(a) 0 ✓

(b) $\dfrac{\pi}{6}$

(c) $\dfrac{\pi}{4}$

(d) $\dfrac{\pi}{3}$ ✓

(e) $\dfrac{\pi}{2}$

(f) $\dfrac{2\pi}{3}$

(g) $\dfrac{3\pi}{4}$

(h) $\dfrac{5\pi}{6}$

(i) π

(j) $\dfrac{7\pi}{6}$

(k) $\dfrac{5\pi}{4}$

(l) $\dfrac{4\pi}{3}$

(m) $\dfrac{3\pi}{2}$

(n) $\dfrac{5\pi}{3}$ ✓

(o) $\dfrac{7\pi}{4}$

(p) $\dfrac{11\pi}{6}$

TRIGWORD1.tex

Exercise 6 *The height of the tide in a small beach town is measured along a seawall. Water levels oscillate between 6 feet at low tide and 12 feet at high tide. On a particular day, low tide occurred at 6 AM and high tide occurred at noon. Approximately every 12 hours, the cycle repeats. Find an equation to model the water levels where x represents the time in hours and y represents the height of the tide in feet. Hint: Use midnight (12 AM) as $x = 0$*

(a) *Which periodic function makes the most sense for this model?* ($\sin/\cos \checkmark/\tan$)

(b) *What is the Amplitude of the tide?*
$\boxed{3}$

(c) *What is the Period of the tide?*
$\boxed{12}$ *hours.*

(d) *Find the b value for this model where is b is the horizontal scale coefficient as in this equation $f(x) = a\sin(bx) + d$.*
Hint: $P = \dfrac{2\pi}{b}$
$\boxed{\dfrac{\pi}{6}}$

(e) *What is the vertical shift for this model?*
$\boxed{9}$

(f) *Write an equation that models the water levels.*
$y = \boxed{3\cos(\dfrac{\pi}{6}x) + 9}$