Part 1

1121 Unit 10 Additional Questions

TRIGCOMP1.tex

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* $[\boxed{-1}, \boxed{-\dfrac{1}{3}}]$

TRIGCOMP2.tex

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 *is equal to multiples of* $\boxed{\pi}$

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

TRIGEQ4.tex

Exercise 4 *Select all "famous" trigonometric values that satisfy the following equation:*
$2\tan(x) - \sec(x) = 0$

Select All Correct Answers:

(a) 0

(b) $\frac{\pi}{6}$ ✓

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

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

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

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

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

(h) $\frac{5\pi}{6}$ ✓

(i) π

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

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

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

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

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

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

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

`TRIGEQ5.tex`

Exercise 5 *Select all "famous" trigonometric values that satisfy the following equation:*
$\sin(2x) = -\sin(-x)$

Select All Correct Answers:

(a) 0 ✓

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

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

(d) $\frac{\pi}{3}$ ✓

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

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

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

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

(i) π

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

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

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

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

(n) $\frac{5\pi}{3}$ ✓

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

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

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? (* $\sin x$ */* $\cos x$ ✓*/* $\tan x$ *)*

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

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

(d) *What is the b value for this model?*
$\boxed{\frac{\pi}{6}}$

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

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