Test: Tomorrow

ex. $f(x)=\sqrt{3x-4}$ & $g(x)=\sqrt{x^2+x-20}$

1) Find the domain of $(f\circ g)(x)$ $f(g(x))$

2) Find the range of $g^{-1}(x)$

3) Find $(f+g)(5)$

$f(x)=\sqrt{\boxed{3x-4}}$

Domain:

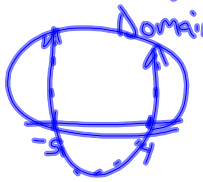
$3x-4\geq 0$

$3x\geq 4$

$x\geq \frac{4}{3}$

$g(x)=\sqrt{x^2+x-20}$ Above x-axis

Domain: $x^2+x-20\geq 0$

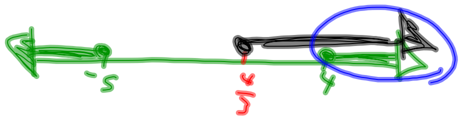


$(x+5)(x-4)=0$

$x=-5,4$

$x\leq -5$ or $x\geq 4$

Domain of $(f\circ g)(x)$ ... *Intersect Domains



D: $\{x \mid x\geq 4, x\in R\}$

2) Range of $g^{-1}(x)$ is Domain of $g(x)$

Range: $\{y \mid y\leq -5$ or $y\geq 4, y\in R\}$

3) $(f+g)(x)$ $(fg)(x)$ $(f\circ g)(x)$

$(f-g)(x)$ $f(x)\,g(x)$ $f(g(x))$

$\left(\frac{f}{g}\right)(x)$

$(f+g)(5)$

$f(5)+g(5)$

$\sqrt{3(5)-4}+\sqrt{(5)^2+(5)-20}$

$\sqrt{11}+\sqrt{10}$

$f(x) = 2x - 4 \qquad g(x) = x^2 + 1 \qquad h(x) = \sqrt{x+9}$

ex 1) $f[\underbrace{g(-5)}_{26}]$ $\Rightarrow$ $g(-5) = (-5)^2 + 1$

$= 26$

$f(26) = 2(26) - 4$

$= \underline{48}$

2) $g[f(\underline{h(7)})] = \underline{17}$ $\quad (4) \quad 4$

3) $g[h(3w)] - (g - f)(3w+1)$

$h(3w) = \sqrt{3w+9}$

$g(\sqrt{3w+9}) = (\sqrt{3w+9})^2 + 1$

$= 3w + 9 + 1$

$= 3w + 10$

$(g-f)(3w+1)$

$g(3w+1) - f(3w+1)$

$(3w+1)^2 + 1 \qquad 2(3w+1) - 4$

$9w^2 + 6w + 1 + 1 \qquad 6w + 2 - 4$

$(9w^2 + 6w + 2) - (6w - 2)$

$(9w^2 + 4)$

$= (3w + 10) - (9w^2 + 4)$

$\boxed{= -9w^2 + 3w + 6}$

Convert each of the following angles from radians to degrees.

a) $\frac{\pi}{2}$ radians b) $\frac{3\pi}{4}$ radians c) π radians d) $\frac{\pi}{6}$ radians

e) 5π radians f) $\frac{4\pi}{5}$ radians g) $\frac{7\pi}{4}$ radians h) $\frac{\pi}{10}$ radians

$\boxed{\pi \text{ Rad} = 180^\circ}$

f) $\frac{4\pi}{5}$

$\frac{4(180^\circ)}{5}$

$= \underline{144^\circ}$

g) $\frac{180^\circ}{10}$

$= \underline{18^\circ}$

Convert each of the following angles from degrees to radians giving your answer to 2 decimal places.

a) 17º b) 49º c) 124º d) 200º

c) $\frac{124\pi}{180}$

$= \frac{31\pi}{45}$

$= 2.2$ Rad

d) $\frac{200\pi}{180} = \frac{10\pi}{9}$

$= 3.5$ Rad

Convert each of the following angles from radians to degrees, giving your answer to 1 decimal place.

a) 0.6 radians b) 2.1 radians c) 3.14 radians d) 1 radian

$0.6 \text{ Rad} \times \frac{180^\circ}{\pi \text{ Rad}}$

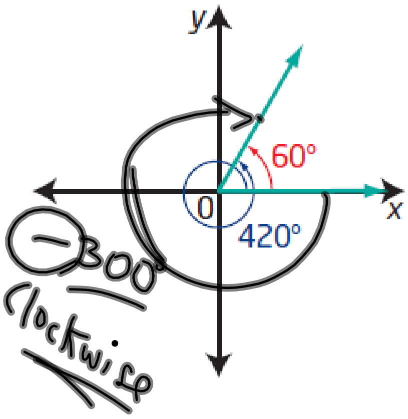
$= 34.4^\circ$

$2.1 \text{ Rad} \times \frac{180^\circ}{\pi \text{ Rad}}$

$= 120.3^\circ$

Coterminal Angles

When you sketch an angle of 60° and an angle of 420° in standard position, the terminal arms coincide. These are **coterminal angles**.



coterminal angles

- angles in standard position with the same terminal arms
- may be measured in degrees or radians
- $\frac{\pi}{4}$ and $\frac{9\pi}{4}$ are coterminal angles, as are 40° and −320°

$2\pi = 360°$

Strategy for finding coterminal angles in either radians or degrees?

$\theta \pm 360°k,\ k \in N$ (Degrees)

or

$\theta + 360°k,\ k \in I$

$\theta \pm 2\pi k,\ k \in N$

OR

$\theta + 2\pi k,\ k \in I$

Radians

For each angle in standard position, determine one positive and one negative angle measure that is coterminal with it.

a) $270°$ **b)** $-\frac{5\pi}{4}$ **c)** $740°$

a) $270° + 360°$

$= \underline{630°}$

$270° - 360°$

$= \underline{-90°}$

b) $-\frac{5\pi}{4} + \frac{2\pi}{1}$

$= \frac{3\pi}{4}$

$= -\frac{5\pi}{4} - \frac{2\pi}{1}$

$= -\frac{13\pi}{4}$

c) $740° + 360°$

$= \underline{1100°}$

$740° - 360°$

$= \underline{380°}$

$380° - 360°$

$= \underline{20°}$

$20° - 360° = \underline{-340°}$

$17\,482°$

$\div 360°$

$\underline{48 \text{ full Rev}}$

$17482° - 49(360°)$

Test Discussion...

Average = 72%

4. $f(x)=\sqrt{1-3x}$

Domain of $f(x)$ is Range of $f^{-1}(x)$

$1-3x \geq 0$

$\frac{-3x}{-3} \geq \frac{-1}{-3}$

$x \leq \frac{1}{3}$

$\left(-\infty, \frac{1}{3}\right]$

6. $f(x)=x^2+8x-3$

$x=y^2+8y-3$

$x=(y^2+8y+16)-16-3$

$x=(y+4)^2-19$

$\pm\sqrt{x+19}=\sqrt{(y+4)^2}$

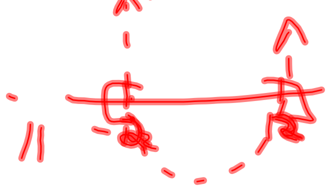
$\pm\sqrt{x+19}=y+4$

$y=-4\pm\sqrt{x+19}$

10. $f(x)=\sqrt{x^2-10x-24}$

$x^2-10x-24 \geq 0$

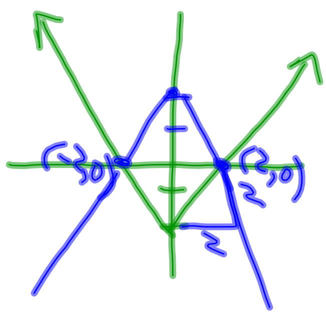
$(x-12)(x+2)=0$



$x \leq -2$ OR $x \geq 12$

$+2\%$

11. $y=|x|-2$



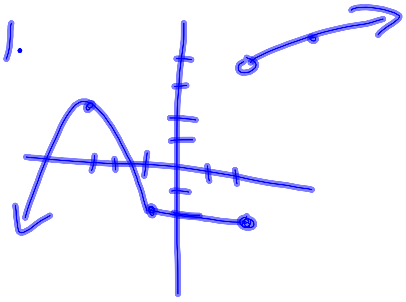
12. $f(x)=2|-3(x-3)|-4$

V(3,-4)

A

Right 3 Down 4

1.



2. a) -2

$(f \circ w)(4y^2)$

b) $f[w(4y^2)] - 2(g+f)(y-1)$

$w(4y^2) = \sqrt{4y^2+4}$

$\sqrt{a^2+b^2} \neq a+b$

$f(\sqrt{4y^2+4}) = 2 - (\sqrt{4y^2+4})^2$

$= 2 - (4y^2+4)$

$= -2 - 4y^2$

$(g+f)(y-1) = g(y-1) + f(y-1)$

$= (y-1)+1 + 2-(y-1)^2$

$= y + \begin{cases} 2-(y^2-2y+1) \\ 1-y^2+2y \end{cases}$

$= -y^2+3y+1$

$=(2-4y^2)-2(-y^2+3y+1)$

$=-2-4y^2+2y^2-6y-2$

$= \underline{-2y^2-6y-4}$

3. a) $g(x) = -7f\left(\frac{5}{3}(x-4)\right)+3$

b) $(x,y) \rightarrow \left(\frac{3}{5}x+4, -7y+3\right)$

$(25,5) \rightarrow \left(\frac{3}{5}(25)+4, -7(5)+3\right)$

$\rightarrow (19, -32)$

5/ $f(x) = \frac{3x+4}{x-2}$ (8) $f^{-1}(8) = ?$

$(y-2)x = \frac{3y+4}{\cancel{y-2}}\cancel{(y-2)}$

$(y-2)x = 3y+4$

$yx-2x-3y = 4$

$yx-3y = 4+2x$

$\frac{y(x-3)}{x-3} = \frac{4+2x}{x-3}$

$y = \frac{2x+4}{x-3}$

$f^{-1}(x) = \frac{2x+4}{x-3}$

$x=8$ on f^{-1} ... $y=8$ of $f(x)$

$f^{-1}(8) = \frac{2(8)+4}{8-3} = \frac{20}{5}$

$= 4$

6/
$g(x) = -3f(x-2)-1$

$= -f(3(x-2))-1$

Determine a negative angle co-terminal with each of the following angles:

Principal Angle ← (Must Be Positive)

1) $476895° \Rightarrow$

$= -105°$

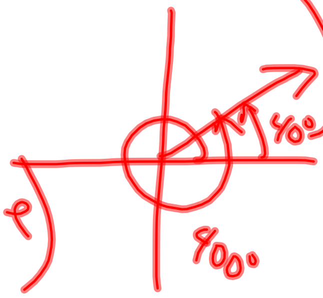
$\div 360° - (\text{whole } \#)$

$\times 360°$

P.A. $= 255°$

$-360°$

$-105°$



2) $\dfrac{35784\pi}{5}$

$= \dfrac{35785\pi}{5} - \dfrac{\pi}{5}$

$= 7157\pi - \dfrac{\pi}{5}$

direction (CW)

$\dfrac{\pi}{1} + \dfrac{\pi}{5}$

$\dfrac{5\pi}{5} + \dfrac{\pi}{5}$

$= \dfrac{6\pi}{5}$

$-\dfrac{6\pi}{5}$