10-3-17 1st Trig

Coupon 1: \$10 off

Coupon 2: 10% off

\$100

1st Coupon 1: \$90 owe

2nd Coupon 2: \$81 owe

2nd: \$90 owe

1st: \$80 owe

$f(x) = 3x + 2$

$g(x) = 2x - 10$

① $f(\boxed{g(7)})$ $g(7) = 2 \cdot 7 - 10 = 4$

$f(4) = 3 \cdot 4 + 2 = 14$

② $g(\boxed{g(4)}) =$

$g(4) = 2 \cdot 4 - 10 = -2$

$g(-2) = 2 \cdot -2 - 10 =$

$-4 - 10$

-14

$h(x) = x^2$ $t(x) = 4x - 1$

③ $h(t(2))$

$t(2) = 4 \cdot 2 - 1$

$= 8 - 1$

$= 7$

$h(7) = 7^2 = 49$

④ $h(h(\boxed{t(1)}))$

$t(1) = 4 \cdot 1 - 1$

$= 3$

$h(\boxed{h(3)})$

$h(3) = 3^2$

$= 9$

$h(9) = 9^2 = 81$

Domain: what the x can be in a problem

Ex: $f(x) = 3x - 1$

No restrictions, so x can be anything.

$\mathbb{R}$

— can't become zero.

State the DOMAIN

5. $f(x) = \dfrac{8x-1}{x+7}$

$x \neq -7$

$\mathbb{R}$ except $x \neq -7$

6. $f(x) = \dfrac{x^4+7}{2x-9}$

$\mathbb{R}$ except $x \neq 4\frac{1}{2}$

$$\begin{aligned} 2x - 9 &\neq 0 \\ +9 \quad &\; +9 \\ \hline 2x &\neq 9 \\ \tfrac{2x}{2} &\neq \tfrac{9}{2} \\ x &\neq 4\tfrac{1}{2} \end{aligned}$$

7. $f(x) = \dfrac{9}{x^2+3x+2}$

$x^2+3x+2 \neq 0$

$(x+2)(x+1) \neq 0$

$x+2 \neq 0$ NOR $x+1 \neq 0$

$-2 \;\; -2$ $\qquad -1 \;\; -1$

$x \neq -2$ $\qquad x \neq -1$

$\mathbb{R}$ except $x \neq -2, -1$

Other problem comes when we have a radical

$\sqrt{}$ ← can't have a negative #

$\sqrt{\boxed{}} \geq 0$

⑧ $f(x) = \sqrt{2x+8}$

$$\begin{aligned} 2x+8 &\geq 0 \\ -8 \quad & \quad -8 \\ \hline \frac{2x}{2} &\geq \frac{-8}{2} \\ x &\geq -4 \end{aligned}$$

$\mathbb{R} : x \geq -4$

↑ such that

⑨ $f(x) = \sqrt{8x+8}$

$$\begin{aligned} 8x+8 &\geq 0 \\ -8 \quad & \quad -8 \\ \hline \frac{8x}{8} &\geq \frac{-8}{8} \end{aligned}$$

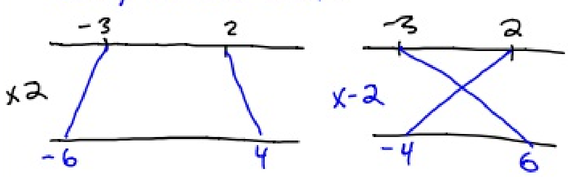
$\mathbb{R} : x \geq -1$

⑩ $f(x) = \sqrt{-3x-12}$

$$\begin{aligned} -3x-12 &\geq 0 \\ +12 \quad & \quad +12 \\ \hline \frac{-3x}{-3} &\geq \frac{12}{-3} \end{aligned}$$

$\mathbb{R} : x \leq -4$

Why do we flip?



⑪ $f(x) = \sqrt{3+9x}$

$$\begin{aligned} 3+9x &\geq 0 \\ -3 \quad & \quad -3 \\ \hline \frac{9x}{9} &\geq \frac{-3}{9} \end{aligned}$$

$\mathbb{R} : x \geq -\frac{1}{3}$

10-3-17 3rd Trig

Coupon 1: \$10 off

Coupon 2: 10% off

\$100	\$100
Coupon 1: \$90	Coupon 2: \$90
Coupon 2: \$81	Coupon 1: \$80

Ex: $f(x) = 3x - 1$ $\quad g(x) = 2x + 4$

$f(\boxed{g(2)})$ $\quad g(2) = 2 \cdot 2 + 4 = 8$

$f(8) = 3 \cdot 8 - 1$

$= 23$

$f(x) = x^2$ $\quad g(x) = 2x + 1$

① $f(\boxed{g(3)})$ $\quad g(3) = 2 \cdot 3 + 1 = 7$

$f(7) = 7^2$

$= 49$

② $g(\boxed{g(5)})$ $\quad g(5) = 2 \cdot 5 + 1 = 11$

$g(11) = 2 \cdot 11 + 1$

23

③ $h(x) = 3x^2 - 1$ $\quad t(x) = x + 2$

$t(h(\boxed{t(3)}))$ $\quad t(3) = 3 + 2 = 5$

$t(h(5))$ $\quad h(5) = 3 \cdot 5^2 - 1 = 74$

$t(74) = 74 + 2$

$= 76$

Domain

$f(x) = 5x - 1$

x can be anything you want

$\mathbb{R}$

Problem when we have a fraction

Domain

(4) $f(x) = \frac{\cancel{2}2x-5}{x-4}$

if $x=4$, we have a problem

$\mathbb{R}$ except $x \neq 4$

(5) $f(x) = \frac{x^{100} - 30x^5}{2x-9}$

$\mathbb{R}$ except $x \neq 4\frac{1}{2}$

$$2x - 9 \neq 0$$
$$+9 \quad +9$$
$$\frac{2x}{2} \neq \frac{9}{2}$$
$$x \neq 4\tfrac{1}{2}$$

(6) $f(x) = \frac{4x+5}{x^2+8x+12}$

$(x+6)(x+2) \neq 0$

$x+6 \neq 0$ NOR $x+2 \neq 0$

$-6 \quad -6 \qquad -2 \quad -2$

$x = -6$ NOR $x = -2$

$\mathbb{R}$ except $x \neq -6, -2$

$$\sqrt{x} \geq 0$$

⑦ $f(x) = \sqrt{x-8}$

$$x - 8 \geq 0$$
$$+8 \quad +8$$
$$\mathbb{R}: x \geq 8$$

such that

⑧ $f(x) = \sqrt{3x - 19}$

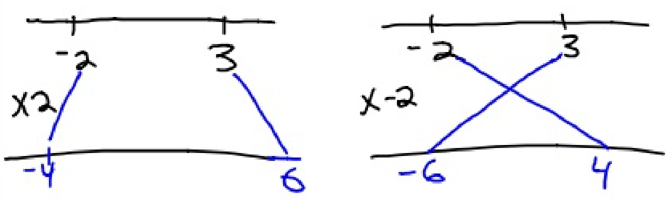
$$3x - 19 \geq 0$$
$$+19 \quad +19$$
$$\frac{3x}{3} \geq \frac{19}{3}$$
$$x \geq 6\tfrac{1}{3}$$

$\mathbb{R}: x \geq 6\tfrac{1}{3}$

⑨ $f(x) = \sqrt{-3x - 9}$

$$-3x - 9 \geq 0$$
$$+9 \quad +9$$
$$\frac{-3x}{-3} \geq \frac{9}{-3}$$

$\mathbb{R}: x \leq -3$



10-3-17 4th Trig

Coupon 1: 10% off

Coupon 2: \$10 off

\$100

option 1	option 2
Coupon 1: \$90	Coupon 2: \$90
Coupon 2: \$80	Coupon 1: \$81

$f(x) = 3x-1$ $g(x) = 2x+5$

① $f(\boxed{g(3)})$ $g(3) = 2\cdot 3+5$
$= 11$

$f(11) = 3\cdot 11 - 1$
$= 32$

② $g(\boxed{f(1)})$ $f(1) = 3\cdot 1 - 1$
$= 2$

$g(2) = 2\cdot 2+5$
$= 9$

③ $h(x) = x^2$ $t(x) = 2x+1$

$h(t(4))$ $t(4) = 2\cdot 4+1 = 9$

$h(9) = 9^2$
81

④ $t(t(3))$ $t(3) = 2\cdot 3+1$
$= 7$

$t(7) = 2\cdot 7+1$
15

Domain - What the x can be.

⑤ $f(x) = 3x + 1$

x can be anything.

$\mathbb{R}$

Fractions $\rightarrow$ ______

can't come out to be zero

⑥ $f(x) = \dfrac{100x^{10000}}{x-5}$

$\neq 0$

$x - 5 \neq 0$

$\;\;\;+5 \;\; +5$

$\mathbb{R}$ except $x \neq 5$

⑦ $f(x) = \dfrac{85}{2x-10}$

$2x - 10 \neq 0$

$\;\;\;+10 \;\; +10$

$2x \neq 10$

$\mathbb{R}$ except $x \neq 5$

⑧ $f(x) = \dfrac{x^{10}}{x^2+9x+20}$

$x^2 + 9x + 20 \neq 0$

$(x+4)(x+5) \neq 0$

$x + 4 \neq 0$ NOR $x + 5 \neq 0$

$\;\;-4 \;\; -4 \qquad\qquad -5 \;\; -5$

$x \neq -4 \qquad\qquad x \neq -5$

$\mathbb{R}$ except $x \neq -4, -5$

$$\sqrt{\bigcirc} \geq 0$$

⑨ $f(x) = \sqrt{x-5}$

$$x - 5 \geq 0$$
$$\underline{\quad +5 \quad +5}$$
$$\mathbb{R}: y \geq 5$$

such that

⑩ $f(x) = \sqrt{2x-7}$

$$2x - 7 \geq 0$$
$$\underline{\quad +7 \quad +7}$$
$$\frac{2x}{2} \geq \frac{7}{2}$$

$$\mathbb{R}: x \geq 3\tfrac{1}{2}$$

⑪ $f(x) = \sqrt{-3x+6}$

$$-3x + 6 \geq 0$$
$$\underline{\quad -6 \quad -6}$$
$$\frac{-3x}{-3} \geq \frac{-6}{-3}$$
$$\mathbb{R}: x \leq 2$$