Test 2 Review

Tuesday, March 3, 2020 9:37 AM

MC

(1) $y = x^2$: Parent Function.

$f(x) = \boxed{\frac{1}{2}}(x \boxed{+3})^2 - 10$

subtract 10 outside

Down, 10 units

add 3 inside

Left, 3 units

Multiply by $\frac{1}{2}$ outside

Shrink vertically by $\frac{1}{2}$

Choice A.

(2) Transformation: $g(x) = f(\boxed{x-1}) + 3$

up, 3

Right, 1 unit

$(6, 15) \xrightarrow{\text{Right, 1}} (7, 15) \xrightarrow{\text{up, 3}} (7, 18)$

+1 to x-coord

+3 to y-coord

Choice : B

(3) Graph on left : formula : $f(x) = -x^3 + 3x$.

Graph on right is obtained from graph on left by moving 4 units to left.

$\longrightarrow$ Transformation : $f(x+4)$

So, formula for graph on right :

$$g(x) = -(x+4)^3 + 3(x+4)$$

(Replace x by x+4 in the original formula)

Choice : C

(4) $g(x) = \dfrac{2x}{\boxed{x^2 - 36}}$ $\longrightarrow$ denominator

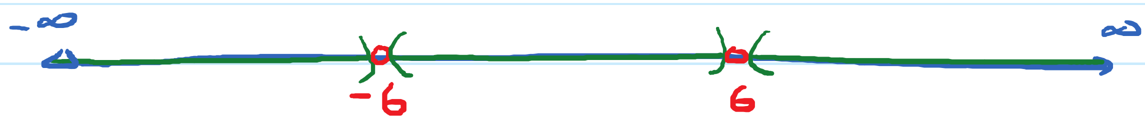
Domain?

Step 1: Set denominator = 0 and solve :

$$x^2 - 36 = 0$$

$\longrightarrow$ $x^2 = 36$ $\longrightarrow$ $x = \pm\sqrt{36} = \pm 6$

Step 2: Domain = all real numbers excluding ± 6



Interval notation: $\boxed{(-\infty, -6) \cup (-6, 6) \cup (6, \infty)}$

Choice: B

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(5) $h(x) = x + 4$; $g(x) = \sqrt{x+2}$

Find $(h+g)(14)$

$(h+g)(14) = h(14) + g(14)$

$h(14) = 14 + 4 = 18$ (Plug 14 into h)

$g(14) = \sqrt{14+2} = \sqrt{16} = 4$ (Plug 14 into g)

Then:

$(h+g)(14) = 18 + 4 = \boxed{22}$

Choice: B

(6) $f(x) = 6 - 5x$; $g(x) = -3x + 5$

Find $f + g$

$(f+g)(x) = f(x) + g(x)$

$= \underbrace{(6 - 5x)}_{f(x)} + \underbrace{(-3x + 5)}_{g(x)}$

$(f+g)(x) = -8x + 11$ (Combine like terms)

Choice : C.

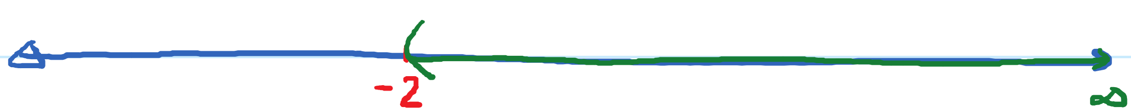
(7)

f/g ← division:

$\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)} = \frac{2x - 5}{\sqrt{\boxed{x+2}}}$ → Square root in denominator

To find domain: Set $x + 2 > 0$

$x > -2$



Domain = $\boxed{(-2, \infty)}$

Choice : D.

8) $f(x) = \boxed{-4x+2}$; $g(x) = 5x+8$

$(g \circ f)(x) = g(\underbrace{f(x)})$

plug $f(x)$ into g

$= 5(-4x+2) + 8$

$= -20x + 10 + 8$ (Distribute)

$(g \circ f)(x) = -20x + 18$ (Combine like terms)

Choice : C

9) $f(x) = \dfrac{x-5}{2}$; $g(x) = 7x + 2$

Find $(g \circ f)(15)$

1st way of doing this:

$(g \circ f)(15) = g(f(15))$: Plug 15 into f then plug result of that into g

Plug 15 into f: $f(15) = \dfrac{15-5}{2} = \boxed{5}$.

Then plug $\boxed{5}$ into g:

$$g(5) = 7\cdot(5) + 2 = \boxed{37}$$

2nd way of doing this.

Find $(g \circ f)(x)$ first:

$$(g\circ f)(x) = g(f(x)) = 7\cdot\left(\frac{x-5}{2}\right) + 2$$

$$= \frac{7(x-5)}{2} + 2$$

Then: plug 15 into formula for $g\circ f$:

$$(g\circ f)(15) = \frac{7(15-5)}{2} + 2 = \boxed{37}$$

Choice: D.

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10 $f(x) = \sqrt[3]{x-27}$

Step 1: Replace $f(x)$ by y:

$$y = \sqrt[3]{x-27}$$

Step 2: Swap x and y:

$$x = \sqrt[3]{y - 27}$$

Step 3: Solve for y

$$x^3 = y - 27 \quad \text{(Cube both sides)}$$

$$x^3 + 27 = y$$

So, $y = x^3 + 27$

Step 4: Replace y by $f^{-1}(x)$

$$\boxed{f^{-1}(x) = x^3 + 27}$$

Choice C

11 $f(x) = 8x^3 - 7$

Step 1: Replace $f(x)$ by y:

$$y = 8x^3 - 7$$

Step 2: Swap x and y:

$$x = 8y^3 - 7$$