Tuesday, November 06, 2018
3:46 PM

Precalculus – MP1 Quarterly Review #3 Date ________________

Name ____KEY____ Period ______________

This will **NOT** be collected and graded tomorrow! Study for your quarterly Sections 1.4 – 1.9, and 4.1.

1. Given $f(x) = x^2 - 2x + 1$, find $f(x-3)$.

$f(x-3) = (x-3)^2 - 2(x-3) + 1 = (x-3)(x-3) - 2x + 6 + 1$

$= x^2 - 6x + 9 - 2x + 7$

$= \boxed{x^2 - 8x + 16}$

2. Find the domain of $h(x) = \dfrac{\sqrt{x}}{x-6}$ ← $x \geq 0$ ← $x \neq 6$

$[0, 6) \cup (6, \infty)$

3. Find the domain of $g(x) = \sqrt{36 + 2x}$. ← ≥ 0

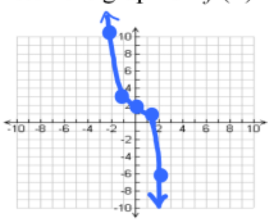
$36 + 2x \geq 0$

$\frac{2x}{2} \geq \frac{-36}{2}$

$x \geq -18$

$\boxed{[-18, \infty)}$

4. Sketch the graph of $f(x) = -x^3 + 2$. Give the domain and range in interval notation.



$P(x) = x^3$

x	y
-2	-8
-1	-1
0	0
1	1
2	8

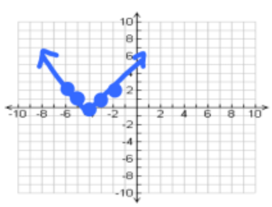
y(-1)	y+2
8	10
1	3
0	2
-1	1
-8	-6

D: $(-\infty, \infty)$

R: $(-\infty, \infty)$

5. Use the graph of $h(x) = |x|$ to graph the following: (a) $h(x+4)$ (b) $h(-x)+1$

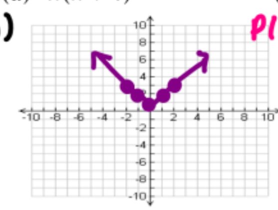
a)



$P(x) = |x|$ h(x)

x	y	x-4
-2	2	-6
-1	1	-5
0	0	-4
1	1	-3
2	2	-2

b)



$P(x) = |x|$ ① ②

x	y	-1(x)	y+1
-2	2	2	3
-1	1	1	2
0	0	0	1
1	1	-1	2
2	2	-2	3

6. Given $f(x) = 3x + 7$ and $g(x) = 2x^2 - 5$, find the following: (a) $(g - f)(x)$ (b) $(f \cdot g)(x)$

a) $g(x) - f(x)$

$= 2x^2 - 5 - (3x + 7)$

$= 2x^2 - 5 - 3x - 7$

$= \boxed{2x^2 - 3x - 12}$

b) $f(x) \cdot g(x)$

$= (3x + 7)(2x^2 - 5)$

$= 6x^3 - 15x + 14x^2 - 35$

$= \boxed{6x^3 + 14x^2 - 15x - 35}$

7. Given $r(x) = x^2 - 2x + 16$ and $s(x) = 2x + 3$, find $r(s(x))$.

$r(2x+3) = (2x+3)^2 - 2(2x+3) + 16$

$= (2x+3)(2x+3) - 4x - 6 + 16$

$= 4x^2 + 12x + 9 - 4x + 10$

$= \boxed{4x^2 + 8x + 19}$

8. Given $f(x) = x^3 + 7$, find $f^{-1}(x)$.

$y = x^3 + 7$

$x = y^3 + 7$

$x - 7 = y^3$

$y = \sqrt[3]{x-7}$

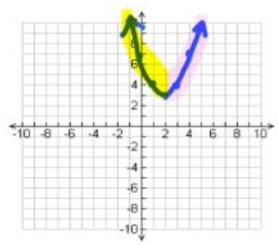
$\boxed{f^{-1}(x) = \sqrt[3]{x-7}}$

9. Determine the intervals over which the function $f(x) = (x-2)^2 + 3$ is increasing, decreasing, or constant.

Vertex $(2,3)$

Decreasing: $(-\infty, 2)$

Increasing: $(2, \infty)$



10. Determine whether the following functions are even, odd, or neither:

(a) $g(x) = x^5 + 4x - 7$

$g(-x) = (-x)^5 + 4(-x) - 7$

$= -x^5 - 4x - 7$

$\neq -g(x) \quad \neq g(x)$

$\boxed{\text{neither}}$

(b) $h(x) = 3x^4 - 21x^2$

$h(-x) = 3(-x)^4 - 21(-x)^2$

$= 3x^4 - 21x^2$

$= h(x)$

$\boxed{\text{even}}$

11. *Verify algebraically*, that $f(x) = 3x^5 + 2$ and $g(x) = \sqrt[5]{\dfrac{x-2}{3}}$ are inverse functions.

$f(g(x)) = 3\left(\sqrt[5]{\frac{x-2}{3}}\right)^5 + 2$

$= 3\left(\frac{x-2}{3}\right) + 2$

$= x - 2 + 2$

$= x$ ✓

$g(f(x)) = \sqrt[5]{\frac{3x^5 + 2 - 2}{3}}$

$= \sqrt[5]{\frac{3x^5}{3}}$

$= \sqrt[5]{x^5} = x$ ✓

Since $f(g(x)) = x$ and $g(f(x)) = x$ the functions are inverses.

12. True/False: if a function has an inverse then it must pass both the vertical and horizontal line tests.

TRUE

13. Express 350° in radian measure.

$350^\circ \cdot \frac{\pi \text{ rad}}{180^\circ} = \boxed{\frac{35\pi}{18}}$

14. Find one positive and one negative coterminal angle to $\frac{2\pi}{9}$.

$\pm$ MULTIPLES of 360° or 2π

$\frac{2\pi}{9} + 2\pi \cdot \frac{9}{9} = \frac{2\pi}{9} + \frac{18\pi}{9} = \boxed{\frac{20\pi}{9}}$

$\frac{2\pi}{9} - 2\pi = \frac{2\pi}{9} - \frac{18\pi}{9} = \boxed{\frac{-16\pi}{9}}$

15. Convert $135^\circ 14' 12''$ to decimal form.

$\boxed{135.237^\circ}$