Honors Math II
Chapter 7 day 2 compositions

Name Key
Period_____ Date_____

Let $f(x) = 2x - 1$, $g(x) = 3x$, and $h(x) = x^2 + 1$. Compute the following:

1. $f(g(-3)) =$
$f(3(-3)) =$
$f(-9) =$
$2(-9)-1 = -19$

2. $f(h(7)) =$
$f(7^2+1) =$
$f(50) =$
$2(50)-1 = 99$

3. $g(f(h(-6)))$
$g(f(37)) =$
$g(73) =$
$3(73) = 219$

4. Let $j(x) = h(f(x))$
$j(2) = 4(2)^2 - 4(2) + 2 = 10$
$j(x) = (2x-1)^2 + 1$
$j(x) = 4x^2 - 4x + 1 + 1$
$j(x) = 4x^2 - 4x + 2$

5. Let $k(x) = g(f(x))$
$k\left(\frac{1}{2}\right) = 6\left(\frac{1}{2}\right) - 3 = 0$
$K(x) = 3(2x-1)$
$K(x) = 6x - 3$

6. Let $m(x) = h(g(x))$
$m(-3) = 9(-3)^2 + 1 = 82$
$m(x) = (3x)^2 + 1$
$m(x) = 9x^2 + 1$

7. Let $k(x) = g(h(x))$
$k(-7) = 3(-7)^2 + 3$
$= 150$
$K(x) = 3(x^2+1)$
$= 3x^2 + 3$

8. Let $j(x) = f(h(x))$
$j\left(\frac{1}{2}\right) = 2\left(\frac{1}{2}\right)^2 + 1$
$= 3/2$
$j(x) = 2(x^2+1) - 1$
$j(x) = 2x^2 + 2 - 1$
$j(x) = 2x^2 + 1$

9. Let $n(x) = f(f(x))$
$n(8) = 4(8) - 3 = 29$
$n(x) = 2(2x-1) - 1$
$n(x) = 4x - 2 - 1$
$n(x) = 4x - 3$

Let $f(x) = 2x^2 - x$ and $g(x) = x + 6$. Compute the following. State the domain.
D: $\mathbb{R}$ D: $\mathbb{R}$

10. $(f \circ g)(2)$
$f(g(2))$
$f(8) = 2(8)^2 - 8$
$= 128 - 8$
$= 120$

11. $(g \circ f)(2)$
$g(f(2))$
$g(2(2)^2 - 2)$
$g(+6) = +6 + 6$
$= 12$

12. $(f \circ g)(x)$ $f(g(x))$
$2(x+6)^2 - (x+6)$
$2(x^2 + 12x + 36) - x - 6$
$2x^2 + 24x + 72 - x - 6$
$2x^2 + 23x + 66$ D: $\mathbb{R}$

D: $\mathbb{R}$
Final

13. $(g \circ f)(x)$ $g(f(x))$
$2x^2 - x + 6$ D: $\mathbb{R}$

Final
D: $\mathbb{R}$

Let $f(x) = \dfrac{2x+1}{3x-2}$ *and* $g(x) = 5x - 6$. *Compute the following. State the domain.*

14. $(f \circ g)(-2)$ $f(g(-2))$

$f(5(-2)-6)$

$f(-16) = \dfrac{2(-16)+1}{3(-16)-2}$

$= \dfrac{-31}{-50} = \dfrac{31}{50}$

15. $(g \circ f)(-2)$ $g(f(-2))$

$g\left(\dfrac{-4+1}{-6-2}\right)$

$g(3/8)$

$5(3/8)-6 = \dfrac{-33}{8}$

16. $(f \circ g)(x)$ $g(x)$ domain $\mathbb{R}$

$f(g(x))$

$\dfrac{2(5x-6)+1}{3(5x-6)-2} = \dfrac{10x-11}{15x-20}$

D: All reals except $x \neq 4/3$

Final Domain

$\mathbb{R}\ x \neq \dfrac{4}{3}$

17. $(g \circ f)(x)$ $f(x)$ domain $\mathbb{R}$

$g(f(x))$

$5\left(\dfrac{2x+1}{3x-2}\right)-6$ or $\dfrac{10x+5}{3x-2} - 6$ or

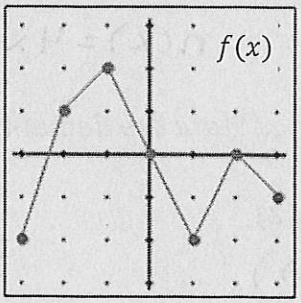
$\dfrac{-8x+17}{3x-2}$

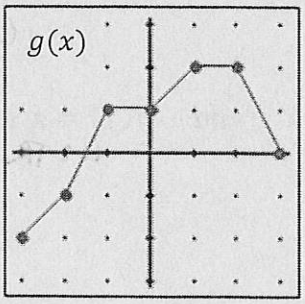
D: All reals except $x \neq 2/3$

Final Domain

$\mathbb{R}\ x \neq 2/3$

Refer to the graphs of $f(x)$ *and* $g(x)$ shown . Find the indicated values.





18. $(f \circ g)(1)$ $f(g(1))$

$f(2) = 0$

19. $(f \circ g)(-3)$ $f(g(-3))$

$f(-2) = 1$

20. $(g \circ f)(1)$ $g(f(1))$

$g(-2) = -1$

21. $(g \circ f)(-1)$ $g(f(-1))$

$g(2) = 2$

22. $(f \circ f)(3)$ $f(f(3))$

$f(-1) = 2$

23. $(g \circ g)(0)$ $g(g(0))$

$g(1) = 2$

Use the table definitions of $H(t)$ *and* $r(t)$ shown below to find the indicated value.

t	1.0	1.5	2.0	2.5	3.0	3.5
$H(t)$	2.8	2.6	2.5	2.0	1.0	2.2

t	2.0	2.2	2.4	2.6	2.8	3.0
$r(t)$	1.2	1.5	3.0	2.8	2.5	2.0

24. $(r \circ H)(2.5)$ $r(H(2.5)) = 1.2$

25. $(r \circ H)(1.0)$ $r(H(1.0)) = 2.5$

26. $(H \circ r)(2.2)$ $H(r(2.2)) = 2.6$

27. $(H \circ r)(3.0)$ $H(r(3.0)) = 2.5$

28. $(H \circ H)(2.0)$ $H(H(2.0)) = 2.0$

29. $(r \circ r)(2.4)$ $r(r(2.4)) = 2.0$

Compute the following.

Let $f(x) = 9 - x$ *and* $g(x) = x^2 + x$ *and* $h(x) = x - 2$. *Compute the following. State the domain.*

30. $(f - h)(x) = f(x) - h(x)$

$f(x)$ domain $\mathbb{R}$

$h(x)$ domain $\mathbb{R}$

$(9-x)-(x-2)$

$9-x-x+2$

$-2x+11$

Final domain $\mathbb{R}$

31. $(h \circ g)(x)$ $h(g(x))$ $g(x)$ domain $\mathbb{R}$

$h(x^2+x) = x^2+x-2$ domain $\mathbb{R}$

Final domain $\mathbb{R}$

32. $(f \circ g)(x)$ $f(g(x))$

$g(x)$ domain $\mathbb{R}$

$f(x^2+x) =$

$9-(x^2+x) =$

$-x^2-x+9$

Domain $\mathbb{R}$

Final Domain $\mathbb{R}$

33. $(fg)(x)$ $f(x) \cdot g(x)$

$f(x)$ domain $\mathbb{R}$

$g(x)$ domain $\mathbb{R}$

$(9-x)(x^2+x)$

$9x^2+9x-x^3-x^2$

$-x^3+8x^2+9x$

Final domain $\mathbb{R}$

34. $f(x) + h(x)$ $= 9-x+x-2$

$f(x)$ domain $\mathbb{R}$ $= 7$

$h(x)$ domain $\mathbb{R}$

Final domain $\mathbb{R}$

35. $(gh)(x)$ $g(x) \cdot h(x)$

$g(x)$ domain $\mathbb{R}$

$h(x)$ domain $\mathbb{R}$

$(x^2+x)(x-2)$

$x^3-2x^2+x^2-2x$

x^3-x^2-2x

Final domain $\mathbb{R}$

$\frac{h(x)}{f(x)} = \frac{(x-2)}{9-x}$

domain: $\mathbb{R}$ $x \neq 9$

37. $\frac{f(x)}{g(x)} = \frac{9-x}{x^2+x}$

domain: $\mathbb{R}$ $x \neq 0, -1$

Evaluate without a calculator.

38. $16^{\frac{3}{2}} = (4)^3$

$= 64$

39. $25^{\frac{3}{2}} = (5)^3$

$= 125$

40. $64^{\frac{-2}{3}} = \frac{1}{64^{2/3}}$

$= \frac{1}{(4)^2} = \frac{1}{16}$

Rewrite the expression using radical notation.

41. $x^{\frac{1}{4}}$

$\sqrt[4]{x}$

42. $x^{\frac{2}{5}}$

$\left(\sqrt[5]{x}\right)^2$

43. $y^{\frac{9}{4}}$

$\left(\sqrt[4]{y}\right)^9$