

Advanced Algebra w/ Trig
6.3 Practice

Name: *Key*

Given the table below, evaluate the following:

| x | $f(x)$ | $g(x)$ | $h(x)$ |
|-----|--------|--------|--------|
| -1 | -12 | 4 | 32 |
| 3 | 4 | 7 | 30 |
| 6 | 6 | -12 | 28 |
| 7 | 0 | 3 | 26 |
| 9 | 1 | 11 | 24 |
| 11 | 26 | 15 | 22 |
| 15 | 7 | 9 | 20 |

1. $f(7) = 0$

2. $g(-1) = -4$

3. $h(-4) = n/a$

4. $f(g(9)) = f(11) = 26$
Handwritten: $\Rightarrow g(9) = 11$ so

5. $h(f(6)) = h(6) = 28$

6. $f(g(g(9))) =$

Handwritten: $f(g(11)) = f(15) = 7$

7. $(f + g)(9) = f(9) + g(9) = 1 + 11 = 12$

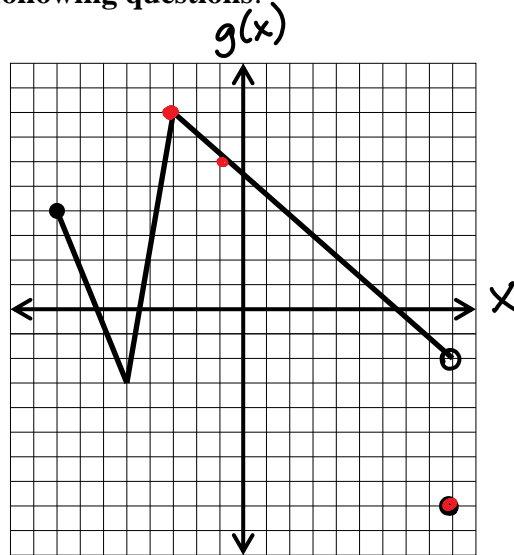
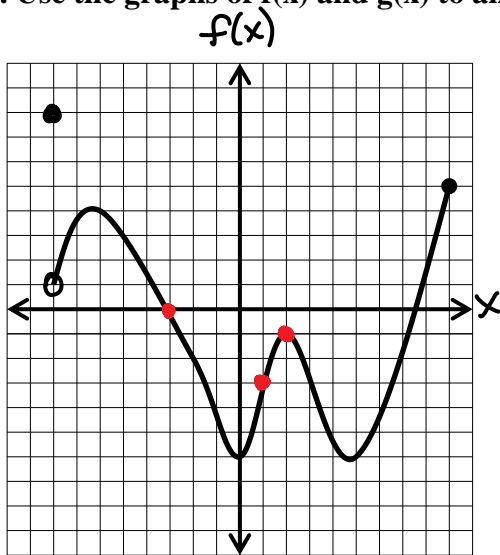
8. $(g - h)(3) =$

Handwritten: $g(3) - h(3) = 7 - 30 = -23$

9. $(f * g)(9) = f(9) * g(9)$

*Handwritten: $1 * 11 = 11$*

II. Use the graphs of $f(x)$ and $g(x)$ to answer the following questions:



Evaluate the following:

1. $f(2) = -1$

2. $g(9) = -8$

3. $g(f(1)) = g(-3) = 8$
Handwritten: $\Rightarrow f(1) = -3$ so

4. $f(g(-5)) = f(-3) = 0$

5. $(f + g)(-8) = f(-8) + g(-8) = 8 + 4 = 12$

6. $(f * g)(-3) = f(-3) * g(-3) = 0 * 8 = 0$

7. $(f - g)(-5) = f(-5) - g(-5) = 3 - (-3) = 6$

8. $(f/g)(9) = \frac{f(9)}{g(9)} = \frac{5}{-8}$

9. $f(f(f(1))) = f(f(-3)) = f(0) = -6$

10. $g(f(g(-2))) = g(f(7)) = g(-2) = 7$

11. $g(g(f(-8))) = g(g(8)) = g(-1) = 6$

III. Use the following polynomials to evaluate the expressions in questions 1-6:

$$f(x) = -2x^2 - 6x + 9$$

$$g(x) = 3x - 9$$

$$h(x) = \frac{x}{5}$$

1. $g(h(10))$

$$\downarrow$$

$$h(10) = \frac{10}{5} = 2$$

So

$$g(2) = 3(2) - 9$$

$$= \boxed{-3}$$

2. $h(f(-2))$

$$f(-2) = -2(-2)^2 - 6(-2) + 9$$

$$= -2(4) + 12 + 9$$

$$= -8 + 12 + 9$$

$$= 13$$

So

$$h(13) = \boxed{\frac{13}{5}}$$

3. $g(f(h(-5)))$

$$\downarrow$$

$$h(-5) = \frac{-5}{5} = -1$$

So

$$f(-1) = -2(-1)^2 - 6(-1) + 9$$

$$= 13$$

So

$$g(13) = 3(13) - 9$$

$$= \boxed{30}$$

4. $g(g(g(0)))$

$$\downarrow$$

$$g(0) = 3(0) - 9$$

$$= -9$$

$$g(-9) = 3(-9) - 9$$

$$= -36$$

$$g(-36) = 3(-36) - 9 = \boxed{-117}$$

5. $h(h(h(35)))$

$$h(35) = \frac{35}{5} = 7$$

$$h(7) = \frac{7}{5}$$

$$h\left(\frac{7}{5}\right) = \frac{\frac{7}{5}}{5} = \frac{7}{5} \cdot \frac{1}{5}$$

$$= \boxed{\frac{7}{25}}$$

6. $f(g(h(0)))$

$$h(0) = \frac{0}{5} = 0$$

$$g(0) = 3(0) - 9$$

$$= -9$$

$$f(-9) = -2(-9)^2 - 6(-9) + 9$$

$$= -2(81) + 54 + 9$$

$$= \boxed{-99}$$

IV. Use $f(x) = x + 5$, $g(x) = x^2 - 5x + 7$, and $h(x) = 9x - 5$ to answer the following questions. Simplify the following with no parentheses in your final answer.

1. $f(h(x)) \Rightarrow$ put $h(x)$ into $f(x)$
(substitute $h(x)$ in for x in $f(x)$)

$$f(9x - 5) = (9x - 5) + 5$$

$$= \boxed{9x}$$

2. $g(f(x))$ $g(x + 5)$

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

$$x^2 + 10x + 25 - 5x - 25 + 7$$

$$\boxed{x^2 + 5x + 7}$$

3. $g(h(x))$

$$g(9x - 5)$$

$$(9x - 5)^2 - 5(9x - 5) + 7$$

$$81x^2 - 90x + 25 - 40x + 25 + 7$$

$$\boxed{81x^2 - 130x + 57}$$

4. $h(f(x))$

$$h(x + 5)$$

$$9(x + 5) - 5$$

$$9x + 45 - 5$$

$$\boxed{9x + 40}$$