

Precalculus - Combining and Composing Functions - Test Answer Key

Common Core F-BF.A.1b, F-BF.A.1c · maths-pdf.fr/en/

Worked solutions and point-by-point scoring for the 9-question composition test. Use the scoring notes to award partial credit.

Precalculus · Common Core State Standards: **F-BF.A.1b, F-BF.A.1c**

Question 1 - Sum and product [2 pts]

$$f(3)=3, g(3)=11, \text{ so } (f+g)(3)=14. f(-1)=3, g(-1)=3, \text{ so } (fg)(-1)=9.$$

14 and 9

Scoring: 1 point for each value.

Question 2 - Composite formulas [2 pts]

$$f(g(x))=(3x-2)^2+1=9x^2-12x+5. g(f(x))=3(x^2+1)-2=3x^2+1.$$

$$9x^2-12x+5 \text{ and } 3x^2+1$$

Scoring: 1 point for each formula.

Question 3 - Table composition [2 pts]

$$g(2)=2, f(2)=1. g(0)=3, g(3)=1.$$

$$f(g(2))=1, g(g(0))=1$$

Scoring: 1 point for each value.

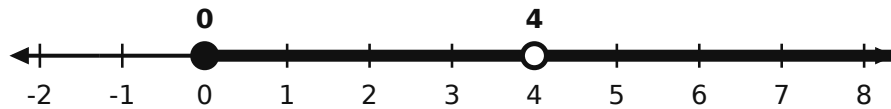
Question 4 - Domain of a quotient [2 pts]

f needs $x \geq -1$. The quotient excludes $x=5$.

$$[-1,5) \cup (5,\infty)$$

Scoring: 1 point for $x \geq -1$, 1 point for excluding 5.

Question 5 - Domain of a composite [3 pts]



Domain: x at least 0, x not 4.

g needs $x \geq 0$. Then $f(g(x)) = \frac{1}{\sqrt{x}-2}$, which fails when $\sqrt{x} = 2$, that is $x = 4$.

$[0, 4) \cup (4, \infty)$

Scoring: 1 point for $x \geq 0$, 1 point for finding $x = 4$, 1 point for the interval.

Question 6 - Decompose [2 pts]

(a) Inside $x^2 + 4$, outside $\frac{1}{x}$. (b) Inside $3x - 7$, outside $|x|$.

(a) $g = x^2 + 4$, $f = \frac{1}{x}$; **(b)** $g = 3x - 7$, $f = |x|$

Scoring: 1 point for each decomposition.

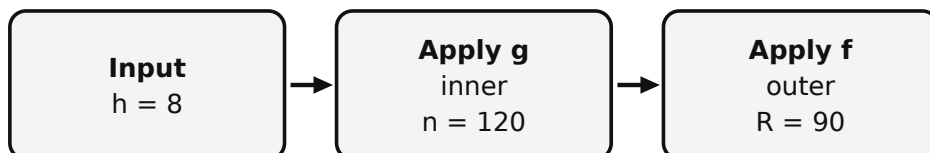
Question 7 - Evaluate composites [2 pts]

$f(3) = 5$, $g(5) = 25$. $g(3) = 9$, $f(9) = 17$.

25 and 17

Scoring: 1 point for each.

Question 8 - Bakery model [3 pts]



Eight hours give 120 cookies and 90 dollars.

(a) $R(n(h)) = 0.75(15h) = 11.25h$. (b) $11.25(8) = 90$. (c) $11.25h = 180$, so $h = 16$.

$11.25h$; \$90; 16 **hours**

Scoring: 1 point for each part.

Question 9 - Inverse check [2 pts]

$$f(g(x)) = 3 \cdot \frac{x+7}{3} - 7 = x. \quad g(f(x)) = \frac{3x-7+7}{3} = x.$$

Both equal x

Scoring: 1 point for each composition.

Total
20 points