

NAME:

1. [2] TRUE/FALSE: Circle T in each of the following cases if the statement is *always* true. Otherwise, circle F. Let f be a function, and x , y , and z be real numbers.

T F $5 + 4(2^3 - 3^2) = -9$

T F $x \cdot x = 2x$

T F All functions pass the horizontal line test.

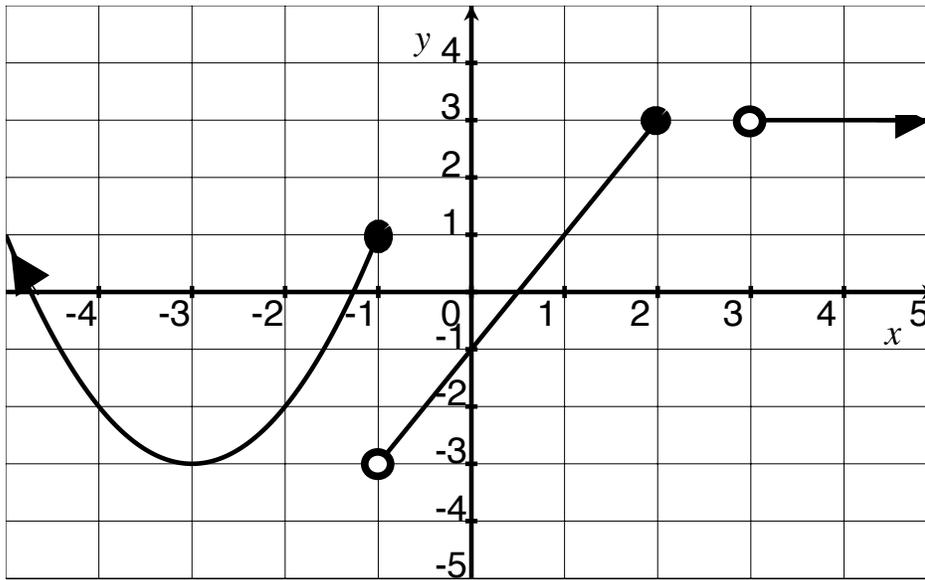
T F $\sqrt{x^2} = x$

Show your work for the following problems. The correct answer with no supporting work will receive NO credit.

2. [4] Solve for r and simplify given:

$$\frac{1}{\frac{1}{r} + \frac{1}{s}} = t$$

3. Let the following be the graph of g .



(a) [2] Is g a function? Why or why not?

(b) [1] Find $g(-1)$.

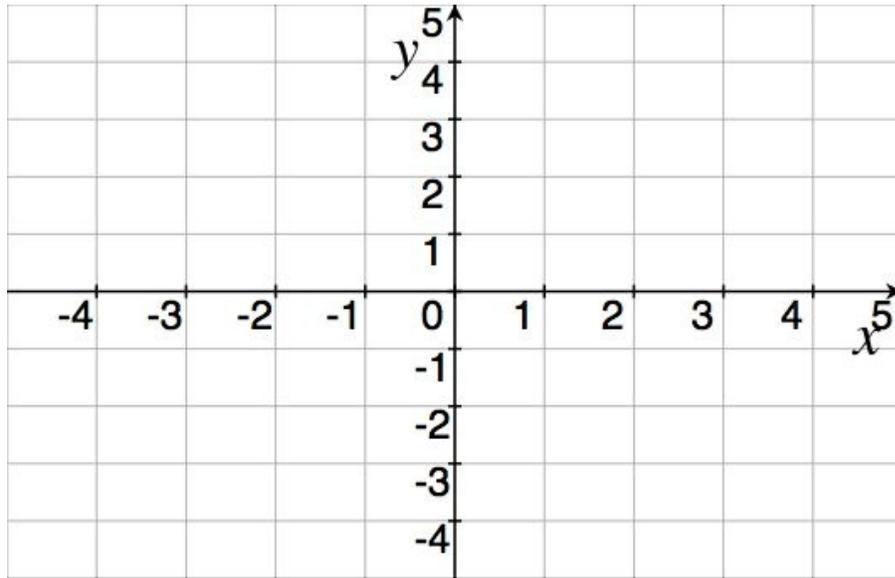
(c) [2] Find $g(-2) + g(4)$.

(d) [3] What is the domain of g ?

4. [4] Find a number t so that the line containing the points $(1, t)$ and $(3, \frac{2}{3})$ has slope $\frac{3}{5}$.

5. Let f be the *function* defined by

$$f(x) = \begin{cases} \frac{1}{x} - 2 & x \leq 1 \\ -x + 3 & 1 < x \end{cases}$$



(a) [3] Graph f . (Explaining graph transformations is worth partial credit.)

(b) [2] Find all possible input(s) so that $f(x) = -1$.

6. Let $g(x) = x^2 + 7x - 12$.

(a) [3] Find the x -intercepts.

(b) [3] Put g into vertex form.

7. Let $\alpha(x) = \sqrt{3x - 7}$ and $\beta(x) = \frac{x-1}{x}$.

(a) [4] What is the domain of α ?

What is the domain of β ?

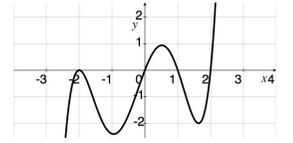
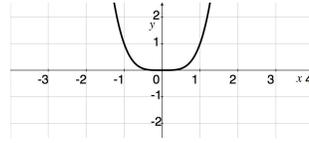
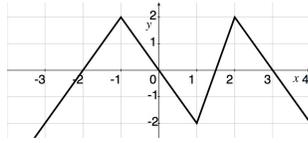
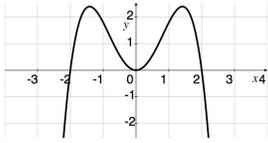
(b) [4] What is the rule of $\beta \circ \alpha$?
Do not simplify.

What is the domain of $\beta \circ \alpha$?

(c) [3] Given that β has an inverse, find β^{-1} .

(d) [3] What is the range of β ? Justify yourself.

8. [3] Circle all graphs that could be of a 4th degree polynomial.



9. [4] Simplify the following as much as possible (remember to show your work):

$$(4a^5b^4c^3)^{-2}(2a^5b^2c^2)^3$$