# **Section 2 Assignment (77 points) - Functions**

To receive credit, you must either show your work on the worksheet or explain how you got the answer.

74.5/79

1. (16 points) Draw an arrow diagram for each of the following functions AND give the range of the function using set notation.
   1. (3 pts) Let A = {q, r, s, t, u} and let B = {2, 3, 4, 5, 6}.

f: A → B is defined as f = {(t, 2), (s, 5), (q, 6), (r, 6), (u, 4)}

q 2

r 3

s 4

t 5

u 6 Range: {2,4,5,6}

1. (3 pts) Let S = {Colton, Devin, Cecilia, Thomas, Skyler} and C = {1030, 1400, 1410, 2130} and g: S → C is defined as g = {(Cecilia, 2130), (Devin, 1400), (Skyler, 2130), (Colton, 1030), (Thomas, 1410)}

Colton 1030

Devin 1400

Cecilia 1410

Thomas 2130

Skyler Range: {1030,1400,1410,2130}

1. (5 pts) Let B = {1, 3, 5, 7}. f: B → Z such that f(b) = b3 - b2 - 1

1 -1

3 17

5 99

7 293 Range{-1,17,99,293}

1. (5 pts) Let D = {0, 1, 2, 3, 4}. i: D → Z such that f(d) = |2d – d3|

0 0

1 1

2 4

3 21

4 56 Range{0,1,4,21,56}

1. (8 points) Give the floor (F) and ceiling (C) for each item.
   1. (2 pts) -15.001

F: -16

C: -15

* 1. (2 pts) -9.98

F: -10

C: -9

* 1. (2 pts) 14.325

F: 14

C: 15

* 1. (2 pts) 10.981

F: 10

C: 11

1. (12 points) Are the following functions one-to-one(injective), onto(surjective), both(bijective) or neither?
2. (3 pts) Given A = {q, r, s, t, u}, B = {2, 3, 4, 5, 6}

and f: A → B where f = {(t, 2), (s, 5), (q, 6), (r, 6), (u, 4)}

neither

because there are the same number of elements in both but there isnt a pair for 3

1. (3 pts) Given S = {Aaron, Peyton, Ryan, Matthew, Madison, Jasim}, C = {1030, 1400, 1410, 2130, 2420}

and g: S → C where g = {(Aaron, 2130), (Jasim, 1400), (Matthew, 2130), (Peyton, 2420), (Ryan, 1410), (Madison, 1030)}

**onto**

**because S > C and all of C has a pair**

1. (3 pts) Given B = {1, 3, 5, 7}. b: B → Z such that f(b) = b3 - b2 – 1

one-to-one

because B = F(b) and each of F(B) has one pair

1. (3 pts) Given C = {q, r, s, t, u, v, w}, D = {2, 4, 6, 8, 10, 12, 14}

and g: C → D where g = {(t, 2), (s, 4), (q, 6), (w, 8), (u, 10), (r, 12), (v, 14)}

q 2

r 4 I checked for one and then forgot to check for the

s 6 other 1.5/3

t 8

u 10

v 12 One-to-One

w 14 because C= D and each of D has one pair

1. (6 points) What is the domain, target(codomain), and range of f?
   1. (3 pts) Given A = {1, 3, 5, 7, 9}, B = {-1, 0, 1} let f: A → B be defined as

f = {(5, 1), (3, 1), (1, 1), (9, 1), (7, 0)}

D: {1, 3, 5, 7, 9}

T: {-1, 0, 1}

R: {0, 1}

* 1. (3 pts) Given C = {0, 1, 2, 3, 4} let g: C → Z+ such that g(c) = 2c

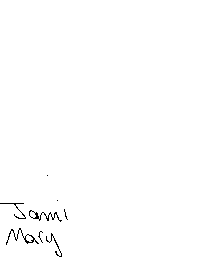
D: {0,1,2,3,4}

T: {0,inf} Because It was a function I thought it would have been from

R: {1,2,4,8,16} to infinity 2/3

1. (10 points) Each of the arrow diagrams below define a function 𝑓. For each arrow diagram, indicate whether 𝑓−1 is well-defined.

* If 𝑓−1 is not well-defined, indicate why
* If 𝑓−1 is well-defined, give an arrow diagram showing 𝑓−1

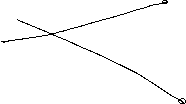


* 1. (5 pts)

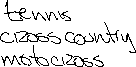




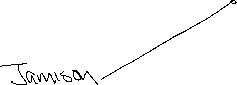












Not well defined because the reverse would have 2 values coming from drag racing

* 1. (5 pts)

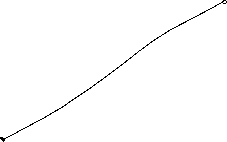
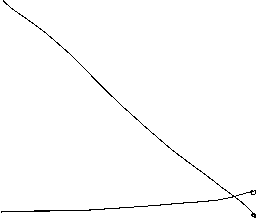
























Well defined because the function is one to one

Johnny Green

Jacob Red

Burke Blue

Alden Black

Joey Orange

Steven Yellow

Constance Cyan

Bryan Gray

1. (25 points) Composition of Functions.

Let A = B = \mathbb{R}, f(a) = a3 - a2 – a and g(b) = |2b – b3|

* 1. (5 pts) (g o f) (-2)

(-2)^3 - (-2)^2 - (-2) |2(-10) - (-10)^3|

-8 – 4 + 2 = -10 -20 + 1000 = 980

(g o f) (2) = 980

* 1. (5 pts) (g o f) (2)

(2)^3 - (2)^2 - (2) |2(2) - (2)^3|

8 – 4 – 2 = 2 -4 + 8= 4

(g o f) (2) = 4

* 1. (5 pts) (f o g) (1)

|2(1) – (1)^3| (1)^3 - (1)^2 - (1)

2 \* 1 – 1 = 1 1 – 1 – 1 = -1

(f o g) (1) = -1

* 1. (5 pts) (f o f) (3)

(3)^3 - (3)^2 – (3) (15)^3 - (15)^2 - (15)

27 – 9 – 3 = 15 3375 – 225 – 15 = 3135

(f o f) (3) = 3135

* 1. (5 pts) (g o g) (-4)

|2(-4) – (-4)^3| |2(56) – (56)^3|

-8 + 64 = 56 -112 + 175616 = 175504