Math 22 (9:30am – 10:20am) **NAME YOU ASKED TO BE CALLED IN CLASS: _____**
Quiz 1 Version P
Fri Sep 30, 2011

SCORE: ___ / 14 POINTS

Write the **formal definition** of a function used in discrete math. Use correct English and mathematical notation. **SCORE: ___ / 3 POINTS**

Given sets A and B, a relation F from A to B is a function if and only if

for all $x \in A$, there is some $y \in B$ such that $(x, y) \in F$ and

for all $x \in A$ and all $y \in B$ and $z \in B$, if $(x, y) \in F$ and $(x, z) \in F$, then $y = z$

Suppose A is a set with 9 elements, B is a set with 11 elements, and C is a set with 7 elements. **SCORE: ___ / 1 POINTS**
How many elements are in $C \times B$?

$7 \times 11 = 77$

Let $P = \{x \in \mathbf{Z} \mid -4 \le x < -1\}$. **SCORE: ___ / 3 POINTS**
Let $S = \{x \in \mathbf{Z}^- \mid 2 < x^2 < 20\}$

[a] Write P in set roster notation.

$\{-4, -3, -2\}$

[b] Is $2 \in S$? Why or why not ?

No, $2 \notin \mathbf{Z}^-$

[c] Is P a **proper subset** of S ? Why or why not ? (**HINT**: Write S in set roster notation.)

No, S does not contain any elements that are not also in P, since $S = P = \{-4, -3, -2\}$

Circle the **two** statements below which are true. **SCORE: ___ / 2 POINTS**
1 point for each circled answer which is a true statement, –1 point for each circled answer which is a false statement.
0 points if more than two statements are circled. Minimum 0 points total.

$\{2\} \in \{\{1\}, \{2\}, \{3\}\}$

$\{e, a\} \subseteq \{a, e, i, o, u\} \times \{d, b, c, a\}$

There are 2 functions from {a} to {b, c}

There is a function from {a, b, c} to {d, e, f} that is not a relation from {a, b, c} to {d, e, f}

Let $J = \{6, 8\}$ and $K = \{-2, 1, 6\}$. **SCORE: ___ / 5 POINTS**
Let T be the relation from J to K defined by xTy if and only if x – y is a multiple of 5.

[a] Write $J \times K$ in set roster notation.

$\{(6, -2), (6, 1), (6, 6), (8, -2), (8, 1), (6, 6)\}$

[b] Write T in set roster notation.

$\{(6, 1), (6, 6), (8, -2)\}$

[c] Is T a function ? Why or why not ?

No, $(6, 1) \in T$ and $(6, 6) \in T$, but $1 \neq 6$

Math 22 (9:30am – 10:20am)
Quiz 1 Version A
Fri Sep 30, 2011

NAME YOU ASKED TO BE CALLED IN CLASS: _____

SCORE: ___ / 14 POINTS

Write the **formal definition** of a function used in discrete math. Use correct English and mathematical notation. **SCORE: ___ / 3 POINTS**

Given sets A and B, a relation F from A to B is a function if and only if

for all $x \in A$, there is some $y \in B$ such that $(x, y) \in F$ and

for all $x \in A$ and all $y \in B$ and $z \in B$, if $(x, y) \in F$ and $(x, z) \in F$, then $y = z$

Suppose A is a set with 9 elements, B is a set with 11 elements, and C is a set with 7 elements. **SCORE: ___ / 1 POINTS**
How many elements are in $B \times A$?

$11 \times 9 = 99$

Let $P = \{x \in \mathbf{Z} \mid -5 < x \leq -2\}$. **SCORE: ___ / 3 POINTS**
Let $S = \{x \in \mathbf{Z}^- \mid 2 < x^2 < 20\}$

[a] Write P in set roster notation.

$\{-4, -3, -2\}$

[b] Is $2 \in S$? Why or why not ?

No, $2 \notin \mathbf{Z}^-$

[c] Is P a **proper subset** of S ? Why or why not ? (**HINT**: Write S in set roster notation.)

No, S does not contain any elements that are not also in P, since $S = P = \{-4, -3, -2\}$

Circle the **two** statements below which are true. **SCORE: ___ / 2 POINTS**
1 point for each circled answer which is a true statement, –1 point for each circled answer which is a false statement.
0 points if more than two statements are circled. Minimum 0 points total.

$\{2\} \in \{\{1\}, \{2\}, \{3\}\}$

$\{(e, a)\} \subseteq \{a, e, i, o, u\} \times \{d, b, c, a\}$

There are 2 functions from {a, b} to {c}

There is a function from {a, b, c} to {d, e, f} that is not a relation from {a, b, c} to {d, e, f}

Let $J = \{8, 10\}$ and $K = \{-2, 0, 8\}$. **SCORE: ___ / 5 POINTS**
Let T be the relation from J to K defined by xTy if and only if x – y is a multiple of 5.

[a] Write $J \times K$ in set roster notation.

$\{(8, -2), (8, 0), (8, 8), (10, -2), (10, 0), (10, 8)\}$

[b] Write T in set roster notation.

$\{(8, -2), (8, 8), (10, 0)\}$

[c] Is T a function ? Why or why not ?

No, $(8, -2) \in T$ and $(8, 8) \in T$, but $-2 \neq 8$

Math 22 (9:30am – 10:20am) **NAME YOU ASKED TO BE CALLED IN CLASS: _____**
Quiz 1 Version R
Fri Sep 30, 2011

SCORE: ___ / 14 POINTS

Write the **formal definition** of a function used in discrete math. Use correct English and mathematical notation. **SCORE: ___ / 3 POINTS**

Given sets A and B, a relation F from A to B is a function if and only if

for all $x \in A$, there is some $y \in B$ such that $(x, y) \in F$ and

for all $x \in A$ and all $y \in B$ and $z \in B$, if $(x, y) \in F$ and $(x, z) \in F$, then $y = z$

Suppose A is a set with 9 elements, B is a set with 11 elements, and C is a set with 7 elements. **SCORE: ___ / 1 POINTS**
How many elements are in $C \times A$?

$7 \times 9 = 63$

Let $P = \{x \in \mathbf{Z} \mid -4 < x \leq -1\}$. **SCORE: ___ / 3 POINTS**
Let $S = \{x \in \mathbf{Z}^- \mid x^2 < 10\}$

[a] Write P in set roster notation.

$\{-3, -2, -1\}$

[b] Is $2 \in S$? Why or why not ?

No, $2 \notin \mathbf{Z}^-$

[c] Is P a **proper subset** of S ? Why or why not ? (**HINT**: Write S in set roster notation.)

No, S does not contain any elements that are not also in P, since $S = P = \{-3, -2, -1\}$

Circle the **two** statements below which are true. **SCORE: ___ / 2 POINTS**
1 point for each circled answer which is a true statement, –1 point for each circled answer which is a false statement.
0 points if more than two statements are circled. Minimum 0 points total.

There are 2 functions from {a, b} to {c}

There is a function from {a, b, c} to {d, e, f} that is not a relation from {a, b, c} to {d, e, f}

$\{\{2\}\} \subseteq \{\{1\}, \{2\}, \{3\}\}$

$(e, a) \in \{a, e, i, o, u\} \times \{d, b, c, a\}$

Let $J = \{7, 9\}$ and $K = \{-1, 2, 7\}$. **SCORE: ___ / 5 POINTS**
Let T be the relation from J to K defined by xTy if and only if x – y is a multiple of 5.

[a] Write $J \times K$ in set roster notation.

$\{(7, -1), (7, 2), (7, 7), (9, -1), (9, 2), (9, 7)\}$

[b] Write T in set roster notation.

$\{(7, 2), (7, 7), (9, -1)\}$

[c] Is T a function ? Why or why not ?

No, $(7, 2) \in T$ and $(7, 7) \in T$, but $2 \neq 7$

Math 22 (9:30am – 10:20am) **NAME YOU ASKED TO BE CALLED IN CLASS: _____**
Quiz 1 Version K
Fri Sep 30, 2011

SCORE: ___ / 14 POINTS

Write the **formal definition** of a function used in discrete math. Use correct English and mathematical notation. **SCORE: ___ / 3 POINTS**

Given sets A and B, a relation F from A to B is a function if and only if

for all $x \in A$, there is some $y \in B$ such that $(x, y) \in F$ and

for all $x \in A$ and all $y \in B$ and $z \in B$, if $(x, y) \in F$ and $(x, z) \in F$, then $y = z$

Suppose A is a set with 9 elements, B is a set with 11 elements, and C is a set with 7 elements. **SCORE: ___ / 1 POINTS**
How many elements are in $C \times C$?

$7 \times 7 = 49$

Let $P = \{x \in \mathbf{Z} \mid -3 \le x < 0\}$. **SCORE: ___ / 3 POINTS**
Let $S = \{x \in \mathbf{Z}^- \mid x^2 < 10\}$

[a] Write P in set roster notation.

$\{-3, -2, -1\}$

[b] Is $2 \in S$? Why or why not ?

No, $2 \notin \mathbf{Z}^-$

[c] Is P a **proper subset** of S ? Why or why not ? (**HINT**: Write S in set roster notation.)

No, S does not contain any elements that are not also in P, since $S = P = \{-3, -2, -1\}$

Circle the **two** statements below which are true. **SCORE: ___ / 2 POINTS**
1 point for each circled answer which is a true statement, –1 point for each circled answer which is a false statement.
0 points if more than two statements are circled. Minimum 0 points total.

$\{(e, a)\} \subseteq \{a, e, i, o, u\} \times \{d, b, c, a\}$

$\{\{2\}\} \in \{\{1\}, \{2\}, \{3\}\}$

There is a function from {a, b, c} to {d, e, f} that is not a relation from {a, b, c} to {d, e, f}

There are 2 functions from {a} to {b, c}

Let $J = \{4, 6\}$ and $K = \{-1, 1, 4\}$. **SCORE: ___ / 5 POINTS**
Let T be the relation from J to K defined by xTy if and only if x – y is a multiple of 5.

[a] Write $J \times K$ in set roster notation.

$\{(4, -1), (4, 1), (4, 4), (6, -1), (6, 1), (6, 4)\}$

[b] Write T in set roster notation.

$\{(4, -1), (4, 4), (6, 1)\}$

[c] Is T a function ? Why or why not ?

No, $(4, -1) \in T$ and $(4, 4) \in T$, but $-1 \neq 4$