Math 22 (9:30am – 10:20am) Pop Quiz 3 Version Y Tue Oct 4, 2011

SCORE: ____ / 6 POINTS

One of the two statements below is true, and the other is false. Prove the statement that is true, and disprove the statement that is false (ie. show that the false statement is false). SCORE: ____ / 6 POINTS

Do NOT use the properties in section 4.2.

[a] If a is any even integer and b is any odd integer, then 5a - 3b is odd.

[b] If *m* is any integer, then $2m^2 + 2$ is composite.

[a] IS TRUE

PROOF:

Let *a* be a particular but arbitrary even integer, and let *b* be a particular but arbitrary odd integer. By the definition of even, a = 2m for some integer *m*. By the definition of odd, b = 2n + 1 for some integer *n*. 5a - 3b= 5(2m) - 3(2n + 1)= 10m - 6n - 3= 2(5m - 3n - 2) + 15m - 3n - 2 is an integer by the closure of integers under multiplication and subtraction. So, 5a - 3b is odd by the definition of odd.

[b] IS FALSE

COUNTEREXAMPLE:

Let m = 0. So $2m^2 + 2 = 2$, which is not composite.

Math 22 (9:30am - 10:20am) Pop Quiz 3 Version O Tue Oct 4, 2011

SCORE: ____ / 6 POINTS

One of the two statements below is true, and the other is false. Prove the statement that is true, and disprove the statement that is false (ie. show that the false statement is false).

SCORE: ____ / 6 POINTS

NAME YOU ASKED TO BE CALLED IN CLASS: _____

Do NOT use the properties in section 4.2.

- If *m* is any integer, then $3m^2 + 3$ is composite. [a]
- [b] If a is any even integer and b is any odd integer, then 7a - 3b is odd.

[a] IS FALSE

COUNTEREXAMPLE:

Let m = 0. So $3m^2 + 3 = 3$, which is not composite.

[b] IS TRUE

PROOF:

Let *a* be a particular but arbitrary even integer, and let b be a particular but arbitrary odd integer. By the definition of even, a = 2m for some integer *m*. By the definition of odd, b = 2n + 1 for some integer *n*. 7a - 3b= 7(2m) - 3(2n + 1)= 14m - 6n - 3= 2(7m - 3n - 2) + 17m - 3n - 2 is an integer by the closure of integers under multiplication and subtraction. So, 7a - 3b is odd by the definition of odd.

Math 22 (9:30am – 10:20am) Pop Quiz 3 Version G Tue Oct 4, 2011

SCORE: ____ / 6 POINTS

One of the two statements below is true, and the other is false. Prove the statement that is true, and disprove the statement that is false (ie. show that the false statement is false). SCORE: ____ / 6 POINTS

Do NOT use the properties in section 4.2.

- [a] If a is any even integer and b is any odd integer, then 9a 3b is odd.
- [b] If *m* is any integer, then $5m^2 + 5$ is composite.

[a] IS TRUE

PROOF:

Let *a* be a particular but arbitrary even integer, and let *b* be a particular but arbitrary odd integer. By the definition of even, a = 2m for some integer *m*. By the definition of odd, b = 2n + 1 for some integer *n*. 9a - 3b= 9(2m) - 3(2n + 1)= 18m - 6n - 3= 2(9m - 3n - 2) + 19m - 3n - 2 is an integer by the closure of integers under multiplication and subtraction. So, 9a - 3b is odd by the definition of odd.

[b] IS FALSE

COUNTEREXAMPLE:

Let m = 0. So $5m^2 + 5 = 5$, which is not composite. Math 22 (9:30am – 10:20am) Pop Quiz 3 Version A Tue Oct 4, 2011

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SCORE: ____ / 6 POINTS

One of the two statements below is true, and the other is false. Prove the statement that is true, and disprove the statement that is false (ie. show that the false statement is false). SCORE: ____ / 6 POINTS

Do NOT use the properties in section 4.2.

- [a] If *m* is any integer, then $7m^2 + 7$ is composite.
- [b] If a is any even integer and b is any odd integer, then 11a 3b is odd.

[a] IS FALSE

COUNTEREXAMPLE:

Let m = 0. So $7m^2 + 7 = 7$, which is not composite.

[b] IS TRUE

PROOF:

Let *a* be a particular but arbitrary even integer, and let *b* be a particular but arbitrary odd integer. By the definition of even, a = 2m for some integer *m*. By the definition of odd, b = 2n + 1 for some integer *n*. 11a - 3b= 11(2m) - 3(2n + 1)= 22m - 6n - 3= 2(11m - 3n - 2) + 111m - 3n - 2 is an integer by the closure of integers under multiplication and subtraction. So, 11a - 3b is odd by the definition of odd.