

Homework 3, Section 1.4: 6, 8, 9, 12, 13, 14

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Homework

6.

- | | |
|-----------------|------------------|
| 1) <i>false</i> | 9) <i>false</i> |
| 2) <i>true</i> | 10) <i>false</i> |
| 3) <i>false</i> | 11) <i>true</i> |
| 4) <i>false</i> | 12) <i>false</i> |
| 5) <i>true</i> | 13) <i>true</i> |
| 6) <i>true</i> | 14) <i>false</i> |
| 7) <i>false</i> | 15) <i>true</i> |
| 8) <i>true</i> | 16) <i>true</i> |

8. a

D = all biology majors.

B(n) = geometry

$\exists_n \in D, B(n)$

8. b

D = all computer science majors.

B(n) = Math Minors

$\exists_n \in D, \neg B(n)$

8. c

D = Math Majors

B(n) = n is required to take a business course

$\forall_n \in D, \neg B(n)$

8. d

$D = \text{puzzles}$

$B(n) = \text{all puzzle solutions}$

$\forall_n \in D, \neg B(n)$

9. a

$D = \text{All all real numbers}$

$B(n): 2n = 9$

$\forall_n \in \mathbb{R}, \neg B(n)$

9. b

$D = \text{all triangles}$

$B(n) = \text{equilateral and perimeter of 10}$

$\exists_n \in D, B(n)$

9. c

$D = \text{Every Circle}$

$B(n) = \text{Has an integer diameter or an integer area}$

$\forall_n \in D, B(n)$

9. d

$D = \text{Real Numbers}$

$B(n, m) = \text{an integer between}$

$\forall_n \in \mathbb{R}, \forall_m \in \mathbb{R}, B(n, m)$

12. a)

$D = \text{even numbers}$

$B(n) = \text{prime numbers}$

$\forall_n \in D, \neg B(n)$

12. b)

$D = \text{All Triangles}$

$B(n) = \text{has 4 sides}$

$\forall_n \in D, \neg B(n)$

12. c)

$D = \text{all integers}$

$B(a, b) = \frac{a^2}{b^2} = 2$

$\forall_a \in D, \forall_b \in D, \neg B(a, b)$

12. d)

D = all square numbers

$B(n)$ = prime number plus one

$$\forall_n \in D, \neg B(n)$$

13. a) I)

$$-12$$

13. a) II)

$$-2, -4$$

13. a) III)

The pattern is even numbers!

13. b) I)

$$i = -3, 23, 3, -31$$

13. b) II)

use the value y in the equation and solve it.

14. a)

$$\exists_a \in \mathbb{R}, \exists_b \in \mathbb{Z}, a^2 + b \notin \mathbb{Z}$$

14. b)

$$\exists_y \in \mathbb{R}, \exists_x \in \mathbb{R}, x + y \neq x$$

14. c)

$$\exists_x \in \mathbb{Z}, \forall_y \in \mathbb{R}, x \neq 2y$$

14. d)

$$\exists_x \in \mathbb{Z}, \forall_y \in \mathbb{R}, \frac{x}{y} \neq 2$$