

This problem set is not homework. Students can use this problem set as extra practice or study guide for quizzes.

- Suppose that $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$. Find each of the following sets.
 - $A = \{x \in U : x > 6 \text{ or } x \text{ is odd}\}$
 - $B = \{x \in U : x > 6 \text{ and } x \text{ is odd}\}$
 - $C = \{x \in U : x \text{ is divisible by 2 or by 3}\}$
 - $D = \{x \in U : x \text{ is divisible by 2 and by 3}\}$
- Suppose that $A = \{1, 2, 4, 8, 9\}$, $B = \{1, 4, 5, 7, 9, 10\}$, and $C = \{2, 3, 4, 7, 9\}$. Find each of the following sets.
 - $A \cap B$
 - $A \cap C$
 - $B \cap C$
 - $A \cap (B \cup C)$
 - $(A \cap B) \cup C$
 - $A \cup (B \cap C)$
- Given a Venn diagram for A , B , and C , shade the region corresponding to each of the given sets.
 - $(A \cap B) \cap C$
 - $A \cap (B \cup C)$
 - $(A \cap B) \cup C$
 - $A \cup (B \cap C)$
- Label each of the following statements as true or false.
 - If n is an integer such that n^2 is divisible by 12, then n is divisible by 12.
 - If integer a is divisible by 8 and integer b is divisible by 6, then the product ab is divisible by 48.
 - If integer n is divisible by 8 and by 6, then it is also divisible by 48.
 - If the product xy of two integers is divisible by 5, then x is divisible by 5 or y is divisible by 5.
 - If the product xy of two integers is divisible by 6, then x is divisible by 6 or y is divisible by 6.
 - The sum of two prime numbers is never prime.
 - The product of two prime numbers is never prime.
 - The sum of the first five prime numbers is 28.
 - Every square is a rectangle.
 - For every set A and B , $A \subseteq B$ or $B \subseteq A$.
- Consider the given numbers. 2356 431, 910 190 198, 6760 233, 34 906 355, and 651 168.
List all numbers from the list that are divisible by:
 - 9
 - 11
 - 99
- Find the prime factorization for each of the following numbers.
 - 4500
 - 1001
 - 7986
- Find the digit a in the six-digit number $931a92$ if we know that the number is divisible by 11.
- Re-write each of the following.
 - 60% as a reduced fraction
 - 175% as a reduced improper fraction
 - $\frac{38}{5}$ as a mixed number
 - $\frac{38}{5}$ as a percent
 - $4\frac{3}{4}$ as an improper fraction
 - $4\frac{3}{4}$ as a percent
 - 120% as a reduced improper fraction
 - 150% as a reduced mixed number
 - $\frac{11}{20}$ as a percent
- Evaluate each of the following.
 - $|3 - 4| - |6 - 9|$
 - $3 - |4 - 6| - 9$
 - $3|-4 - 6| - 9$
 - $3 - 4|-6 - 9|$
 - $3 - |4 - |6 - 9||$
- Evaluate each of the following.
 - $\left(-4^2 - 3(4 - (5 - 8)^2)\right)^3$
 - $\frac{2 - 3(5 - 3^2)}{2^3 - (-1)^4}$
 - $\sqrt{7\sqrt{5\sqrt{2 \cdot 5 - 1} + 1} - 3}$

11. Evaluate each of the given expressions if $a = -3$, $b = 2$, and $c = -5$.

a) $ab - c$

d) $b^2 - 4ac$

g) $-a^4$

j) $\frac{a-b}{b-a}$

l) $\sqrt{\sqrt{\frac{a-b}{c}} - a}$

b) $ab(-c)$

e) $-a^2$

h) $-a^5$

c) $-a^2 - bc$

f) $-a^3$

i) $-\sqrt{c^2 - a^2}$

k) $\frac{2a-b}{b-a+c}$

12. Solve each of the following equations. Make sure to check your solutions.

a) $-5x + 10 = -10$

e) $\frac{3a+1}{-5} = 4$

$\frac{x-1}{3} + 1$

b) $\frac{x-8}{3} = -2$

f) $-2x + 7 = 7$

h) $\frac{\frac{2}{5} - 1}{5} = -2$

c) $\frac{x}{3} - 8 = -2$

g) $3 \left(\frac{\frac{5x+1}{4} + 3}{-2} + 1 \right) = 15$

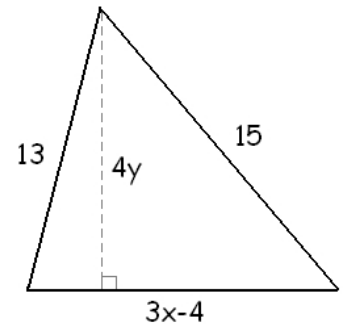
d) $5(x+8) = 10$

13. Compute the perimeter and area of the right triangle with sides 8 cm, 17 cm, and 15 cm. Include units in your computation and answer.

14. Find the value of x and y if we know that the triangle shown on the picture has a perimeter 42 unit and area 84 unit².

15. Emma is asked about her age. She answers as follows. "My age is five years less than three times the age of my son". If Emma is 46 years old, how old is her son?

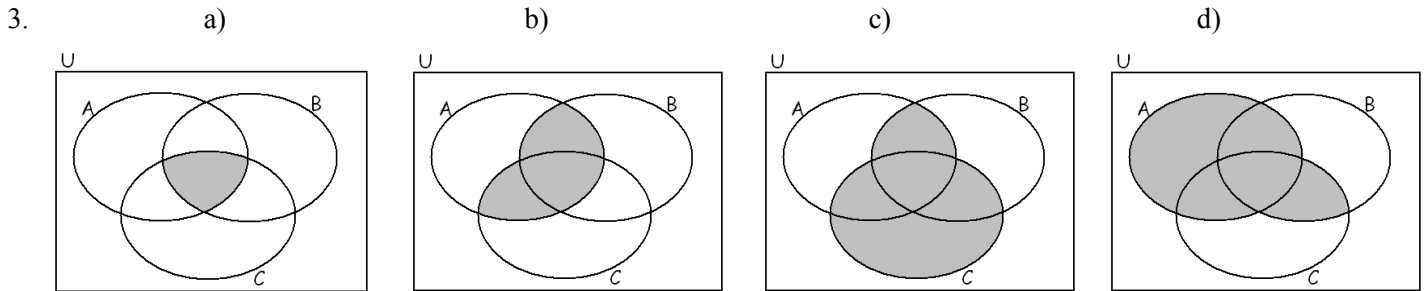
16. The first night in a hotel costs 85 dollars. All additional nights cost 79 dollars. How many nights did we stay at this hotel if the total bill was 1033 dollars?



Answers

1. a) $\{1, 3, 5, 7, 8, 9, 10\}$ b) $\{7, 9\}$ c) $\{2, 3, 4, 6, 8, 9\}$ d) $\{6\}$

2. a) $\{1, 4, 9\}$ b) $\{2, 4, 9\}$ c) $\{4, 7, 9\}$ d) $\{1, 2, 4, 9\}$ e) $\{1, 2, 3, 4, 7, 9\}$ f) $\{1, 2, 4, 7, 8, 9\}$



4. a) false b) true c) false d) true e) false f) false g) true h) true i) true j) false

5. a) 5943 564 297, 6760 233, 651 168 b) 2356 431, 5943 564 297, 34 906 355 c) 5943 564 297

6. a) $2^2 \cdot 3^2 \cdot 5^3$ b) $7 \cdot 11 \cdot 13$ c) $2 \cdot 3 \cdot 11^3$

7. 3

8. a) $\frac{3}{5}$ b) $\frac{7}{4}$ c) $7\frac{3}{5}$ d) 760% e) $\frac{19}{4}$ f) 475% g) $\frac{6}{5}$ h) $1\frac{1}{2}$ i) 55%

9. a) -2 b) -8 c) 21 d) -57 e) 2

10. a) -1 b) 2 c) 5

11. a) -1 b) -30 c) 1 d) -56 e) -9 f) 27 g) -81 h) 243 i) 16 j) -1 k) undefined l) 2

12. a) 4 b) 2 c) 18 d) -6 e) -7 f) 0 g) -9 h) -56

13. $P = 40$ cm, $A = 60$ cm²

14. $x = 6$ and $y = 3$

15. 17 years

16. 13 nights