

Student: _____
Date: _____

Instructor: Andreas Lazari
Course: Math1111-Summer2018

Assignment: Section P.1 Homework

1. Evaluate the algebraic expression $3 + 5(x - 4)^3$ for $x = 5$. $\Rightarrow 3 + (5 - 4)^3 = 3 + 5(5 - 4)^3 = 3 + 5(1)^3$

When $x = 5$, $3 + 5(x - 4)^3 = \underline{8}$.

$= 3 + 5 = 8$

2. Evaluate the algebraic expression for the given values of the variables.

$x^2 - 2(x - y)$, for $x = 8$ and $y = 1$ $\Rightarrow (8)^2 - 2(8 - 1) = 64 - 2(7) = 64 - 14 = \underline{50}$

When $x = 8$ and $y = 1$, $x^2 - 2(x - y) = \underline{50}$.

3. The formula $C = \frac{5}{9}(F - 32)$ expresses the relationship between Fahrenheit temperature, F , and Celsius temperature, C . Use the formula to convert 68°F to its equivalent temperature on the Celsius scale.

$68^\circ\text{F} = \underline{20}^\circ\text{C}$

$C = \frac{5}{9}(68 - 32) = \frac{5}{9}(36) = 5(4) = 20$

4. A football is kicked vertically upward from a height of 6 feet with an initial speed of 45 feet per second. The formula $h = 6 + 45t - 16t^2$ describes the ball's height above the ground, h , in feet, t seconds after it was kicked. Use this formula to find the ball's height 2 seconds after it was kicked.

The ball's height, 2 seconds after it was kicked, was 32 feet.

$h = 6 + 45(2) - 16(2)^2 = 6 + 90 - 64 = 32$

5. Find the intersection of the following sets.

$\{3, 5, 8, 9\} \cap \{5, 8, 10\}$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. $\{3, 5, 8, 9\} \cap \{5, 8, 10\} = \{5, 8\}$
(Use a comma to separate answers as needed.)

B. $\{3, 5, 8, 9\} \cap \{5, 8, 10\} = \emptyset$

6. Find the union of the following sets.

$\{9, 11, 12, 13\} \cup \{11, 13, 15\}$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. $\{9, 11, 12, 13\} \cup \{11, 13, 15\} = \{9, 11, 12, 13, 15\}$
(Use a comma to separate answers as needed.)

B. $\{9, 11, 12, 13\} \cup \{11, 13, 15\} = \emptyset$

7. List all numbers from the given set that are a. natural numbers, b. whole numbers, c. integers, d. rational numbers, e. irrational numbers, and f. real numbers.

$$\left\{-2, -\frac{3}{5}, 0, 0.75, \sqrt{5}, 4.6, \sqrt{49}\right\}$$

- a. List all the natural numbers from the given set. Type each number in the same form as it appears in the problem statement.

$$\sqrt{49}$$

Natural numbers are "positive integers!"

(Use a comma to separate answers as needed.)

- b. List all the whole numbers from the given set. Type each number in the same form as it appears in the problem statement.

$$0, \sqrt{49}$$

whole numbers are the natural numbers including 0.

(Use a comma to separate answers as needed.)

- c. List all the integers from the given set. Type each number in the same form as it appears in the problem statement.

$$-2, 0, \sqrt{49}$$

Integers are the whole numbers including the negative integers.

(Use a comma to separate answers as needed.)

- d. List all the rational numbers from the given set. Choose the correct answer below.

- A. 0.75, 4.6, $\sqrt{49}$
- B. $-2, -\frac{3}{5}, 0, 0.75, \sqrt{5}, 4.6, \sqrt{49}$
- C. 0, 0.75, $\sqrt{5}, 4.6, \sqrt{49}$
- D. $-2, -\frac{3}{5}, 0, 0.75, 4.6, \sqrt{49}$

rational numbers are any number that can be written in the form of $\frac{a}{b}$

- e. List all the irrational numbers from the given set. Type each number in the same form as it appears in the problem statement.

$$\sqrt{5}$$

irrational; any number that can not be written in the form $\frac{a}{b}$.

(Use a comma to separate answers as needed.)

- f. List all the real numbers from the given set. Choose the correct answer below.

- A. 0.75, 4.6, $\sqrt{49}$
- B. 0, 0.75, $\sqrt{5}, 4.6, \sqrt{49}$
- C. $-2, -\frac{3}{5}, 0, 0.75, 4.6, \sqrt{49}$
- D. $-2, -\frac{3}{5}, 0, 0.75, \sqrt{5}, 4.6, \sqrt{49}$

8. Rewrite the expression without absolute value bars.

$$|\sqrt{10} - 7|$$

$$|\sqrt{10} - 7| = 7 - \sqrt{10}$$

(Simplify your answer. Type an exact answer, using radicals as needed.)

since $\sqrt{10} - 7$ is negative we write $|\sqrt{10} - 7| = 7 - \sqrt{10}$ which is positive.

9. Rewrite the expression without absolute value bars.

$$\frac{-14}{|-14|} = \frac{-14}{14} = -1$$

$$\frac{-14}{|-14|} = \underline{-1}$$

(Simplify your answer.)

10. Express the distance between the given numbers using absolute value. Then find the distance by evaluating the absolute value expression.

-15 and 6

$$|6 - (-15)| = 21$$

An expression for the distance between the two numbers is $|6 - (-15)|$
(Do not simplify.)

The distance between -15 and 6 is 21.

11. Select the property that is illustrated by the given equation.

$$1 + (-7) = (-7) + 1$$

- Inverse property of addition
- Associative property of addition
- Distributive property of addition
- Commutative property of addition
- Identity property of addition
- None of the above

12. Determine which property is illustrated by the given equation.

$$7(-2 + 1) = -14 + 7$$

Choose the correct property below.

- | | |
|----------------------------------------------------------------------------------------|--------------------------------------------------------------|
| <input type="radio"/> Inverse Property of Multiplication | <input type="radio"/> Identity Property of Addition |
| <input type="radio"/> Commutative Property of Addition | <input type="radio"/> Inverse Property of Addition |
| <input type="radio"/> Identity Property of Multiplication | <input type="radio"/> Associative Property of Multiplication |
| <input type="radio"/> Commutative Property of Multiplication | <input type="radio"/> Associative Property of Addition |
| <input checked="" type="radio"/> Distributive Property of Multiplication over Addition | <input type="radio"/> None of the above |

13. State the name of the property illustrated.

$$a + 6 + (-a - 6) = 0$$

Name the property illustrated. Choose the correct answer below.

- A. Inverse property of addition.
- B. Identity property of addition.
- C. Inverse property of multiplication.
- D. Identity property of multiplication.

14. Simplify the given algebraic expression.

$$7(5x - 4) + 12x = 35x - 28 + 12x = 47x - 28$$

$$7(5x - 4) + 12x = 47x - 28$$

15. Simplify the algebraic expression.

$$7(5y - 4) + 2(4y + 6) = 35y - 28 + 8y + 12 = 43y - 16$$

$$7(5y - 4) + 2(4y + 6) = 43y - 16$$

16. Simplify the given algebraic expression.

$$2(3y - 9) - (2y + 5) = 6y - 18 - 2y - 5 = 4y - 23$$

$$2(3y - 9) - (2y + 5) = 4y - 23$$

17. Simplify the given algebraic expression.

$$2 - 9[7 - (9y - 4)] = 2 - 63 + 9(9y - 4) = 2 - 63 + 81y - 36 = 81y - 97$$

$$2 - 9[7 - (9y - 4)] = 81y - 97$$

18. The maximum heart rate, in beats per minute, that you should achieve during exercise is 220 minus your age, $220 - a$. Your exercise goal is to improve cardiovascular conditioning. Use the following formulas to answer parts a and b.

Lower limit of range $H = \frac{7}{10}(220 - a)$

Upper limit of range $H = \frac{4}{5}(220 - a)$

a. What is the lower limit of the heart range, in beats per minute, for a 26-year-old with this exercise goal?

The lower limit of the heart range is 136 beats per minute.
(Round to the nearest integer as needed.)

$$H = \frac{7}{10}(220 - 26) = 135.8 \approx 136$$

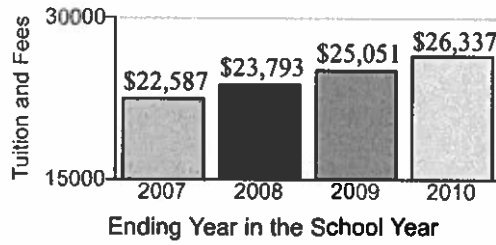
b. What is the upper limit of the heart range, in beats per minute, for a 26-year-old with this exercise goal?

Thus, the upper limit of the heart range is 155 beats per minute.
(Round to the nearest integer as needed.)

$$H = \frac{4}{5}(220 - 26) = 155.2$$

$$\approx 155$$

19. The formula $T = 26x^2 + 816x + 15,601$ models the average cost of tuition and fees, T , at private colleges for the school year ending x years after 2000. The graph to the right shows average cost of tuition and fees at private four-year college.



Answer parts a through c.

- a. Use the formula to find the average cost of tuition and fees at private colleges for the school year ending in 2010.

Using the formula, the tuition and fees for the school year ending in 2010 was \$ 26361.
(Simplify your answer. Do not include the \$ symbol in your answer.)

$$\begin{aligned}
 T &= 26(10^2) + 816(10) + 15601 \\
 &= 2600 + 8160 + 15601 \\
 &= 26361 \\
 &\quad \underline{-26337} \\
 &\quad \quad 24
 \end{aligned}$$

- b. By how much does the formula underestimate or overestimate the actual cost shown by the graph for the school year ending in 2010?

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The formula overestimates the actual cost by \$ 24.
- B. The formula underestimates the actual cost by \$ _____.

- c. Use the formula to project the average cost of tuition and fees at private colleges for the school year ending in 2017.

Using the formula, the tuition and fees for the school year ending in 2017 will be \$ 36987.
(Simplify your answer. Do not include the \$ symbol in your answer.)

$$T = 26(17)^2 + 816(17) + 15601 = 36987$$

1. 8

2. 50

3. 20

4. 32

5. A. $\{3,5,8,9\} \cap \{5,8,10\} = \{ \underline{5,8} \}$ (Use a comma to separate answers as needed.)

6. A. $\{9,11,12,13\} \cup \{11,13,15\} = \{ \underline{9,11,12,13,15} \}$ (Use a comma to separate answers as needed.)

7. $\sqrt{49}$

$0, \sqrt{49}$

$-2, 0, \sqrt{49}$

D. $-2, -\frac{3}{5}, 0, 0.75, 4.6, \sqrt{49}$

$\sqrt{5}$

D. $-2, -\frac{3}{5}, 0, 0.75, \sqrt{5}, 4.6, \sqrt{49}$

8. $7 - \sqrt{10}$

9. -1

10. $|6 - (-15)|$

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11. Commutative property of addition

12. Distributive Property of Multiplication over Addition

13. A. Inverse property of addition.

14. $47x - 28$

15. $43y - 16$

16. $4y - 23$

17. $81y - 97$

18. 136

155

19. 26,361

A. The formula overestimates the actual cost by \$ 24 .

36,987
