

## Arithmetic

### PART I – Solutions not provided

Solve the following problems and choose your answer from the alternatives given. You may use the paper you have been given for scratch work.

Question 1: All of the following are ways to write 20 percent of N, EXCEPT

- a.  $0.20N$
- b.  $20/100N$
- c.  $1/5N$
- d.  $20N$

Question 2:  $7/20$

- a. 0.035
- b. 2.858
- c. 0.35
- d. 3.5

Question 3:  $7.86 * 4.6 =$

- a. 36.156
- b. 36.216
- c. 351.56
- d. 361.56

Question 4: Which of the following is the least?

- a. 0.105
- b. 0.501
- c. 0.015
- d. 0.15

Question 5: The average weight for a group of 20 women is 130 pounds. If the average weight for  $\frac{3}{4}$  of these women was 140 pounds, what was the average weight, in pounds, for the rest of the women?

- a. 100
- b. 110
- c. 120
- d. 135

Question 6: A soccer team played 160 games and won 65% of them. How many games did they win?

- a. 94
- b. 104
- c. 114
- d. 124

Question 7: The Number of Employees of Company K Who Were Involved in Accidents

	Plant X	Plant Y
Mechanic	11	30
Power Machine Operators	9	12

The table above shows the results of an industrial health survey of 10,000 people employed at company K for more than 5 years. If 2,500 employees were surveyed in each of the four categories, which group of employees had the highest accident rate?

- a. Mechanics in Plant X
- b. Mechanics in Plant Y
- c. Power Machine Operators in Plant X
- d. Power Machine Operators in Plant Y

Question 8: Three people who work full time are to work together on a project, but their total time on the project is to be equivalent to that of only one person working full time. If one of the people is budgeted for  $\frac{1}{2}$  of his time to the project and a second person for  $\frac{1}{3}$  of her time, what part of the third worker's time should be budgeted to this project?

- a.  $\frac{1}{3}$
- b.  $\frac{1}{4}$
- c.  $\frac{1}{6}$
- d.  $\frac{1}{8}$

ANSWERS

- |       |      |      |
|-------|------|------|
| 1. D  | 4. C | 7. B |
| 2. C. | 5. A | 8. C |
| 3. A  | 6. B |      |

PART II – Solutions provided

Answer the questions without using a calculator.

1. Find the difference:  $4\frac{3}{5} - 2\frac{2}{3}$

a.  $2\frac{1}{2}$

b.  $6\frac{3}{4}$

c.  $1\frac{14}{15}$

d.  $2\frac{1}{15}$

2. What is  $\frac{5}{6}$  of 78 ?

a. 60

b. 65

c. 72

d. 75

3. Find:  $7 - 2.042$

a. 2.042

b. 4.958

c. 5.042

d. 5.958

4.  $\frac{91}{0.28}$  is approximately equal to

a. 3

b. 30

c. 300

d. 3000

5. What percent of 420 is 63 ?

a. 15%

b. 12%

c. 7%

d. 63%

6. In a fruit bowl, there are four apples, three oranges, seven peaches, and five bananas. What is the ratio of peaches to fruit?

- a.  $\frac{3}{19}$
- b.  $\frac{4}{19}$
- c.  $\frac{5}{19}$
- d.  $\frac{7}{19}$

7. 17% is equal to all of the following except

- a.  $\frac{9}{100} + \frac{8}{100}$
- b. 17
- c.  $0.1 + 0.07$
- d.  $0.2 - 0.03$

8. Bob's annual salary was **\$24,000** last year. This year he received a **4%** raise. What is his annual salary this year?

- a. **\$24,960**
- b. **\$25,040**
- c. **\$26,120**
- d. **\$30,000**

9. Find:  $-3 + 4(-2)$

- a. -2
- b. -1
- c. 14
- d. -11

10. Find:  $-2 + 5 - 3(1 - 2)^2$

- a. 0
- b. 3
- c. 6
- d. 9

## Arithmetic Answers

1. Answer: c
2. Answer: b
3. Answer: b
4. Answer: c
5. Answer: a
6. Answer: d
7. Answer: b
8. Answer: a
9. Answer: d
10. Answer: a

## Arithmetic Solutions

1. One method to subtract mixed numbers is to change them to improper fractions. Borrowing is not necessary using this method:

$$\begin{aligned}4\frac{3}{5} - 2\frac{2}{3} &= \frac{23}{5} - \frac{8}{3} \\ &= \frac{23}{5} \cdot \frac{3}{3} - \frac{8}{3} \cdot \frac{5}{5} \\ &= \frac{69}{15} - \frac{40}{15} \\ &= \frac{29}{15} \\ &= 1\frac{14}{15}\end{aligned}$$

2. What is  $\frac{5}{6}$  of 78?  
In mathematics, 'of' means to multiply:

$$\begin{aligned}\frac{5}{6} \cdot 78 &= \frac{5}{6} \cdot \frac{78}{1} \\ &= \frac{5}{\cancel{6}} \cdot \frac{13}{\cancel{78}} \\ &= \frac{5 \cdot 13}{1 \cdot 1} \\ &= \frac{65}{1} \\ &= 65\end{aligned}$$

3. Find:  $7 - 2.042$

Rewrite the 7 as 7.000 then place the numbers in a column, lining up decimal points, and subtract:

$$\begin{array}{r} 7.000 \\ -2.042 \\ \hline 4.958 \end{array}$$

**91**

4.  $\frac{0.28}{28}$  is approximately equal to ?

Move the decimal point to the right two places in the numerator and denominator. This is a shortcut for multiplying the original fraction by 100/100:

$$\frac{9100}{28}$$

Then round 9100 down to 9000 and round 28 up to 30:

$$\frac{9000}{30}$$

Divide:

$$\begin{array}{r} 300 \\ 900 \cancel{0} \\ \hline 3 \cancel{0} \\ 1 \\ = 300 \end{array}$$

5. What percent of 420 is 63 ?

There are many different methods used to do this problem. One way to view it is: a part (63) divided by the total (420).

Use long division to obtain:

$$\frac{63}{420} = 0.15$$

Then multiply by 100%: **15%**

6. In a fruit bowl, there are four apples, three oranges, seven peaches, and five bananas. What is the ratio of peaches to fruit?

The ratio of 7 peaches to 19 pieces of fruit is: 7 to 19 or 7 divided by 19 or  $\frac{7}{19}$

7. 17% is equal to all of the following except ?

17 percent means 17 per one hundred.

- $\frac{9}{100} + \frac{8}{100}$  equals 17 per one hundred
- 17 does not equal 17 per one hundred
- $0.1 + 0.07 = 0.17$  which equals 17 per one hundred
- $0.2 - 0.03 = 0.17$  which equals 17 per one hundred

Final answer: **17**

8. Bob's annual salary was **\$24,000** last year. This year he received a **4%** raise.

What is his annual salary this year?

Multiply 4% by 24000:  $0.04(24000) = 960$

Add 960 to last year's salary to obtain: \$24,960

9. Find:  $-3 + 4(-2)$

Order of operations: parentheses; exponents; multiplication or division left to right; addition or subtraction left to right.

Following order of operations:

$$-3 + 4(-2)$$

$$= -3 + (-8)$$

$$= -11$$

10. Find:  $-2 + 5 - 3(1 - 2)^2$

Following order of operations:

$$-2 + 5 - 3(1 - 2)^2$$

$$= -2 + 5 - 3(-1)^2$$

$$= -2 + 5 - 3(1)$$

$$= -2 + 5 - 3$$

$$= 3 - 3$$

$$= 0$$