

For those of you who take the Cooperative Personnel Services (CPS) Firefighter Examinations, on some versions of the exams, the math may be fairly easy; on others, it can be quite difficult.

Below are some examples of math problems you may see on the exam.

1. **Subtract 78 from 9,829 then subtract an additional 128 then divide by 15. The total equals:**
  - A) 621.23
  - B) 641.53
  - C) 651.43
  - D) 672.52
  
2. **93 plus 144 multiplied by 3 divided by 4 equals:**
  - A) 76.55
  - B) 156.35
  - C) 166.75
  - D) 177.75
  
3. **492 plus 25 multiplied by 4 minus 288 equals:**
  - A) 1480
  - B) 1880
  - C) 1780
  - D) 1970
  
4. **Firefighters from Engine 17 are laying out hose at a high-rise fire. The firefighters have coupled together six 25' hoses, seven 50' hoses, three 75' hoses, and four 100' hoses. How many feet in length is the coupled hose:**
  - A) 1125
  - B) 1425
  - C) 1500
  - D) 1525
  
5. **The Jonesville Fire Department is determining whether or not to start charging residents for false alarm calls. Last year, false alarms to the Jonesville Fire Department accounted for 32% of the 2,300 total alarms received. How many calls were for actual emergencies:**
  - A) 736
  - B) 1,354
  - C) 1,564
  - D) 958
  
6. **How many 25' hoses must be coupled together to create a length of hose that is 1,575 feet to be able to reach a fire in a large commercial occupancy:**
  - A) 62
  - B) 63
  - C) 64
  - D) 65

7. **One fifth divided by two eighths equals:**

- A)  $\frac{2}{40}$
- B)  $\frac{16}{18}$
- C)  $\frac{8}{10}$

8. **Twenty-five percent of eight hundred twenty equals:**

- A) 265
- B) 195
- C) 205

9. **105.9 multiplied by 14.3 equals:**

- A) 1514.37
- B) 15.1437
- C) 151.437
- D) 15143.7

10. **806,249 – 679 – 78,424 – 14,267 =**

- A) 712,879
- B) 711,789
- C) 712,789
- D) 712,979

11. **16 = what percentage of 24?**

- A) 70%
- B) 67.1%
- C) 72.1%
- D) 66.6%

12. **A fire truck is equipped with 600' of 4" hose, 400' of 2-1/2" hose, 800' of 1-3/4" hose, 1200' of 1-1/2" hose. If 25% of the total hose load is used, how many feet of hose is laid out?**

- A) 650
- B) 750
- C) 850
- D) 950

13. **A gallon of water weighs 8.35 pounds. How many pounds of water would be on Fire Apparatus #10 if it carried 523 gallons of water?**

- A) 4184
- B) 4314.75
- C) 4367.05
- D) 4393.20

14. Twenty-five percent of eight hundred twenty equals:

- A) 265
- B) 195
- C) 205

Use the following numerical values when answering the following question:

$a = 6$ ,  $b = 5$ ,  $c = 4$ ,  $m = 3$ ,  $n = 2$

15.  $b \div (4 + mn)$

- A) .5
- B) .85
- C) .3
- D) 1.5

16. If a flammable gas is expanding at the rate of 14 cubic feet per second, how many cubic feet of gas will there be after 3 minutes:

- A) 42
- B) 840
- C) 1680
- D) 2520

17. If an engine will run at a constant speed of 8 hours on 30 gallons of fuel, how many hours will the same engine run on 20 gallons of fuel?

- A) 6.33 hours
- B) 5.10 hours
- C) 5.33 hours
- D) 4.75 hours

## MATHEMATICAL ABILITY - INSTRUCTIONAL

1. Subtract 78 from 9,829 then subtract an additional 128 then divide by 15. The total equals:

$$9829 - 78 = 9751$$

$$9751 - 128 = 9623$$

$$9623 \div 15 = 641.53 \quad (B)$$

2. 93 plus 144 multiplied by 3 divided by 4 equals:

$$93 + 144 = 237$$

$$237 \times 3 = 711$$

$$711 \div 4 = 177.75 \quad (D)$$

3. 492 plus 25 multiplied by 4 minus 288 equals:

$$492 + 25 = 517$$

$$517 \times 4 = 2068$$

$$2068 - 288 = 1780 \quad (C)$$

4. Firefighters from Engine 17 are laying out hose at a high-rise fire. The firefighters have coupled together six 25' hoses, seven 50' hoses, three 75' hoses, and four 100' hoses. How many feet in length is the coupled hose:

$$25' \times 6 = 150'; 50' \times 7 = 350'; 75' \times 3 = 225'; 100' \times 4 = 400'$$

$$150' + 350' + 225' + 400' = 1125' \quad (A)$$

5. The Jonesville Fire Department is determining whether or not to start charging residents for false alarm calls. Last year, false alarms to the Jonesville Fire Department accounted for 32% of the 2,300 total alarms received. How many calls were for actual emergencies:

$$2300 \text{ total calls} \times .32 = 736 \text{ false alarms}$$

$$2300 \text{ total calls} - 736 \text{ false alarms} = 1,564 \text{ actual emergencies} \quad (C)$$

6. How many 25' hoses must be coupled together to create a length of hose that is 1,575 feet to be able to reach a fire in a large commercial occupancy:

$$1575' \text{ needed} \div 25' \text{ hose length} = 63 \text{ sections of hose required} \quad (B)$$

7. **One fifth divided by two eighths equals:**

$$\frac{1}{5} \div \frac{2}{8}$$

invert and change to multiplication:

$$\frac{1}{5} \times \frac{8}{2} = \frac{8}{10} \quad (C)$$

8. **Twenty-five percent of eight hundred twenty equals:**

$$\frac{1}{4} \times \frac{820}{1} = 205 \quad (C)$$

Problem 9

$$\begin{array}{r} 105.9 \\ \times 14.3 \\ \hline \end{array}$$

Step 1

$$\begin{array}{r} 105.9 \\ \times 14.3 \\ \hline 3177 \\ 4236 \\ \underline{1059} \\ 151437 \end{array}$$

Step 2

$$\begin{array}{r} 105.9 \text{ (one-place decimal)} \\ \times 14.3 \text{ (one-place decimal)} \\ \hline 3177 \\ 4236 \\ \underline{1059} \\ 1514.37 \text{ (two-place decimal)} \end{array}$$

Multiply the numbers:  
 $14.3 \times 105.9 = 151437$

Mark off the decimal point in the product, starting from the right, two places to the left.

10. **806,249 – 679 – 78,424 – 14,267 =**

$$712,879 \quad (A)$$

11. **16 = what percentage of 24?**

$$16 \div 24 = 66.6\% \quad (D)$$

$$\begin{array}{r} .66 \quad (B) \\ 24 \overline{)16.00} \text{ (move decimal points over 2 spaces)} \\ \underline{-144} \\ 160 \text{ (add zero)} \\ \underline{-160} \\ 0 \end{array}$$

12. **A fire truck is equipped with 600' of 4" hose, 400' of 2-1/2" hose, 800' of 1-3/4" hose, 1200' of 1-1/2" hose. If 25% of the total hose load is used, how many feet of hose is laid out?**

$$\begin{aligned} 600' + 400' + 800' + 1200' &= 3000' \\ 3000' \times .25 &= 750' \quad (B) \end{aligned}$$

13. **A gallon of water weighs 8.35 pounds. How many pounds of water would be on Fire Apparatus #10 if it carried 523 gallons of water?**

$$523 \text{ gallons} \times 8.35 \text{ pounds per gallon} = 4367.05 \text{ pounds} \quad (\text{C})$$

14. **Twenty-five percent of eight hundred twenty equals:**

$$\frac{1}{4} \times \frac{820}{1} = 205 \quad (\text{C})$$

Use the following numerical values when answering the following question:  $a = 6, b = 5, c = 4, m = 3, n = 2$

15.  **$b \div (4 + mn)$**

$$5 \div (4 + (3 \times 2))$$

$$5 \div (4 + 6)$$

$$5 \div 10 = 0.5 \quad (\text{A})$$

16. **If a flammable gas is expanding at the rate of 14 cubic feet per second, how many cubic feet of gas will there be after 3 minutes:**

$$14 \times 60 \text{ sec} = 840 \text{ cubic feet per minute. } 840 \times 3 \text{ minutes} = 2520 \quad (\text{D})$$

17. **If an engine will run at a constant speed of 8 hours on 30 gallons of fuel, how many hours will the same engine run on 20 gallons of fuel?**

$$30 \text{ gallons} \div 8 \text{ hours} = 3.75 \text{ gallons of fuel per hour}$$

$$20 \text{ gallons} \div 3.75 = 5.33 \text{ hours} \quad (\text{C})$$

Additional exam prep for the Cooperative Personnel Services (CPS) examination can be found by going to our CPS page under Firefighter Entry-level Written Exam Preparation.