Linear Equations and Functions Word problems

1. The cost of using a shower at a camping ground is $1.50 to start and $0.25 every minute after. Which of the following equations represent the total cost *c*, for *m* minutes of shower use? *(No Calculator)*
   A) $c = 0.25(1.50m)$
   B) $c = 0.25m + 1.50$
   C) $c = \frac{1.50}{0.25}m$
   D) $c = \frac{0.25}{1.50}m$

2. Jimmy and Melvin each ordered a scoop of ice cream at an ice cream shop. The price of Jimmy's ice cream was *x* dollars, and the price of Melvin's ice cream was $1 more than the price of Jimmy's ice cream. If Jimmy and Melvin split the cost of the ice cream evenly and each paid a 15% tip, which of the following expressions represents the amount, in dollars, paid in total? *(Calculator)*
   A) $2.3x + 1.15$
   B) $0.15x + 0.15$
   C) $1.15x + 0.30$
   D) $0.65x + 0.45$

3. A nanny earns $12 an hour for picking up 2 children from school and an additional $5 tip if they both have their homework done on time. If the nanny gets the children to complete their homework done on time, what expression could be used to determine how much the babysitter earned? *(no calculator)*
   A) $5x + 12, x$ is the number of hours
   B) $x(12+2)+3$, x is the number of children
   C) $12x + 5$, x is the number of hours
   D) $5+(4+8)$, x is the number of children

4. Carrie is a freelance copy editor who edits news articles. She charges a fee of $100 for the first 2 hours of work and a rate of $25 per hour for every hour after the first 2 hours. Which of the following models the amount of money, *D* (in dollars), that Carrie charges if it takes her *x* hours to edit an article, where $x > 2$ hours? *(no calculator)*
   A) D=100x
   B) D=25x+50
   C) D=100x+25
   D) D=25x+100

5. A retailer for a large electronics store purchased 170 items directly from the manufacturer for a total of $3000. Some of the order included headphones purchased for $20 each, and the rest were smartphone cases purchased for $15 each. How many more headphones than phone cases did the buyer purchase? *(no calculator)*
   A) 10
   B) 80
   C) 90
   D) 170

6. A landscaper is designing a rectangular garden. The length of the garden is to be 7 feet longer than the width. If the area of the garden will be 78 square feet, what will be the length in the feet of the garden? *(no calculator)*
   A) 6
   B) 13
   C) 18
   D) 78

7. In a study of Pacific Blue Fin Tuna's (PBFT) migration habits, 210 male PBFTs and 200 female PBFTs were tagged. If 110 more PBFTs are tagged, how many of these PBFTs must be male such that $\frac{3}{5}$ of total number of PBFTs in the study are male? *(calculator)*
   A) 60
   B) 102
   C) 510
   D) 770

8. Ricky works for a non-profit organization that collects signatures to acquire members. If Ricky is paid $12 an hour and can acquire an additional $50 bonus for receiving more than 10 signatures a day, which of the following linear equations best models his daily wage assuming he acquires more than 10 signatures? *(no calculator)*
   A) $y = 10x + 50$
   B) $y = 12(10 + x) + 50$
   C) $y = 50x + 12$
   D) $y = 12x + 50$

9. Janelle wants to rent a car. The rental shop charges an initial fee of \$150 plus \$5 per mile to rent the car. If the total cost was \$250, how many miles did Janelle drive? *(no calculator)*
   A) 10
   B) 20
   C) 50
   D) 100

10. An exterminator charges a fee of \$35 to make a house call. He also charges \$20 per hour for labor. Which of the following linear equations best modes the amount the exterminator charges for a house call based on the number of hours of labor? *(no calculator)*
   A) $y = x(20+35)$
   B) $y = 35x + 20$
   C) $y = 20x + 35$
   D) $y = x + 55$

11. A popular R&B music artist has made their music available for download or streaming. The artist earns \$0.08 each time a song is downloaded and \$0.0015 each time a song is streamed. Which of the following expressions represents the amount, in dollars, that the musician earns if the song is downloaded *x* times and streamed *y* times? *(no calculator)*
   A) $\frac{0.0015y}{0.08x}$
   B) $0.0015y - 0.08x$
   C) $0.08x + 0.0015y$
   D) $0.08y - 0.0015x$

12. A delivery truck enters a road that decreases in elevation by 3 meters every 90 meters along the length of the road. The elevation of the road is at 850 meters when the truck started traveling on the road, and the truck is traveling at a constant speed of 6 meters per second. What is the road's elevation, in meters, at the point where the truck passes *t* seconds after entering the road? *(no calculator)*
   A) $850 - 0.033t$
   B) $850 - 0.2t$
   C) $850 - 3t$
   D) $850 - 6t$

13. Jenny subscribes to a television streaming service that charges a monthly fee of \$15.00 and \$5.00 per hour time spent watching pre-released shows. Which of the following functions gives Jenny's cost, in dollars, for a month in which she spends *x* hours watching pre-released shows? *(no calculator)*
   A) $C(x) = 20x$
   B) $C(x) = 15x + 5$
   C) $C(x) = 15 + 5x$
   D) $C(x) = 20 + 5x$

14. A marine biologist dives into a freshwater lake to a depth of 11 feet below the surface. The pressure due to the atmosphere and surrounding water is 20 pounds per square inch. As the marine biologist dives further down, the pressure increases linearly. At a depth of 15 feet, the pressure is about 22.2 pounds per square inch. If the pressure increases at a constant rate as the marine biologist's depth below the surface increases, which of the following linear models best describes the pressure *p* in pounds per square inch at a depth of *d* feet below the surface? *(calculator)*
   A) $p = 0.55d + 14.5$
   B) $p = 0.55d + 11$
   C) $p = 2.2d + 11$
   D) $p = 2.2d - 15$

15. The Department of Water and Power have indicated there has been a significant decrease in brown energy use, or energy used through the burning of fossil fuels, from 3.9 billion units in 2000 to 2.7 billion units in 2008. Assuming that brown energy usage has decreased at a constant rate, which of the following linear functions *f* best models the production, in billions of units, for *t* years after the year 2000? *(no calculator)*
   A) $f(t) = \frac{12}{80}t + 3.9$
   B) $f(t) = -\frac{27}{80}t + 3.9$
   C) $f(t) = \frac{27}{80}t + 3.9$
   D) $f(t) = -\frac{12}{80}t + 3.9$

16. A landscaping company buys two kinds of rocks. The weight of Rock X contains 80% filler materials and the weight of Rock Y contains 20% filler materials. All together, the rocks purchased by the gardener contain a total of 320 pounds of genuine rock (non-filler material). Which of the following equations models this relationship, where x is the number of pounds of Rock X and y is the number of pounds of Rock Y? *(no calculator)*
    A) $0.2x+0.8y=320$
    B) $0.8x+0.2y=320$
    C) $80x+20y=320$
    D) $20x+80y=320$

17. Four college students are looking for an apartment to rent for the semesters. There is an initial deposit of $1,500, and a monthly rent, x, both of which are divided evenly between each student. Which of the following functions represents the cost for one student to rent an apartment? *(calculator)*
    A) $R=x+1500$
    B) $R=\frac{x}{4}+1500$
    C) $R=\frac{x}{4}+375$
    D) $R=x+375$

18. A helicopter is at the bottom of a hill and is 35 feet above the ground. If the helicopter rises at a constant rate of 12 feet per second, which of the following equations gives the height, h, in feet, of the helicopter s seconds after it starts ascending? *(no calculator)*
    A) $h=12s+35$
    B) $h=35s+\frac{35}{12}$
    C) $h=12s+\frac{35}{15}$
    D) $h=35s+12$

19. Stop motion photography creates a sense of motion by displaying still images, called frames, in rapid succession. If a photographer combines a myriad of images into a 60 frames per second video, which of the following shows the total number of frames, f, that the video will display in s seconds? *(no calculator)*
    A) $f=s+60$
    B) $f=\frac{s}{60}$
    C) $f=\frac{60}{s}$
    D) $f=60s$

20. Jamie's house is located 3.2 miles from her school. When she walks home from school, it takes her an average of 28 minutes. Assuming that Jamie walks at a constant rate, which of the following functions best models Jamie's distance from home, d, in miles, if she has walked a total of t minutes on her trip home that day? *(calculator)*
    A) $d=3.2+\frac{4}{35}t$
    B) $d=3.2+28t$
    C) $d=3.2-\frac{35}{4}t$
    D) $d=3.2-\frac{4}{35}t$