

1. One morning, Mr. Blue drove directly from his home to his workplace in 33 minutes. If his workplace was 20.9 miles away, what was his average speed, in miles per hour, during his drive that morning? [Round to nearest whole number]
  
2. One morning, Mr. Brown drove directly from his home to his workplace in 48 minutes. If his workplace was 20.4 miles away, what was his average speed, in miles per hour, during his drive that morning? [Round to nearest whole number]
  
3. One morning, Mr. Red drove directly from his home to his workplace in 39 minutes. If his workplace was 20.8 miles away, what was his average speed, in miles per hour, during his drive that morning? [Round to nearest whole number]
  
4. The distance traveled by Mars in one orbit around the Sun is about 570,000,000 miles. Mars makes once complete orbit around the Sun in one year. Of the following, which is closest to the average speed of Mars, in miles per hour, as it orbits the Sun?
  - A) 61,000
  - B) 65,000
  - C) 560,000
  - D) 1,560,000

5. The distance traveled by Venus in one orbit around the Sun is about 480,000,000 miles. Venus makes once complete orbit around the Sun in one year. Of the following, which is closest to the average speed of Venus, in miles per hour, as it orbits the Sun?
- A) 85,000
  - B) 65,000
  - C) 55,000
  - D) 45,000
6. Joe's car travels an average of 30 miles per gallon of gas used, and he pays an average of \$2.75 per gallon of gas. If Joe travels 210 miles, what will be the total cost of the gas that his car uses for the drive? (round to nearest dollar)
- A) \$6.00
  - B) \$14.00
  - C) \$17.00
  - D) \$19.00
7. Joe's car travels an average of 35 miles per gallon of gas used, and he pays an average of \$3.25 per gallon of gas. If Joe travels 280 miles, what will be the total cost of the gas that his car uses for the drive? (round to nearest dollar)
- A) \$8.00
  - B) \$22.00
  - C) \$24.00
  - D) \$26.00

8. Phil walks 35 meters in 19.8 seconds. If he walks at the same rate, which of the following is closest to the distance he will walk in 4 minutes?
- A) 105 meters
  - B) 425 meters
  - C) 700 meters
  - D) 1400 meters
9. A horse travels 13 miles in 28 minutes. What is the average speed of the horse, to the nearest mile per hour ?

## USING LOGIC – APPLES and ORANGES

10. If  $a$  and  $b$  are positive integers and , for all values of  $x$ ,  $ax + bx = 2 + 3x$ , what is  $a$ ? What is  $b$ ?
11. If  $a$ ,  $b$ , and  $c$  are integers and , for all values of  $x$ ,  $ax^2 + bx + c = 4x^2 - 5x$ , what is  $a$ ? what is  $b$ ? what is  $c$ ?

12. If  $a$ ,  $b$ , and  $c$  are positive integers and , for all values of  $x$ ,  $ax + b(x + c) = 6x + 18$ , what is one *possible* value of  $a$  ?

13. If  $a$ ,  $b$ , and  $c$  are positive integers and , for all values of  $x$ ,  $ax + b(x + c) = 5x + 20$ , what is one *possible* value of  $a$  ?

14. In the expression below,  $a$  is an integer.

$$8x^2 + ax - 10$$

If  $4x + 5$  is a factor of the expression above, what is the value of  $a$  ?

15. In the expression below,  $a$  is an integer.

$$12x^2 + ax - 18$$

If  $3x + 6$  is a factor of the expression above, what is the value of  $a$  ?

16. In the expression below,  $a$  is an integer.

$$14x^2 + ax - 24$$

If  $2x + 3$  is a factor of the expression above, what is the value of  $a$  ?

$$(x + a)(x - 6) = x^2 - 2ax + c$$

17. [HARD] In the equation above,  $a$  and  $c$  are constants. If the equation is true for all values of  $x$ , what is the value of  $c$  ?

- (A) 12
- (B) 6
- (C) -6
- (D) -12

$$(x + a)(x - 12) = x^2 - 3ax - b$$

18. [HARD] In the equation above,  $a$  and  $b$  are constants. If the equation is true for all values of  $x$ , what is the value of  $b$  ?

- (A) 36
- (B) 18
- (C) -6
- (D) -18

Answers:

1. 38
2. 25 or 26
3. 32
4. B
5. C
6. D
7. D
8. B
9. 28
10.  $a=2, b=3$
11.  $a=4, b=-5, c=0$
12. 3, 4
13. 1, 3
14. 2
15. 15
16. 5
17. D
18. A