EXERCISE SET 2 ANSWER KEY

1. **108**　$time = distance/rate = 90$ miles/50 mph $= 1.8$ hours $= 1.8$ hour $\times 60$ min/hour $= 108$ minutes.

2. **20**　The fast car is moving ahead of the slow car at a rate of $50 - 35 = 15$ mph, and so it will be 5 miles ahead after $5 \div 15 = 1/3$ hour $= 20$ minutes.

3. **2,400**　Since $8 + 5 + 2 = 15$, charity A receives 8/15 of the contribution, and charity C receives 2/15. The difference is 6/15, or 2/5, of the total, which is $(2/5)(\$6,000) = \$2,400$.

4. **1.5**　Since the faster car is catching up to the slower car at $60 - 50 = 10$ mph, it will take $(1/4$ mile$)/(10$ mph$) = 1/40$ hours $= 60/40$ minutes $= 1.5$ minutes.

5. **20**　The tank contains $(2/3)(18) = 12$ gallons, and travels $(4$ hours$)(60$ mph$) = 240$ miles, so its efficiency is $240/12 = 20$ miles per gallon.

6. **12**　With 10 gallons of gas and an efficiency of 60 miles per gallon, the car can travel $10 \times 60 = 600$ miles. At 50 miles an hour this would take $600/50 = 12$ hours.

7. **D**　$\dfrac{b}{c} = \dfrac{b}{a} \times \dfrac{a}{c} = \dfrac{4}{3} \times \dfrac{5}{2} = \dfrac{10}{3}$

8. **A**　According to the ratio, the mixture is $2/(3 + 2 + 11) = 2/16 = 1/8$ violet. Therefore 256 ounces of the mixture would contain $(1/8)(256) = 32$ ounces of violet paint.

9. **C**　If the pool is ¼ full, it requires $(3/4)(20,000) = 15,000$ more gallons.

$$15,000 \text{ gallons} \times \frac{m \text{ minutes}}{g \text{ gallons}} \times \frac{d \text{ dollars}}{1 \text{ minute}}$$

$$= \frac{15,000 \, md}{g} \text{ dollars.}$$

10. **B**　Let $x =$ the distance, in miles, from home to work. Since $time = distance/rate$, it takes Yael $x/40$ hours to get to work and $x/24$ hours to get home.

$$\frac{x}{40} + \frac{x}{24} = 2$$

Simplify:
$$\frac{x}{15} = 2$$

Multiply by 15:　　$x = 30$ miles

11. **B**　The tortoise would take d/b hours to complete the race, and the hare would take d/a hours to complete the race, so the tortoise would take

$$\frac{d}{a} - \frac{d}{a} = \frac{ad}{ab} - \frac{bd}{ab} = \frac{ad - bd}{ab}$$ hours longer.

12. **30**　Together they can edit $700 + 500 = 1,200$ words per minute, so in 20 minutes they can edit

$$20 \text{ minutes} \times \frac{1,200 \text{ words}}{1 \text{ minute}} \times \frac{1 \text{ page}}{800 \text{ words}} = 30 \text{ pages}$$

13. **75**　If the printer can print 5 pages in 20 seconds, it can print 15 pages in 1 minute, and therefore $15 \times 5 = 75$ pages in 5 minutes.

14. **9**　Since 45 minutes is ¾ hour, Diego's daily commute is $40 \times ¾ = 30$ miles. If he traveled at 50 mph it would take him $30/50 = 3/5$ hours $= 36$ minutes, so he would save $45 - 36 = 9$ minutes.

15. **3/10 or 0.3**

$$\frac{2a}{3b} \times \frac{2b}{c} = \frac{1}{5} \times \frac{2}{1}$$

Simplify:
$$\frac{4a}{3c} = \frac{2}{5}$$

Multiply by ¾:
$$\frac{a}{c} = \frac{2}{5} \times \frac{3}{4} = \frac{3}{10}$$

16. **36**　Pick a convenient length for the race, such as 180 miles (which is a multiple of both 30 and 45). The first half of the race would therefore be 90 miles, which would take 90 miles $\div$ 30 mph $= 3$ hours, and the second half would take 90 miles $\div$ 45 mph $= 2$ hours. Therefore, the entire race would take $3 + 2 = 5$ hours, and the cyclist's average speed would therefore be 180 miles $\div$ 5 hours $= 36$ miles per hour.

17. **1.2 or 6/5**　Anne's rate is 1/2 room per hour, and Barbara's rate is 1/3 room per hour, so together their rate is $1/3 + 1/2 = 5/6$ room per hour. Therefore, painting one room should take $(1 \text{ room})/(5/6 \text{ room per hour}) = 6/5$ hours.

18. **C** $\dfrac{0.25 \text{ mile}}{45 \text{ seconds}} \times \dfrac{3{,}600 \text{ seconds}}{1 \text{ hour}} = 20 \text{ mph}$

20. **D** $\dfrac{3 \text{ miles}}{x + y + z \text{ minutes}} \times \dfrac{60 \text{ minutes}}{1 \text{ hour}} = \dfrac{180}{x + y + z} \text{ mph}$

19. **B** In order to arrive on time, it would have to travel the d miles in $t - 3$ hours, which would require a speed of $d/(t - 3)$ mph.

21. **B** Sylvia traveled at $315/9 = 35$ miles per hour. If she had traveled at $35 + 10 = 45$ miles per hour, she would have arrived in $315/45 = 7$ hours, thereby saving 2 hours.