

## EXERCISE SET 3 ANSWER KEY

1. **45**  $1.50 \times 30 = 45$

2. **1.5** Imagine that the areas are  $4\pi$  and  $9\pi$ . Since the area of a circle is  $\pi r^2$ , their radii are 2 and 3, and their circumferences are  $2(2)\pi = 4\pi$  and  $2(3)\pi = 6\pi$ , and  $6\pi \div 4\pi = 1.5$ .

3. **49**  $70 - 0.30(70) = 0.70(70) = 49$ .

4. **7.5**  $\frac{x}{36} = \frac{5}{24}$   
 Cross multiply:  $24x = 180$   
 Divide by 24:  $x = 7.5$

5. **100**  $\frac{\frac{2}{5} \text{ gallon}}{8 \text{ miles}} = \frac{5 \text{ gallons}}{x \text{ miles}}$   
 Cross multiply:  $\frac{2}{5}x = 40$   
 Multiply by  $5/2$ :  $x = 100$

6. **D**  $1.05 \times 0.80 \times 0.80 \times \$60 = \$40.32$

7. **C**  $(120,000 - 40,000)/40,000 \times 100\% = 200\%$

8. **D** The fraction of students who are athletes is  $3/(2+3) = 3/5$ , and the fraction of these who are females is  $5/(3+5) = 5/8$ . Therefore the portion who are female athletes is  $3/5 \times 5/8 = 3/8 = 37.5\%$ .

9. **C** The purple dye is  $3/(3+4) = 3/7$  red, and the orange dye is  $3/(3+2) = 3/5$  red. Therefore, a half-purple, half-orange dye is  $(1/2)(3/7) + (1/2)(3/5) = 3/14 + 3/10 = 18/35$  red.

10. **B** If the price of the stock were originally, say, \$100, then after this two-year period its price would be  $(0.70)(1.80)(\$100) = \$126$ , which is a 26% increase.

11. **D** The quantity of barley seed is proportional to the acreage it can cover. The cost of seed for each acre of barley was originally  $\$1,200/30 = \$40$  per acre. The next year, after the 20% decrease, the price would be  $(0.80)(\$40) = \$32$  per acre. With the same budget, the farmer can therefore plant  $1,200/32 = 37.5$  acres of barley.

12. **1/15 or 0.067 or 0.066**

$$\frac{2}{3} \% \text{ of } 90 = \frac{2}{3} \div 100 \times 90 = \frac{180}{300} = \frac{3}{5}$$

$$\frac{2}{3} - x = \frac{2}{3} - \frac{3}{5} = \frac{1}{15}$$

13. **5**  $n = \left| \frac{5}{2} - (3) \left( \frac{5}{2} \right) \right| = \left| -\frac{10}{2} \right| = 5$

14. **8.00** Let  $x$  be the price before tax:  
 $1.05x = \$8.40$   
 Divide by 1.05:  $x = \$8.00$

15. **15**  $(68 - 80)/80 = -0.15$

16. **1.82**  $b = 1.30a$  and  $c = 1.40b$ , so  $c = 1.40(1.30a) = 1.82a$ . Therefore  $c/a = 1.82a/a = 1.82$ .

17. **150** For convenience, pick the dimensions of the rectangle to be 10 and 10. (This is of course a square, but remember that a square is a rectangle!) This means that the original area is  $10 \times 10 = 100$ . If the width decreases by 20%, the new width is  $(0.80)(10) = 8$ . Let the new length be  $x$ . Since the new rectangle has double the area,  $8x = 200$ , and so  $x = 25$ . This is an increase of  $(25 - 10)/10 \times 100\% = 150\%$ .

18. **15** The total number of "St. Louis votes" can be expressed in two ways, so we can set up an equation to solve for  $n$ :  
 $(0.56)(25) + (0.60)n = 0.575(25 + n)$   
 Simplify:  $14 + 0.6n = 14.375 + 0.575n$   
 Subtract 14 and  $.575n$ :  $0.025n = 0.375$   
 Divide by  $.025$ :  $n = 15$

19. **C** The total amount of salt in the mixture is  $(.30)(12) + (.60)(24) = 18$ , and the total weight of the mixture is  $12 + 24 = 36$  ounces, so the percent salt is  $18/36 = 50\%$ .

20. **A** If the original dimensions are  $w$  and  $l$ , the original area is  $wl$ . If the length is doubled and the width decreased by 10%, the new area is  $(0.9l)(2w) = 1.8wl$ , which is an increase of 80%.

21. **C** The number of girls in the class is  $n + 45$ , and the total number of students is  $n + n + 45$ , so the percent of girls is  $\frac{n+45}{2n+45} \times 100\%$ .

22. **B**  $B$  is 50% greater than  $A$ :  $B = 1.5A$   
 $C$  is 20% greater than  $A$ :  $C = 1.2A$   
 Divide by 1.2:  $0.8\bar{3}C = A$   
 Substitute:  $B = 1.5(0.8\bar{3}C)$   
 Simplify:  $B = 1.25C$