

# Answer Key

1. 6
2.  $100 - 98 + 66 - 64 + 2 = 6$
3. 5
4.  $\frac{13}{15} = 13/15$
5.  $10\frac{5}{24} = 10\ 5/24$
6. 286
7. 25
8.  $12 = 4 \times 3$   
 $15 = 5 \times 3$   
The least common multiple is  $3 \times 4 \times 5 = \boxed{60}$
9.  $1 - 75\% = 25\%$   
 $200 \times 25\% = \boxed{50 \text{ acres}}$
10.  $20 \times \frac{1}{5} = 4$   
 $20 + 4 = \boxed{\$24}$
11. 6:15 P.M. - 6:30 A.M.  
 $= 18:15 - 6:30$   
 $= \boxed{11\frac{3}{4} = 11\ 3/4 \text{ hr}}$
12.  $330 \div 40 = 8R10$   
 $\boxed{\text{Ans} = 9}$  boxes
13. D  
1 square yard = 9 sq. ft.
14. 80
15. There are two methods to find the radius.  
Method I)  
 $60 \div 2 = 30$   
 $30 = 10 + 20$   
radius = 10  
AB = 20  
Method II)  
 $2(1 + 2) = 6$   
 $60 \div 6 = 10$  (radius)  
  
 $10^2\pi = 100\pi = 314$   
 $2 \times 314 = \boxed{628 \text{ cm}^2}$
16. \$95
17.  $3 \times 0.8 + 2 \times 0.95 + 2.5$   
 $= 2.4 + 1.9 + 2.5$   
 $= 6.8$   
 $10 - 6.8 = \$3.20$
18.  $64 = 8 \times 8$   
 $4 \times 8 = \boxed{32 \text{ in}}$
19. 12 (cups)
20.  $3.50 - 0.25 = \boxed{3.25}$
21.  $(\frac{1}{2})^2 - (\frac{1}{3})^3 = \frac{1}{4} - \frac{1}{27} = \frac{23}{108} = 23/108$
22.  $1\ 9/16$
23. 0.9
24.  $28/25$
25. 12.5
26. 84
27. 3
28. -2
29. 3
30. 9
31.  $\frac{1}{2} = 1/2$
32.  $91 = 7 \times 13$   
Ans = 7 & 13
33.  $5 \times 12 = 60$   
 $\frac{1}{3} \times 12 = 4$   
 $60 + 4 = 64$
34.  $80 \times 70\% = 80 \times .7 = \$56$
35.  $5 \times 12 \div 6 = 10$  pieces of tile  
 $6 \times 12 \div 6 = 12$   
 $10 \times 12 = 120$  pieces
36. Let's split 12 into 3 parts: 2 for the tens digit, and 1 for the ones digit. So, tens digit is 8 and ones digit is 4.  
Ans = 84
37. F(6, 4)
38. -1.25
39.  $\frac{1}{2}x - \frac{1}{3}x = 6$   
 $\frac{1}{6}x = 6$   
 $x = 36$
40.  $180 \div 250 = 72\%$
41. 0.16
42.  $-\frac{1}{8} = -1/8$
43. 5
44.  $\frac{11}{5} \div \frac{11}{2} = \frac{11}{5} \times \frac{2}{11} = \frac{2}{5} = 2/5$
45. 6
46.  $\frac{1}{2}x + \frac{2}{3}x = 14$   
 $6(\frac{1}{2}x + \frac{2}{3}x) = 6 \times 14$   
 $3x + 4x = 84$   
 $7x = 84$   
 $x = 12$
47. Multiply both sides by 12:  
 $4(2x+3) = 3(x+6)$   
 $4x+12 = 3x+18$   
 $x = 6$
48.  $12.8 \times \frac{375}{1000} = 4.8 \text{ lb}$
49. 314
50. 123.45

## Cheetah (Fall, 2024) Issue 2

51.  $\frac{5000-4000}{4000} = \frac{1}{4} = 25\%$

52.  $6 \times 12 = 8 \times 9$   
 $12 - 9 = 3$  (hr) saved

53.  $15 - 2x \leq 41$

54.  $60 - 6x \leq 132$

55.  $3 \times 2 \times 8 = 48$

56.  $144 + 180 = 324$   
 $324 = 18^2$   
 $4 \times 18 = 72$  in

57.  $210 - 190 = 20$   
 $20 \div (\frac{1}{4} - \frac{1}{5}) = 400$   
 $400 \times \frac{1}{5} = 80$   
 $210 + 80 = 290$

58.  $1 - \frac{1}{8} = \frac{7}{8}$   
 $175 \div \frac{7}{8} = 200$

59.  $17 \div 250 = 0.068 = 6.8\%$   
 $1 - 6.8\% = 93.2\%$

60.  $48 - 3 = 45$   
 $45 \div 1\frac{1}{4} = 36$  books

61.  $1\frac{1}{2} = 1 \frac{1}{2}$

62.  $\frac{1}{64} = 1/64$

63.  $3n - 1 = 4$   
 $n = 1\frac{2}{3} = 1 \frac{2}{3}$

64.  $8^2 \times 2^3 = 4^{3+2} = 4^5$   
 $\square = 5$

65. B

66. D

67. A

diameter =  $\sqrt{6^2 + 8^2} = 10$  cm

radius = 5 cm

area of the shaded region =  $25\pi - 48$  (cm<sup>2</sup>)

68. 120°

69.  $15\% : 25\% = 3 : 5 = 360:600$   
 Ans = 600

70. After Monday he got  $\frac{3}{4}$  left, and he spent  $\frac{2}{3}$  of it, so he has  $\frac{1}{3}$  of  $\frac{3}{4}$  left.  
 Ans =  $\frac{1}{3}(\frac{3}{4}) = \frac{1}{4} = 1/4$

71. C

There are

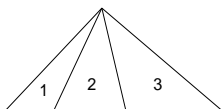
3 smaller sized triangles: (1), (2), (3)

2 medium sized triangles: (12), (23)

1 large sized triangle: (123)

$1 + 2 + 3 = 6$

Note: (13) is not a triangle.



72. D

From smallest to the largest:

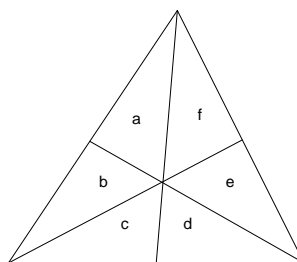
6: a, b, c, d, e, f

3: ab, cd, ef

6: abc, bcd, cde, def, efa, fab

1: abcdef

total: 16



73. C

$1 + 2^2 + 3^2 = 14$

74. B

#(the smallest size triangles) = 9

#(the medium size triangles) = 3

#(the largest size triangle) = 1

$9 + 3 + 1 = 13$

75.  $20 + \frac{1}{3}x = 2x$

$20 = \frac{5}{3}x$

$x = 12$

76. 0.01

77.  $\frac{1}{2}(5)(4) = 10$

78. D

$\frac{3}{8} - \frac{1}{4} = \frac{1}{8}$

$\frac{1}{4} - \frac{3}{16} = \frac{1}{16}$

$\frac{3}{8} - \frac{1}{4} = \frac{1}{8}$

$\frac{16}{4} - \frac{4}{64} = \frac{32}{64}$

$\frac{1}{4} - \frac{15}{64} = \frac{1}{64}$

79. A:  $36 = 6 \times 6$ ;  $4 \times 6 = 24$

B:  $24 - 12 = 12$ ;  $12 \div 4 = 3$ ;  $3 \times 3 = 9$  in<sup>2</sup>

80.  $11 \times 1.1 \times 11 = \$133.10$

81. 72

82.  $250000 + 12000 + 144 = 262144$

83.  $4\sqrt{xy} = 12$

84.  $4^{x+2} + 4^{x+5} = 65(4^{x+2}) = 130$

$4^{x+2} = 2$

$x + 2 = 0.5$

$x = -1.5$

85. 2

86. 385

87. C

88. 9

89.  $(x + \frac{1}{x})^2 = x^2 + 2 + \frac{1}{x^2} = 9$

$x + \frac{1}{x} = \sqrt{7}$

$x^2 - 1 + \frac{1}{x^2} = 6$

$x^3 + \frac{1}{x^3} = (x + \frac{1}{x})(x^2 - 1 + \frac{1}{x^2}) = 6\sqrt{7}$

# Answer Key

- .000006
  - 100
  - 5
  - 60
  - 60
  - $\frac{2}{3} \times 24 = 16$
  - 16
  - $\text{GCD}(90, 72) = \boxed{18 \text{ teams}}$
  - $90 \div 18 = \boxed{5 \text{ boys}}$
  - $72 \div 18 = \boxed{4 \text{ girls}}$
  - A
  - If he open 3 boxes, then  $3 \times 6 = 18$  (copies), which are not enough.  
Ans =  $\boxed{4 \text{ boxes}}$
  - $\text{GCF}(45, 60, 90) = 15$  (groups)  
 $45 \div 15 = 3$   
 $60 \div 15 = 4$   
 $90 \div 15 = 6$   
 $3 + 4 + 6 = \boxed{13}$
  - $30 \times 2 + 5 \times 2 + 4(15 - 5)$   
 $= 60 + 10 + 40$   
 $= \boxed{110}$
  - C  
radius = 10  
 $\frac{3}{4} \times 2 \times 100\pi = 150\pi$   
 $10 \times 20 = 200$   
 $200 + 150\pi = 671$
- 
- Julio = 15  
Erin = 30  
Kesha = 37  
Total =  $\boxed{82}$
  - $9.45 \div 3 = \$3.15$
  - $\frac{1}{2} \times 3 \times 4 = 6$  (triangle area)  
 $42 - 6 = 36$  (rectangle area)  
 $36 \div 3 = 12 \text{ cm}$  (length of CD)  
 $4 + 5 + 12 + 3 + 12 = \boxed{36 \text{ cm}}$  (perimeter)
  - $9,500 + 2,100 = \boxed{11,600}$
  - $360 \div 10 = 36$   
 $36 = 6 \times 6$   
 $6 \times 6 \times 6 = 216$   
 $2 \times 216 = \boxed{432 \text{ in}^3}$
  - $\frac{1}{8} = 1/8$
  - 1
  - $\frac{9}{14} = 9/14$
  - $\frac{5}{3} \div 1\frac{2}{3} = 1$
  - 0.09
  - $4\frac{1}{3} = 4\frac{1}{3}$
  - $12\frac{5}{6} = 12\frac{5}{6}$
  - 214
  - 9.5
  - $4\frac{1}{4} - 3\frac{1}{3} = 1\frac{1}{4} - \frac{1}{3} = \frac{15-4}{12} = \frac{11}{12} = 11/12$
  - $5\frac{35}{36}$
  - $x^5 = \sqrt{x^{10}}$ , a = 10
  - 3.3
  - $3.60 \div 12 = 0.3$   
 $2.40 \div 6 = 0.4$   
 $0.4 - 0.3 = \$0.10$
  - $\text{GCF}(84, 96) = 12$   
 $84 \div 12 \times (96 \div 12) = 7 \times 8 = 56 \text{ pieces}$
  - 150
  - $360 \times 4 = 1440$   
 $40(1 + 2 + 3) = 240$   
 $1440 + 240 = 1680$
  - $30 + 45 = 75$   
 $40\% \times 75 = 30$   
 $30 - 9 = 21 \text{ games}$
  - A  
 $900 \div 300 \times 20 = 60$  (gallons)
  - B  
 $600 \div 60 = 10$
  - 0.008
  - $\pi - 3 + 4 - \pi = 1$
  - 0.0081
  - $2\frac{2}{3} + 3\frac{3}{4} - 5\frac{1}{10}$   
 $= 2 + 3 - 5 + \frac{2}{3} + \frac{3}{4} - \frac{1}{10}$   
 $= \frac{2}{3} + \frac{3}{4} - \frac{1}{10}$   
 $= 1\frac{19}{60} = 1\frac{19}{60}$
  - 180

## Cheetah (Fall, 2024) Issue 3

46.  $26 \times 40 = 1040$  (miles)  
 $26 - 6 = 20$   
 $1040 \div 20 = 52$  miles per hour  
 $52 - 40 = 12$  mph faster

47.  $180 \div 3 = 60$  mi

48.  $60 \times 4 = 240$  mi

49. 10:11

50.  $30 \times 2 + 5 \times 2 + 4(15 - 5)$   
 $= 60 + 10 + 40$   
 $= 110$

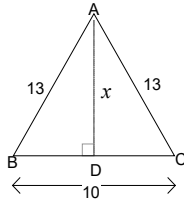
51.  $17 \div 2.5 = 6.8$   
 $3 \times 6.8 = 20.4 = 21$  bushels will be enough.

52. 14.4

53.  $13 \times 1.3 = \$16.90$

54.  $6 \times 6 = 8 \times 4.5$   
 Ans = 4.5 hr

55.  $BD = 5$   
 $AD = 12$   
 Area =  $\frac{1}{2}(10 \times 12) = 60$



56.  $\frac{78}{65} = \frac{6}{5} = 1.2$   
 $6 \div 1.5 = 4$   
 $4 + 1 = 5$   
 $5 \times 1.2 = 6$   
 $6 \times 3 = \boxed{18}$

57.  $.8 \times 0.9 = 0.72$  (left to pay)  
 $1 - 0.72 = 0.28 = 28\%$

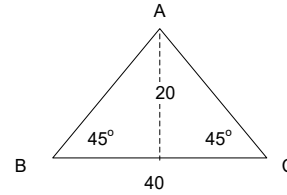
58.  $CD = 4$   
 $AB = 5$   
 Perimeter = 21

59.  $100 \div 2 = 50$   
 $50 - 5 = 45$   
 $45 \div (1 + 2) = 15$   
 width = 15  
 length =  $5 + 2 \times 15 = 35$   
 $15 \times 35 = 525$  in<sup>2</sup>

60.  $\frac{4 \times 3}{10 \times 9} = \frac{2}{5 \times 3} = \frac{2}{15} = 2/15$

61.  $4.50 - 3.25 = 1.25$   
 $2 \times 1.25 = 2.50$   
 $3.25 - 2.50 = 0.75$   
 $2 \times 0.75 = 1.50$

62. The height from A to BC is 20.  
 Area:  $\frac{1}{2}(20)(40) = 400$



63.  $\frac{3}{2} \times \frac{7}{3} \times \frac{22}{7} = 11$

64.  $.2^3 = 0.008$

65.  $\frac{-27}{8} = -27/8$

66.  $x = -8$

67. 32

68.  $2^6 \times (2^2)^3 = 2^{12}$   
 $\square = 3$

69.  $(3^3)^3 = (3^3)^x = 64 = 4^3$   
 $3^x = 4$

70.  $4(10+20+30) = 240$  cm

71.  $42 - 30 = 12$   
 $60 - 42 = 18$   
 $12:18 = 2:3$

Ans = 6 (L of 30%) & 4 (L of 60%)

72. D

$y = -x + 6$

73. A

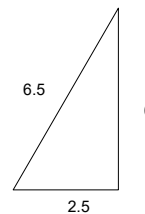
74. B

$98 = 4 \times 12 + 5 \times 10$   
 $4 + 5 = 9$  pieces

75. 2 oranges = 3 pears  
 72 oranges = 108 pears  
 3 apples = 4 pears  
 108 pears = 81 apples

76. Let  $x$  = the investment at 8%. Therefore, we have  
 $4000 \times 0.06 + .08x = 520$   
 $.08x = 280$   
 $x = 3500$

77.  $6.5 : 2.5 : \square$   
 $= 13 : 5 : 12$   
 $\square = 6$  ft



78. B

$3(36\pi) + 144 = 108\pi + 144$

79.  $120 \times 1.25 = 150$

# Answer Key

1.  $2\frac{2}{3} \times 60 = 120 + 40 = 160$  min

2.  $0.85 \times 3000 = \boxed{2,550}$

3. 30

4.  $.14 \times .7 = .098$

5. 15

6. 20%

7.  $4\frac{1}{16} = 4 \frac{1}{16}$

8.  $44 \div 5 = 8R4$   
 $8 + 1 = \boxed{9 \text{ cars}}$

9. 30

10. Method I)  
 $\frac{1}{2}(5 + 35) = \boxed{20}$

Method II)

$35 - 5 = 30$

$30 \div 2 = 15$

$15 + 5 = \boxed{20}$

11. 1-round:  $2 \times (13 + 23) = 72$  (ft) = 24 (yd)

5-round:  $5 \times 24 = \boxed{120 \text{ (yd)}}$

12.  $50 \div 5 = 10$  cm (diameter)

circumference =  $10\pi = 31.4$  (cm)

five cir. =  $5 \times 31.4 = \boxed{157 \text{ (cm)}}$

13.  $n = 1, 6 + 2 = 8$

$n = 2, 8 + 2 = 10$

$n = 3, 10 + 2 = 12$

$n = 100, 6 + 200 = \boxed{206}$

14.  $85 + 92 + 96 = 273$

$273 \div 3 = 91$

15.  $93 \times 4 = 372$

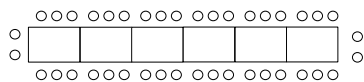
$372 - 273 = \boxed{99}$

16.  $2(2 + 3) = 10$  (people each table)

$40 \div 10 = \boxed{4 \text{ tables}}$

17.  $40 - 4 = 36$

$36 \div 6 = \boxed{6 \text{ tables}}$



18.  $40 - 6 = 34$

$34 \div 4 = 8 \text{ R } 2$

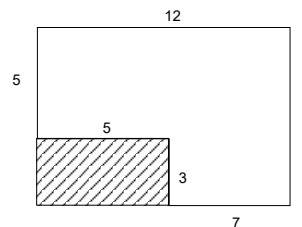
$8 + 1 = \boxed{9 \text{ tables}}$



19.  $81 - 25 = 56$

$56 \div 7 = 8$

$(12 + 8) \times 2 = \boxed{40 \text{ in}}$



20.  $50 \times 5\% = 50 \times .05 = \$2.50$

21. 0.0004

22. 36

23. 110

24. .098

25. 0.089

26.  $\frac{14}{3} = 14/3$

27.  $2^9 = 8^3$

28. -4

29.  $x = 9$

30.  $\frac{7}{10} = 7/10$

$\square = 30\frac{1}{15}$

$\square = 10\frac{5}{15}$

$+ 20\frac{9}{15}$

31.  $\frac{60\frac{15}{15}}{15} = 61$

32.  $x^{12}$

$\square = 12$

33.  $54 \times 2 = 108$

$54 \times \frac{1}{9} = 6$

$108 + 6 = 114$

34.  $6 \times 5 \div 2 = 15$  chords

35.  $60 \times 5\% = 60 \times 0.05 = 3$

$60 + 3 = \$63.00$

36.  $\frac{1}{2} \times 6 \times 8 = 24$

37.  $\Delta ABC = 30 = \frac{1}{2} \times BH \times AC = \frac{1}{2} \times BH \times 13$

$BH = \frac{60}{13} = 60/13$

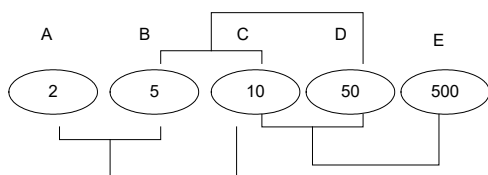
38.  $63.75 \div 5 = \$12.75$

39. 19

40. 567 (cards)

See the following figure.

# Cheetah (Fall, 2024) Issue 4



$$2+5+10+50+500 = 567$$

41. 14.4

42.  $2x - 3 = 12$

$$2x = 15$$

$$x = 7.5$$

43.  $-2(x - 3) = 4(3x + 1)$

$$-x + 3 = 2(3x + 1)$$

$$-x + 3 = 6x + 2$$

$$7x = 1$$

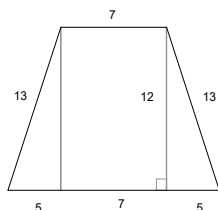
$$x = \frac{1}{7} = 1/7$$

44.  $A:B = 4:3$

$$A^2:B^2 = 16:9$$

45.  $\frac{1}{2}(7+17) \times 12 = 144$

46.  $17 + 13 + 7 + 13 = 50$



47.  $36 \text{ min} = 0.6 \text{ hr}$

$$\frac{24(\text{miles})}{0.6(\text{hour})} = 40 \text{ miles per hour}$$

48.  $x = 20$

49.  $0, -\frac{1}{5}$

$$\text{Ans} = 0 \text{ \& } -1/5$$

50. The area of the larger circle \ the area of the smaller circle

$$= 12^2\pi - 10^2\pi$$

$$= 44\pi$$

51.  $x = 60$

52.  $3.9 + 4.6 = \$8.50$

53.  $\frac{87}{96} = \frac{29}{32}$

$$160 \times \frac{29}{32} = 145$$

54. The total parts is  $2+3+5 = 10$ , thus each part account for  $180 \div 10 = 18$ . Ans =  $90^\circ$ .

55.  $1 - \frac{1}{8} = \frac{7}{8} = 7/8$

56.  $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

$$1 - \frac{1}{4} = \frac{3}{4} = 3/4$$

57. Let  $x$  be the number of calories for Breakfast meal.

Lunch meal:  $200 + x$

Dinner meal:  $3x$

Thus, we have

$$x + (x + 200) + 3x \leq 1200$$

$$5x + 200 \leq 1200$$

$$5x \leq 1000$$

$$x \leq 200$$

$$\text{Dinner: } 3x = 600$$

58. 60

59. 6

60.  $21 \div 2 = 10.5$

$$10.5 - 8.5 = 2 \text{ (width)}$$

$$2 \times 8.5 = 17 \text{ sq. ft}$$

61.  $\frac{\frac{3}{4}}{\frac{8}{5}} = \frac{3}{4} \times \frac{5}{8} = \frac{15}{32} = 2/5$

62. 64

63. 49

64. 2700

65.  $y = \frac{13}{2} = 6.5$  (in decimal)

66. D

67.  $30 \times 1.3 = \$39.00$

68. B

$$\frac{\text{distance}}{\text{time}} = \frac{2 \times 12}{s + 12} = \frac{24}{s + 12}$$

69.  $x = 6$

70. D

$$3(n + 6)(n - 3)$$

71.  $a:b:c = 15:10:6$

Let's assume

$$a = 15k, b = 10k, c = 6k.$$

$$a + c = 21k = 105$$

$$k = 5$$

$$\text{Thus, } b = 10k = 50$$

72. A

$$3y = 2x - 8$$

$$6y + 4$$

$$= 4x - 16 + 5$$

$$= 4x - 11$$

73. The other leg  $AC = 8$  by Pythagorean theorem.

Thus, the area of the triangle is  $\frac{1}{2}(6 \times 8) = 24$ . On

the other hand, the area of the triangle is also

$\frac{1}{2}(10)(AH) = 24$ . Therefore, the height  $AH = 4.8$

74.  $37.5\% \times \frac{1}{3} = 12.5\%$

$$24 \times 12.5\% = 24 \times \frac{1}{8} = 3$$

75.  $40 + 15 = 55$  hours

$$660 \div 55 = \$12 \text{ (per regular hour)}$$

$$12 \times 30 = \$360$$

76.  $24 \times 3\frac{1}{8}$

$$72 + 3 = 75$$

77. B

$$196 = 14^2$$

$$14 \div 2 = 7 \text{ (radius)}$$

$$7^2\pi = 49\pi \text{ (area of a full circle)}$$

## Cheetah (Fall, 2024) Issue 4

$$4 \frac{3}{4}\text{-circles} = 4 \times \frac{3}{4}(49\pi) = 147\pi$$

$$\text{Shaded area} = 196 + 147\pi$$

78. Since there is a 20% increase, it becomes 1.2 times

$$60 \times 1.2 = 72$$

After 5% tax

$$72 \times 1.05 = \$75.60$$

79.  $r + c = 5$

$$r - c = 2$$

$$r = 3.5$$

$$c = 1.5$$

Ans = 3.5 (rowing speed) & 1.5 (current speed)

80.  $AC = 8$

$$\frac{1}{2}(6 \times 8) = 24$$

$$\frac{1}{2}(10)(AH) = 24$$

$$AH = 4.8$$

# Answer Key

1. 0.16
2.  $1\frac{1}{2} + 2\frac{1}{3} = 3 + (\frac{1}{2} + \frac{1}{3}) = 3\frac{5}{6} = 3\frac{5}{6}$
3.  $6\frac{5}{6} = 6\frac{5}{6}$
4. 123 & 4 (R)
5. 225
6. 450 (min)
7. 12
8.  $\frac{13}{15} = 13/15$
9.  $30 \times 8 = 240$   
 $240 - 210 = \$30$
10. C  
 $36 = 6 \times 6 = 4 \times 9 = 3 \times 12 = 2 \times 18 = 1 \times 36$   
(6, 6) is not good as they must be different.  
(4, 9) is the only answer.  
Their difference is  $9 - 4 = 5$ .
11.  $Speed_{avg} = \frac{D_{tot}}{T_{tot}} = \frac{365+245}{6+4} = \boxed{61 \text{ mph}}$
12. A  
 $\frac{10}{5} = 2$   
 $2^2 = 4$  times
13. 50
14. { 25, 50, 100 }
15. Let  
 $x = \#$  daughters  
 $3x + 1 = \#$  sons  
Each daughter has  $x - 1$  sisters.  
 $3x + 1 = 5(x - 1)$   
 $2x = 6$   
 $x = 3$  (daughters)  
 $3x + 1 = 10$  (sons)  
 $10 + 3 = \boxed{13 \text{ (children)}}$
16.  $8 \text{ lb } 12 \text{ oz} + 8 \text{ oz} = \boxed{9 \text{ lb } \& 4 \text{ oz}}$
17. 14
18.  $28 \div 14 = 2$   
 $98 \div 14 = 7$   
 $196 \div 14 = 14$   
 $2 + 7 + 14 = 23$
19.  $48 \div 6 = 8$   
 $2(6 + 8) = \boxed{28 \text{ in}}$
20.  $800 \times 15\% \times 2 = \boxed{240}$
21. -0.008
22. 0.027
23.  $5^8 = (5^2)^4 = 25^4$   
 $\square = 4$
24. 0.0144
25. 4
26. 27
27. .0125
28. -42
29. -10
30.  $7\frac{1}{3}$
31. 640
32. 120
33.  $9\frac{1}{3}$
34.  $\frac{7}{15}$
35.  $400 \times 60\% = \$240$
36.  $400 - 240 = \$160$
37.  $2,000 \times 0.95 = 1,900$   
 $1,900 \times 0.05 = \$95.00$
38.  $60 \div 1.2 = 50$
39.  $\frac{1}{2}(8 + 16) \times h = 12 \times h = x^2$   
 $h = 3$   
 $x = 6$   
 $4 \times 6 = 24$
40.  $(120 - 96) \div 120 = .2 = 20\%$
41.  $2\frac{1}{4}$
42.  $9\frac{7}{48} = 9\frac{7}{48}$
43. 5
44. -.49
45.  $\frac{8}{3} \div \frac{16}{5} \div \frac{5}{3} = \frac{8}{3} \times \frac{5}{16} \times \frac{3}{5}$   
 $= 1/2$
46.  $3^6 \div 9^2 = 3^6 \div 3^4 = 3^2$   
 $\square = 2$
47.  $\frac{3}{8} = 0.375 = 37.5\%$
48.  $x + \frac{1}{4} = 2x - 4$   
 $x = 4\frac{1}{4} = 4\frac{1}{4}$
49.  $4(x - 1) + 5(x + 2) = 3(x - 8)$   
 $4x - 4 + 5x + 10 = 3x - 24$   
 $9x + 6 = 3x - 24$   
 $6x = -30$   
 $x = -5$
50.  $3x = 20 - 2$   
 $3x = 18$   
 $x = 6$
51. The area is  $5 \times 12 / 2 = 30$ . There are 4 such right triangles. The area is  $30 \times 4 = 120$ .
52. The figure is a rhombus. Each side has a length of 13. Thus, the perimeter is  $13 \times 4 = 52$ .

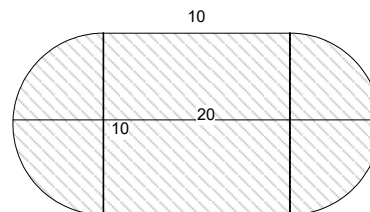


## Cheetah (Fall, 2024) Issue 5

53.  $\angle BAD + \angle ADC = 180^\circ$   
 $\frac{1}{2}(\angle BAD + \angle ADC) = 90^\circ$   
 $180 - 90 = 90$
54.  $x = 20$
55.  $60 \div 360 = \frac{1}{6}$   
 $\frac{1}{6} \times 6^2 \pi = 6\pi \text{ cm}^2$
56.  $x = 58^\circ$  (corresponding angle)  
 $y = 70^\circ$
57.  $(36 \div 2) \times 0.35$   
 $= 18 \times 0.35$   
 $= 9 \times 0.7$   
 $= \$6.30$
58.  $1000 \times \frac{1}{2} = 500$   
 $1000 \times \frac{1}{4} = 250$   
 $1000 - 500 - 250 = \$250$
59.  $720 \times \frac{3}{8} = 270$   
 $270 \times \frac{1}{6} = 45$
60.  $13 - 2x = 8$   
 $\Rightarrow 2x = 5$   
 $\Rightarrow x = 2\frac{1}{2}$
61.  $\frac{7}{5} \div \frac{21}{10} = \frac{7}{5} \times \frac{10}{21} = \frac{2}{3} = 2/3$
62. 25
63.  $2 \times (-3) \times (-4) \times \frac{1}{8} = 3$
64.  $3^{12}$
65.  $3^5$
66.  $3^{64}$
67. C
68. 26
69.  $\frac{30}{120} = \frac{1}{4} = 25\%$
70.  $180 \div 1.5 = \$120$
71. C  
 The new distance becomes 24, the new speed becomes  $s+10$ . So, the new speed =  $\frac{\text{distance}}{\text{travel time}}$   
 $= \frac{24}{s+10}$
72. C  
 $2(x+2)(x-4)$   
 $= 2x^2 - 4x - 16$
73. A
74. The intercept form is  
 $\frac{x}{-8} + \frac{y}{12} = 1$   
 X-intercept = -8 and Y-intercept = 12.  
 The area described =  $\frac{1}{2} \times 8 \times 12 = 48$
75.  $\frac{1}{16} = 1/16$
76.  $\frac{1}{2}(12)(10) = 60$
77.  $1 - 24\% - 13\% - 41\% = 22\%$
78.  $2 \times 30 = 60$   
 $60 \times 2 = 120$  miles (round-trip distance)  
 total time:  $2+3 = 5$  hours
- Average Speed  
 $= \frac{\text{total distance}}{\text{total time}}$   
 $= \frac{120}{5} = 24$  mph
79.  $66 \div 1.2 = \$55$
80. B  
 $R = \frac{1}{2}\pi$   
 $\pi R^2 = \frac{1}{4}\pi^3$

# Answer Key

1.  $0.4 = 40\%$
2. 4
3. 9
4.  $\frac{3}{2} \times \frac{4}{3} \times \frac{5}{4} \times 144 = \boxed{360}$
5.  $4 \frac{13}{24} = 4 \frac{13}{24}$
6.  $\frac{5}{7}$
7.  $A = 56$
8.  $882 \div 9 = 98$
9.  $\frac{1}{21}$
10.  $750 \div 50 = \boxed{1.5 \text{ gal per sec}}$
11.  $600 \div 1.5 = 400 \text{ sec} = \boxed{6 \text{ min } 40 \text{ sec}}$
12. Brian:  
 $\frac{1}{6} \times 300 = 30$   
 $50 + 30 = 80$
13. C  
 Alex:  $\frac{1}{6} \times 300 = 50$   
 Brian: 80  
 Calvin:  
 $300 - 50 - 80 = 170$   
 $170 \div 2 = 85$   
 $85 + 10 = \boxed{95}$
14.  $54 - 15 - 3 \times 9 = 12$   
 $\frac{1}{2} \times 12 \times 9 = 54$   
 $54 + 9^2 = \boxed{135}$
15.  $63 \text{ lb } 8 \text{ oz} - 36 \text{ lb } 9 \text{ oz}$   
 $= \boxed{26 \text{ lb \& } 15 \text{ oz}}$
16.  $10 \times 10 = 100$  (square area)  
 $\frac{1}{2}(20 \times 10) = 100$   
 $x = \boxed{10 \text{ in}}$
17. A = 1  
 B = 5  
 C = 3  
 D = 7  
 $1535 \times 5 = 7675$   
 $C + D = 3 + 7 = \boxed{10}$
18.  $3.25 \times 200 = 650$   
 $15.75 \times 6 = 94.5$   
 $650 + 94.5 = \boxed{\$744.50}$
19.  $343 \div 7 = \$49.00$
20.  $35 \times 4 = 140$   
 $140 - 50 = 90$   
 $90 \div 3 = \boxed{30 \text{ pounds}}$
21.  $0.07^2 = 0.0049$
22. 54
23.  $\frac{7}{8} = 7/8$
24.  $1 \frac{35}{36}$
25. 12.5
26. 0.008
27.  $1.1 + 1.3 - 0.4 \times 0.3 = 2.28$
28.  $(2 \times 3) \times (3 \times 4) \times (4 \times 5) = 6 \times 12 \times 20$   
 $\square = 20$
29. -7
30.  $x = -6$
31.  $(\frac{1}{2} \times \frac{2}{3} \times \frac{3}{4} \times \frac{4}{5} \times \frac{5}{6})^2 = (\frac{1}{6})^2 = \frac{1}{36} = 1/36$
32. 9
33. 5
34. 16
35.  $2,000 \times 0.8 = 1,600$   
 $1,600 \times 0.05 = \$80.00$
36.  $60 \times 20\% = 60 \times 0.2 = 12$   
 $60 - 12 = \$48.00$
37. C  
 $1 - 20\% = 0.8$   
 2<sup>nd</sup> time:  $0.8 \times 0.8 = 0.64$   
 3<sup>rd</sup> time:  $0.8 \times 0.64 = 0.512$   
 4<sup>th</sup> time:  $0.8 \times 0.512 = 0.4096$
38. 20 yd



39.  $420 \times .3 = \$126.00$
40.  $80 \times 80\% = 80 \times .8 = \$64.00$
41.  $\frac{1}{2} \times 4 = 2$   
 $\square = 29 \frac{28}{24}$
42.  $\frac{20 \frac{15}{24}}{1 \frac{13}{24}} = 1 \frac{13}{24} = 1 \frac{13}{24}$
43. 8
44.  $\frac{8}{3} \times \frac{25}{12} \times \frac{21}{10}$   
 $= \frac{2}{3} \times \frac{25}{3} \times \frac{21}{10}$   
 $= \frac{2}{3} \times \frac{25}{3} \times \frac{7}{10}$   
 $= \frac{1}{3} \times \frac{5}{3} \times \frac{7}{1}$   
 $= \frac{1}{3} \times \frac{5}{3} \times \frac{7}{1}$   
 $= \frac{35}{3} \text{ or } 11 \frac{2}{3} = 11 \frac{2}{3}$

## Cheetah (Fall, 2024) Issue 6

45. 5
46.  $0.5^3$   
 $= 0.125$   
 $= 12.5\%$
47.  $4(x - 1) + 5(x + 2) = 3(x - 8)$   
 $4x - 4 + 5x + 10 = 3x - 24$   
 $9x + 6 = 3x - 24$   
 $6x = -30$   
 $x = -5$
48.  $x = -2$
49.  $3x - 4 = 20$   
 $3x = 24$   
 $x = 8$
50. 4 possible arrangements  
**DACBE**  
**DACEB**  
**BECAD**  
**EBCAD**
51.  $BD = 25$   
 $AH \times 25 = 15 \times 20$   
 $AH = 12$
52.  $60 \times 3\frac{1}{3} = 180 + 20 = 200$
53.  $\frac{165}{60} = \frac{11}{4} = 2\frac{3}{4}$  hrs = 2 hr & 45 min
54.  $1 \times 5 = 5$   
 $5 + 2 = \$7.00$
55.  $1 - \frac{2}{3} = \frac{1}{3}$  left  
 $\frac{1}{2} \times \frac{1}{3} = \frac{1}{6} = 1/6$
56.  $\frac{1}{2}(6)(x) = 24$   
 $x = 8$
57.  $12 - 8 = 4$   
 $4 \times 8 = 32$
58. (9, 0)
59. (12, 0)
60. D  
 $r = 4$   
 $\text{area} = 16\pi$   
 $\text{shade area} = 64 - 16\pi.$
61.  $\frac{1}{10} = 1/10$
62.  $(0.2)^{-3} = (\frac{1}{5})^{-3} = 5^3 = 125$
63. -32
64.  $2\sqrt{3} \times 5 \times 2\sqrt{3} \times 7\sqrt{5} \times 7 = 4 \times 3 \times 5 \times 7 = 420$
65.  $y = 2$
66.  $420 \times 75\% = \$315$
67. 17
68. C
69. Method I)  
 $80 \times 0.8 \times 0.85 = \$54.40$
- Method II)  
 $80 \times 0.2 = 16$   
 $80 - 16 = 64$   
 $64 \times 0.15 = 9.6$   
 $64 - 9.6 = \$54.40$
70.  $48 = \square \times 75\%$   
 $48 \times \frac{4}{3} = 64$
71. C
72.  $2x + 3y = 0$   
 $\text{Ans} = 2 \text{ \& } 3$
73. C  
 $\text{Speed}_{\text{original}} = \frac{70}{\frac{1}{2}} = 28 \text{ mph}$   
 $\text{Speed}_{\text{new}} = \frac{70}{\frac{1}{2} \times \frac{3}{4}} = \frac{70}{\frac{1}{2} + \frac{1}{4}} = \frac{70}{\frac{3}{4}} = 40 \text{ mph}$   
 $40 - 28 = 12 \text{ mph faster}$
74.  $n = 1, 6 + 2 = 8$   
 $n = 2, 8 + 2 = 10$   
 $n = 3, 10 + 2 = 12$   
 $n = 100, 6 + 200 = 206$
75. D
76.  $\$950 \times 60\% = \$570$  (saving)
77. 520 is 65% of the price of the new stereo.  
 $520 \div 65\% = 800$   
 $520 \times 2 - 800 = \$240$  left
78.  $8 \times 6 = 10 \times 4.8$   
 $\text{height} = 4.8$
79. B  
 $AC^2 + BC^2 = AB^2$   
 $8^2 + 6^2 = 10^2$   
 $AB = 10$   
 $\text{radius} = 5$   
 $\text{area of the semicircle} = \frac{1}{2}(5^2\pi) = 12.5\pi$   
 $\text{The area of the shaded part}$   
 $= 12.5\pi - 24$
80. -150

# Answer Key

1. 0.034
2. 8
3.  $\frac{2}{3}$
4.  $\frac{13}{20} = 13/20$
5.  $104\frac{1}{12} = 104 \frac{1}{12}$ 

$$\begin{array}{r} \square \quad 3\frac{2}{3} \\ + \quad 100\frac{5}{12} \\ \hline 103\frac{13}{12} = 104\frac{1}{12} \end{array}$$
6.  $\frac{25}{9} = \left(\frac{5}{3}\right)^2 = \left(1\frac{2}{3}\right)^2$   
 $a = \boxed{2}$
7. 12449
8. 7  
 $1^2 = 1, 2^2 = 4, \dots, 7^2 = 49$
9.  $30 \div 2.5 = 12$  packets
10.  $3 \times 10 = 30$  (total)  
 $30 - (10 + 12) = 8$  years old (Charlie)
11. D
12.  $80 \div 4 = 20$   
 $20^2 = 400 \text{ ft}^2$   
 $10^2 \pi = 314 \text{ ft}^2$   
 $400 - 314 = \boxed{86 \text{ ft}^2}$
13.  $401 \div 5 = 80\text{R}1$   
 $R = 1$
14.  $\frac{1}{2} \times 6 \times 12 = 36$   
 $6 \times 6 = 36$   
 $x = 6$
15.  $40\% \times 20 = .4 \times 20 = 8$
16.  $720 \div 12 = 60$   
 $60 + 50 + 50 = \boxed{160}$
17. C  
 Nancy: 46 sec  
 $\boxed{\text{Jennifer: 45 sec}}$   
 Alex: 50 sec  
 Joy: 45.8 sec
18.  $24 \div 3 = 8$  rows  
 $15 \div 3 = 5$  columns  
 $8 \times 5 = \boxed{40}$  (plates)
19.  $14 \div 3\frac{1}{2} = \boxed{4}$
20.  $12 \div \frac{1}{3} = \boxed{36}$
21. -0.027
22. 1
23.  $\frac{4}{3} = 1 \frac{1}{3}$
24. .007
25. 0.00032
26.  $25/36$
27. 132
28.  $3.14 \times .03 = .0942$
29.  $2(x - 1) + 3(x + 1) = 6$   
 $5x + 1 = 6$   
 $x = 1$
30.  $(1+\frac{1}{2})(1+\frac{1}{3})(1+\frac{1}{4})(1+\frac{1}{5})(1+\frac{1}{6}) = \frac{3}{2} \times \frac{4}{3} \times \frac{5}{4} \times \frac{6}{5} \times \frac{7}{6} = \frac{7}{2}$   
 $7/2$
31. 8
32. 0.0025
33. 12
34.  $7\frac{7}{10} = 7 \frac{7}{10}$
35.  $80 \times 70\% = 80 \times 0.7 = \$56$
36.  $25^2 = 20^2 + 15^2$   
 Ans = 20
37.  $\frac{1}{2}(12) = 6$  in
38.  $20 \times 1.5 = 30$   
 $12 \times 30 = \$360$
39.  $22 \times 14 \times 12 / 231 = 16$   
 Note  $231 = 11 \times 21$
40.  $273 \div 3 = 91$   
 $91 \div 7 = 13$   
 $273 = 3 \times 7 \times 13$   
 Ans = { 3, 7, 13 }
41.  $1/8$
42. 4
43. 0.09
44.  $2^{12} = 4^6$   
 $8^2 = 4^3$   
 $6 - 3 = 3$
45.  $4^2 \times 2^3 = 2^4 \times 2^3 = 2^7$   
 Ans = 7
46. -49
47.  $100 - 4(2.5)^2 \pi = 100 - 25\pi$
48.  $\frac{1}{2}(3 \times 4) = 6$
49.  $49 - 4 \times 6 = 25$
50. The unit price is  $\frac{19}{3}$  per apple. Thus, the number of apples you can purchase with  $\$1.52 = 152\text{c}$  is  
 $\frac{152}{\frac{19}{3}} = \frac{152 \times 3}{19} = 24$  apples.
51.  $6 \div 0.03 = 200$
52.  $100 - 3(x - y) = 100 - 3 \times 7 = 100 - 21 = 79$

## Cheetah (Fall, 2024) Issue 7

53.  $20\%:80\% = 1:4$   
 $100 \times \frac{1}{4} = \$25$

54.  $390 \div 6.5 = 60$  mph

55.  $390 \div 65 = 6$  (hours)

56. 3:4

57.  $3,800 \div 20 = 190$  sec

58.  $12 \times 3 = 36$

$10 \times 2 = 20$

$36 - 20 = 16$

59.  $80 \div 2 = 40$

$40 \div 4 = 10$  (width)

$40 - 10 = 30$  (length)

$10 \times 30 = 300$  cm<sup>2</sup>

60. Let  $x$  = the number students enrolled last year. So, we have

$1.2x = 660$

$x = 550$

61.  $1/10$

62.  $35\% \times 30\% \times 80$   
 $= 35\% \times 40 \times 2 \times 30\%$   
 $= 14 \times 60\%$   
 $= 8.4$

63.  $1\frac{1}{5} = 1\frac{1}{5}$

64.  $(x - 3.6)^2 = 6^2$

$x = 3.6 \pm 6 = -2.4 \text{ \& } 9.6$

65.  $25^3 = (5^2)^3 = (5^3)^2 = 125^2$   
 $\square = 2$

66. D

$9(x-4)(x-6)$

67. A : B = 9 : 12

B : C = 12 : 14

A : C = 9 : 14

68. A

$10/30 = \frac{1}{3} < 15/40 = \frac{3}{8}$

69.  $3 \times 3 + 2 = 11$

$11 \div 7 = 1R4$

R = 4

70.  $1 - 25\% = 75\% = \frac{3}{4}$

$39 \div \frac{3}{4} = \$52$

71. Ans = 12 (x-int) & 9 (y-int)

72. Area =  $\frac{1}{2} \times 9 \times 12 = 54$

73.  $3 \times 8^4 = 25$

$25 \times 8\frac{1}{3} = 208\frac{1}{3}$  sq ft = 209 sq ft

74. Let  $x = AD$ .

Since  $\triangle ADB \approx \triangle CDA$ ,

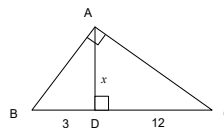
$\frac{AD}{BD} = \frac{CD}{AD}$ ,

$\frac{x}{3} = \frac{12}{x}$ ,

$x^2 = 36$ ,

$x = 6$

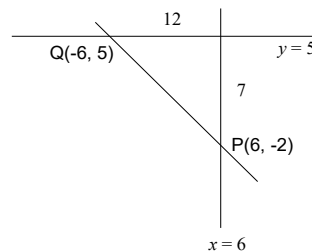
area( $\triangle ABC$ ) =  $\frac{1}{2}(15 \times 6) = 45$



75. 50

76. B

77.  $\frac{1}{2}(7 \times 12) = 42$



78.  $y = \frac{7}{12}x + b$

$-2 = -3.5 + b$

$b = 1.5$

$y = \frac{7}{12}x + 1.5$

$y = \frac{7}{12} \times 12 + 1.5 = -5.5$

$8.5 = \frac{7}{12} \times (-12) + 1.5$

$\frac{1}{2}(24)(14) = 168$

79.  $a = 10, b = 6$

$a + b = 16$

80.  $180 \div (3 + 4 + 5) = 15$

the largest measure is  $5 \times 15 = 75$

the least measure is  $3 \times 15 = 45$

the difference is  $75 - 45 = 30$

# Answer Key

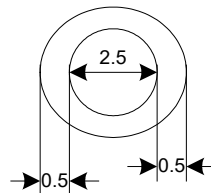
- 0.5
- 3
- $1 \frac{3}{10}$
- 36
- $\frac{7}{5} \div \frac{49}{15} = \frac{7}{5} \times \frac{15}{49} = \frac{3}{7} = 3/7$
- $\frac{23}{30} = 23/30$
- $\frac{3}{7} = \frac{9}{21}$   
A =  $\boxed{21}$
- 12350
- 8 (in)
- $13 \times 3 = 39$   
 $10 \times 2 = 20$   
 $39 - 20 = \boxed{19}$
- the area of A =  $464 - 20^2 = 64 = 8^2$   
the perimeter of A =  $4 \times 8 = 32$  in
- 24
- A
- $1 = 1$   
 $3 = 1+2$   
 $6 = 1+2+3$   
 $10 = 1+2+3+4$   
 $1 + 3 + 6 + 10 = 20$
- $0.24 \times 1.5 \times 0.5$   
 $= 0.24 \times 0.75$   
 $= 0.06 \times (4 \times 0.75)$   
 $= \boxed{0.18}$
- $30 + 5^2 = \boxed{55}$

	increment from the previous night	#nickels
1 <sup>st</sup> night	$1 = 1^2$ $\rightarrow$ + $\rightarrow$	1
2 <sup>nd</sup> night	$4 = 2^2$ $\rightarrow$ $\rightarrow$	5
3 <sup>rd</sup> night	$9 = 3^2$	14
4 <sup>th</sup> night	$16 = 4^2$	30
5 <sup>th</sup> night	$25 = 5^2$	55

- 385  
See the following table.

	increment from the previous night	#nickels
1 <sup>st</sup> night	$1 = 1^2$ $\rightarrow$ + $\rightarrow$	1
2 <sup>nd</sup> night	$4 = 2^2$ $\rightarrow$ $\rightarrow$	5
3 <sup>rd</sup> night	$9 = 3^2$	14
4 <sup>th</sup> night	$16 = 4^2$	30
5 <sup>th</sup> night	$25 = 5^2$	55
6 <sup>th</sup> night	$36 = 6^2$	91
7 <sup>th</sup> night	$49 = 7^2$	140
8 <sup>th</sup> night	$64 = 8^2$	204
9 <sup>th</sup> night	$81 = 9^2$	285
10 <sup>th</sup> night	$100 = 10^2$	385

- B  
 $2.94 \div 10 = 0.294$  (per ounce)  
 $1.56 \div 6 = 0.26$  (per ounce)  
6-oz cheaper
- $0.75 \times 2 = 1.5$   
 $1.5 - 1.25 = \$0.25$
- $(4 \div 2) \times 1.39 = 2.78$   
 $4 \times 0.9 = 3.6$   
 $3.6 - 2.78 = \$0.82$
- $\frac{4}{9} = 4/9$
- 1
- $\frac{4}{5} = 4/5$
- .001
- 0.027
- $(2-1) + (4-3) + (6-5) + (8-7) + (10-9) = 5$
- $2.1^2 = 4.41$
- $314 \times 5 = 1570$   
 $3.14 \times 0.05$   
four decimal places altogether  
 $= 0.1570 = 0.157$
- $x = 4$
- $\frac{1}{7} + \frac{1}{3} = \frac{49}{30} = \frac{1}{7} + \frac{10}{49} = \frac{17}{49} = 17/49$
- $2^{10} \div 2^3 = 2^7$   
 $\square = 7$
- 0.000125
- 112
- $2 \frac{5}{12} = 2 \frac{5}{12}$
- $2.5 + 2 \times 0.5 = 3.5$  in



- $90 - 72 = 18$   
 $18 \div 90 = .2 = 20\%$
- $60^\circ$
- $64 = 8 \times 8$   
 $8 \times 4 = 32$  in
- $3 \times 4.5 = 13.5$  (cm<sup>2</sup>)
- $\frac{1}{2}(12 \times 5) = 30$
- $\frac{1}{4} = 1/4$

## Cheetah (Fall, 2024) Issue 8

42.  $5x - 2 = 4x + 6$   
 $x = 8$
43. C
44.  $80\% \times 15 = 12$   
 $5 + 15 = 20$   
 $20 \times 0.75 = 15$   
 $15 - 12 = 3$  games
45.  $\angle CBA = 80^\circ, x = \frac{1}{2}(80) = 40$
46.  $5\frac{1}{4} \times 24 = 126$  (miles)
47. A  
 $r = 5$   
area =  $25\pi$   
shade area =  $100 - 25\pi$ .
48. Group them every 3 numbers. The sums of these groups are  
0, 3, 6, ..., 96  
 $97 + 98 - 97 = 96$
49. D  
The radius of a small circle is 2, so each circle has an area of  $4\pi$ , therefore, four circles have a combined area of  $16\pi$ . (Amazingly, the area is the same as the previous problem.) The area of the shaded region is  $64 - 16\pi$ .
50.  $120 + 110 + 108 + 112 = 450$   
The total commission he was to receive for 5 weeks:  
 $125 \times 5 = 625$   
So, he must receive  
 $625 - 450 = \$175$  for the 5<sup>th</sup> week commission.
51.  $0.72 \div 4 = 0.18$   
 $7 \times 0.18 = \$1.26$
52.  $10 \div 5 = 2$   
 $2^2 = 4$   
 $2.5 \times 4 = \$10$
53.  $2 \times 6 - 3 \times 7 = -9$
54.  $100 \times 8\% \times 2 = 16$  ounce
55.  $12 \times 4 = 48$
56.  $12 \div 4 = 3$
57.  $17 + 89 - 4 = 102$   
 $1530 \div 102 = 15$  mpg
58.  $75 \times 3 = 225$   
 $225 - 85 = 140$   
 $140 \div 2 = 70$
59.  $0.2 \div 4 = 0.05$   
 $0.05^2 = 0.0025$  in<sup>2</sup>
60. Alex:  $\frac{1}{2} \times 18 = 9$   
Brian:  $\frac{1}{3} \times 18 = 6$   
Charlie:  $\frac{1}{6} \times 18 = 3$   
 $9 + 6 + 3 = 18$  (great match)  
 $9 - 2 = 7$
61.  $13 + 64 - 10 = 67$
62.  $5\% \times 12.5 = 0.05 \times 12.5 = 0.625$
63.  $3^{12} \div 3^6 = 3^6$   
 $\square = 6$
64. B  
 $-108a^{14}b^{11}$
65.  $(x - 2)(2x + 1)$   
 $x = -0.5$  &  $2$
66. LCM(21, 9) = 63  
 $63 \times 2 + 7 = 126 + 7 = 133$
67.  $\sqrt{12^2 + 9^2} = 3\sqrt{4^2 + 3^2} = 15$
68.  $12 \times 9 = \square \times 15$   
 $\square = \frac{36}{5} = 7.2$
69. C  
Between which two consecutive positive integers is  $\sqrt{16^2 + 17^2}$ ?  
 $16^2 = 256$   
 $17^2 = 289$   
 $16^2 + 17^2 = 545$   
 $22^2 = 484$   
 $23^2 = 529$   
 $24^2 = 576$
70. From page 0 to 9, 10 single-digit pages. From page 10 to 99, there are 90 double-digit pages.  
 $10 + 90 \times 2 = 190$
71.  $(30 - 24) \div 30 = \frac{1}{5} = 1/5$
72.  $90 \times 90\% \times 90\% = 90 \times 0.9 \times 0.9 = \$72.90$
73. Let  $x$  be the original price, then we have  
 $0.7x = 35$   
 $x = 35 \div 0.7 = \$50$
74. The height is 3.  
area =  $(6+10) \times 3/2 = 24$   
perimeter =  $5+6+3+10 = 24$   
Ans = 24 (area) & 24 (perimeter)
75.  $x^2 - 6x + 12$   
 $= (x - 3)^2 + 3$   
 $a = -3$  and  $b = 3$   
 $a + b = 0$
76. 1 hour = 60 min  
 $60 \times 10 = 600$  times  
 $600 \times 20 = 12,000$  ft
77. 4
78.  $R = 2^3 \cdot 3^3 \cdot 7$   
 $S = 2^3 \cdot 3 \cdot 7^2$   
GCF(R, S) =  $2^3 \cdot 3 \cdot 7$   
Ans = 3 & 1 & 1
79. LCM(R, S) =  $2^3 \cdot 3^3 \cdot 7^2$   
Ans = 3 & 3 & 2
80. slope =  $8/-12 = 2/-3$   
 $y = -\frac{2}{3}x + b, b = 2$   
 $\frac{x}{3} + \frac{y}{2} = 1$   
two intercepts : 3 and 2  
area of the triangle :  $\frac{1}{2}(3)(2) = 3$