**Ratio and Proportions**

**April 2017**

1. Marcus’s favorite casserole recipe requires 3 eggs and makes 6 servings. Marcus will modify the recipe by using 5 eggs and increasing all other ingredients in the recipe proportionally. What is the total number of servings the modified recipe will make?

a. 6

b. 8

c. 10

d. 12

e. 15

**June 2017**

15. The ratio of Jane’s age to her daughter’s age is 9:2. The sum of their ages is 44. How old is Jane?

A. 22

B. 33

C. 35

D. 36

E. 40

17. What value of x makes the proportion below true?

(10/10+x) = (35/42)

A. 2

B. 7

C. 12

D. 17

E. 32

34. A school admissions office accepts 2 out of every 7 applicants. Given that the school accepted 630 students, how many applicants were NOT accepted?

F. 140

G. 180

H. 490

J. 1260

K. 1575

36. Jie asked 90 students to choose 1 favorite fruit from 4 options. Jie has begun to represent the results in the circle graph below. Peaches were chosen as the favorite of 15 students. Apples, bananas, and strawberries were each chosen as favorites by an equal number of the remaining students. What must be the measure of the central angle in the circle graph for bananas? [**PICTURE]**

F. 100º

G. 102º

H. 105º

J. 112.5º

K. 115º

The Harrisburg Recreation Center recently changed its hours to open 1 hour later and close 3 hours later than it had previously. Residents of Harrisburg age 16 or older were given a survey, and 560 residents replied. The survey asked each resident his or her student status (high school, college, or nonstudent) and what he or she thought about the change in hours (approve, disapprove, or no opinion). The results are summarized in the table below.

|  |  |  |  |
| --- | --- | --- | --- |
| Student Status | Approve | Disapprove | No Opinion |
| High School  College Nonstudent | 30  14  85 | 4  10  353 | 11  6  47 |
| Total | 129 | 367 | 64 |

38. What fraction of these nonstudent residents replied that they disapproved of the change in hours?

F. 1/3

G. 4/45

H. 14/75

J. 353/367

K. 353/485

**April 2016**

20. Carpenters use the term *pitch* to describe the slope of a roof. For example, a roof with a pitch of ¼ means the roof has 1 foot of vertical rise for every 4 feet of horizontal distance. The figure below shows a 13-foot-long roof with 5 feet of vertical rise and x feet of horizontal distance. What is the pitch of this roof? **[PICTURE]**

F. 1/6

G. 5/8

H. 5/12

J. 5/14

K. 5/18

44. A box contains a combination of solid-colored tickets: 1/10 of the tickets are green, ½ are red, ¼ are blue, and the remaining 30 tickets are white. How many blue tickets are in the box?

F. 10

G. 20

H. 50

J. 100

K. 200

48. The points graphed in the standard (x,y) coordinate plane below show the positions of 5 stars in a plane relative to a point represented by the origin, where each coordinate unit equals 1 light-year. A *light-year* is the distance that light travels in 1 year, and 1 light-year = 5.9\*1012 miles. The distance from Star A to Star D is approximately 11.4 light-years. Star A has a mass of 3 solar masses; and Stars B, C, D, and E each have a mass of 1 solar mass. **[PICTURE]**

Which of the following values is the closest to the number of miles between Stars A and D?

F. 2.0\*1010

G. 5.2\*1011

H. 1.9\*1012

J. 6.7\*1013

K. 8.6\*1021

**June 2016**

9. The combined length of 3 pieces of a board is 60 inches. The lengths of the pieces are in the ratio 3:5:7. What is the length, in inches, of the longest piece?

A. 4

B. 12

C. 15

D. 20

E. 28

A family plans to remodel their kitchen. They have a total budget of $45,000 to cover expenses in 6 categories. Not all the budget has been assigned. The budget amounts the have been assigned are shown in the table below.

|  |  |
| --- | --- |
| Expense Category | Budget Amount |
| Appliances  Cabinets  Flooring  Lighting  Labor  Other | $4,000  $9,000  $5,000  $3,000  ?  ? |
| Total Budget | $45,000 |

18. In a circle graph illustrating the 6 budget amounts in the table, what should be the measure of the central angle of the Flooring sector?

F. 24º

G. 32º

H. 40º

J. 45º

K. 72º

20. Suppose a bar graph will be constructed illustrating the amounts of the assigned expenses. The length of the bar for Lighting should be what fraction of the length of the bar for Cabinets?

F. 1/15

G. 1/5

H. 1/3

J. 3/5

K. ¾

**December 2016**

7. On a map, ½ inch represents 10 actual miles. Two towns that are 4 ½ inches apart on this map are how many actual miles apart?

A. 10

B. 20

C. 22

D. 45

E. 90

9. Property valued at $56,000 is assessed at ¾ of its value. If the yearly tax is calculated as $3 per $100 of assessed value, what is the yearly tax on this property?

A. $420

B. $1,120

C. $1,260

D. $1,680

E. $2,240

20. A survey about 3 issues affecting Bluff City Park was given to 60 residents. The results of the survey are shown below.

|  |  |  |
| --- | --- | --- |
| Issue | Yes | No |
| Curfew  Skateboard Use  Children under 14 accompanied by a person at least 14 years old | 48  26  38 | 12  34  22 |

Assume that the results in the table accurately predict the response ratios for the town’s 1,200 residents. How many of the 1,200 residents would respond No on the curfew issue?

F. 240

G. 300

H. 600

J. 680

K. 960

**April 2015**

9. In △ABC below, D is on AB (line on top), E is on AC (line on top), and ED (line on top) ⃦CB (line on top). If it can be determined, what is the ratio of the area of △ABC to the area of △ADE? **[PICTURE]**

A. 2:1

B. 3:1

C. 4:1

D. 4:3

E. Cannot be determined form the given information

15. In the figure below, the border of a pool and the border of a patio surrounding the pool are similar rectangles. The given dimensions are in feet. What is the length of the pool, in feet? **[PICTURE]**

A. 30

B. 40

C. 42

D. 48

E. 52

17. A certain computer performs 1.5\*108 calculations per second. How many seconds would it take this computer to perform 6.0\*1016 calculations?

A. 2.5\*10-9

B. 9.0\*100

C. 4.0\*102

D. 4.0\*108

E. 9.0\*1024

**June 2015**

#31. The perimeter of rectangle ABCD is 96cm. The ratio of the side lengths AB:BC is 3:5. What is the length, in centimeters, of (line)AB?

1. 6
2. 18
3. 30
4. 36
5. 60

46. Diana is baking bread, and the original recipe calls for 1 ½ teaspoons of yeast and 2 ½ cups of flour. Diana will use the entire contents of a packet that contains 2 ¼ teaspoons of yeast and will use the same ratio of ingredients called for in the original recipe. How many cups of flour will Diana use?

F. 1 7/8

G. 3 ¼

H. 3 ½

J. 3 ¾

K. 4

**December 2015**

1. A cookie recipe that yields 24 cookies requires 1¾ cups of butter. When the ingredients in this recipe are increased proportionally, how many cups of butter are required for the recipe to yield 72 cookies?

A. 2 5/8

B. 3

C. 3 ½

D. 5 ¼

E. 10 ½