

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

*A. LABEL RATIO*  
 $E : S = 3 : 6$   
 $5 : x$   
 $3x = 30$   
 $x = 10$

2. The 35-member History Club is meeting to choose a student government representative. The members decide that the representative, who will be chosen at random, CANNOT be any of the 3 officers of the club. What is the probability that Hiroko, who is a member of the club but NOT an officer, will be chosen?

F. 0  
 G.  $\frac{4}{35}$   
 H.  $\frac{1}{35}$   
 J.  $\frac{1}{3}$   
 K.  $\frac{1}{32}$

*A. LABEL*  
 $\frac{H}{TOT ELIGIBLE} = \frac{1}{35-3} = \frac{1}{32}$

3. For what value of  $x$  is the equation  $2^{2x+7} = 2^{15}$  true?

A. 2  
 B. 4  
 C. 11  
 D. 16  
 E. 44

*A. EXPONENT RULES*  
 $2x+7=15$   
 $2x=8$   
 $x=4$

4. Let the function  $f$  be defined as  $f(x) = 5x^2 - 7(4x + 3)$ . What is the value of  $f(3)$ ?

F. -18  
 G. -26  
 H. -33  
 J. -60  
 K. -75

*A. PLUG IN*  
 $x=3$   
 $5(3)^2 - 7(4(3) + 3)$   
 $(5 \times 9) - 7(12 + 3)$   
 $45 - 105$   
 $-60$

5. A wallet containing 5 five-dollar bills, 7 ten-dollar bills, and 8 twenty-dollar bills is found and returned to its owner. The wallet's owner will reward the finder with 1 bill drawn randomly from the wallet. What is the probability that the bill drawn will be a twenty-dollar bill?

A.  $\frac{1}{20}$   
 B.  $\frac{4}{51}$   
 C.  $\frac{1}{8}$   
 D.  $\frac{2}{5}$   
 E.  $\frac{2}{3}$

*A. LABEL*  
 $F : T : TW = TOT$   
 $5 : 7 : 8 = 20$   
*B. FIGURE TW:TOT*  
 $8 : 20 = \frac{8}{20} = \frac{2}{5}$

6. The ABC Book Club charges a \$40 monthly fee, plus \$2 per book read in that month. The Easy Book Club charges a \$35 monthly fee, plus \$3 per book read in that month. For each club, how many books must be read in 1 month for the total charges from each club to be equal?

F. 1  
 G. 4  
 H. 5  
 J. 6  
 K. 75

*A. ENGLISH TO MATH*  
 $40 + 2b = 35 + 3b$   
 $5 = b$   
*B. SOLVE FOR B*

7. In parallelogram ABCD below, AC is a diagonal, the measure of  $\angle ABC$  is  $40^\circ$ , and the measure of  $\angle ACD$  is  $57^\circ$ . What is the measure of  $\angle CAD$ ?

*A. PARALLELOGRAM RULES*  
 $180 - 57 - 40 = 83$   
*B. TRIANGLE RULES*

- A.  $40^\circ$   
 B.  $57^\circ$   
 C.  $77^\circ$   
 D.  $83^\circ$   
 E.  $97^\circ$

8. When  $x = \frac{1}{2}$ , what is the value of  $\frac{8x-3}{x}$ ?

F.  $\frac{1}{2}$   
 G. 2  
 H.  $\frac{5}{2}$   
 J. 5  
 K. 10

*A. PLUG IN*  
 $x = .5$   
 $\frac{8(.5) - 3}{.5} = \frac{4 - 3}{.5} = \frac{1}{.5} = 2$

9. In the standard  $(x,y)$  coordinate plane, what is the midpoint of the line segment that has endpoints  $(3,8)$  and  $(1,-4)$ ?

A.  $(-2, -12)$   
 B.  $(-1, -6)$   
 C.  $(\frac{11}{2}, -\frac{3}{2})$   
 D.  $(2, 2)$   
 E.  $(4, -12)$

*A. DRAW IT*  
*B. MARK APPROX MIDPOINT*  
*C. P.O.E.*

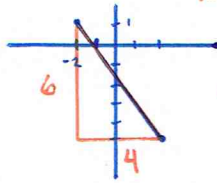
10. The fluctuation of water depth at a pier is shown in the figure below. One of the following values gives the positive difference, in feet, between the greatest water depth and the least water depth shown in this graph. Which value is it?

*A. MARK IT*  
*B. SUBTRACT*  
 $12 - 6 = 6$

- F. 3  
 G. 6  
 H. 9  
 J. 12  
 K. 19

11. What is the slope of the line through  $(-2,1)$  and  $(2,-5)$  in the standard  $(x,y)$  coordinate plane?

- A.  $\frac{3}{2}$   
 B. 1  
 C. -1  
 D.  $-\frac{3}{2}$   
 E. -4



A. DRAW IT & P.O.E.  
 B. TRIANGULATE IT  
 C. RISE =  $\frac{y}{x} = \frac{-6}{4} = -\frac{3}{2}$

12. In Cherokee County, the fine for speeding is \$17 for each mile per hour the driver is traveling over the posted speed limit. In Cherokee County, Kirk was fined \$221 for speeding on a road with a posted speed limit of 30 mph. Kirk was fined for traveling at what speed, in miles per hour?

- F. 13  
 G. 17  
 H. 43  
 J. 47  
 K. 60

A. FIGURE HOW MANY MPH OVER  
 $221 \div 17 = 13$   
 $+ 30 = 43$   
 B. ADD 30mph

13. What is the sum of the solutions of the 2 equations below?

- A.  $2\frac{5}{8}$   
 B.  $7\frac{1}{2}$   
 C. 9  
 D. 10  
 E.  $17\frac{1}{2}$

$8x = 12$   
 $2y + 10 = 22$   
 A. SOLVE FOR X  
 $x = \frac{12}{8} = 1.5$   
 B. SOLVE FOR Y  
 $2y + 10 = 22$   
 $2y = 12$   
 $y = 6$   
 C. ADD X+Y  
 $x+y = 1.5+6 = 7.5$

14. The average of 5 distinct scores has the same value as the median of the 5 scores. The sum of the 5 scores is 420. What is the sum of the 4 scores that are NOT the median?

- F. 315  
 G. 320  
 H. 336  
 J. 350  
 K. 360

A. FIGURE AVG  
 $420 \div 5 = 84$   
 B. SUBTRACT  
 $420 - 84 = 336$   
 C. MED  
 82, 83, 84, 85, 86

15. What is the value of the expression below?

- A. -18  
 B. -2  
 C. 0  
 D. 2  
 E. 18

$|-8+4| - |3-9|$   
 $|1-4| - |-6|$   
 $4 - 6$   
 $-2$   
 A. CAREFULLY SOLVE & P.O.E.

16. Which of the following expressions is equivalent to  $x^{\frac{2}{3}}$ ?

- F.  $\frac{x^2}{3}$   
 G.  $\frac{x(2)}{3}$   
 H.  $\sqrt{x^2}$   
 J.  $\sqrt[3]{x}$   
 K.  $\sqrt{x^2}$

A. REMEMBER RULES  
 $x^{\frac{2}{3}} = \sqrt[3]{x^2}$   
 $4^{\frac{1}{2}} = \sqrt[2]{4^1}$   
 $4^{-\frac{1}{2}} = \frac{1}{\sqrt[2]{4^1}}$

17. In the standard  $(x,y)$  coordinate plane, what is the slope of the line given by the equation  $4x = 7y + 5$ ?

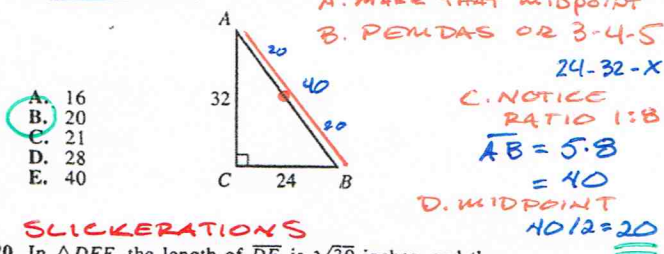
- A.  $-\frac{4}{7}$   
 B.  $\frac{4}{7}$   
 C.  $\frac{7}{4}$   
 D. 4  
 E. 7

A. SOLVE FOR Y  
 $4x - 5 = 7y$   
 $\frac{4x-5}{7} = y$

18. For which of the following conditions will the sum of integers  $m$  and  $n$  always be an odd integer?

- F.  $m$  is an odd integer.  $3+2=5$  YES BUT  $3+3=6$  NOPE  
 G.  $n$  is an odd integer.  $3+2=5$  YES BUT  $3+3=6$  NOPE  
 H.  $m$  and  $n$  are both odd integers.  $3+3=6$  NOPE  
 J.  $m$  and  $n$  are both even integers.  $2+2=4$  NOPE  
 K.  $m$  is an odd integer and  $n$  is an even integer.  $3+2=5$  YUP  $7+2=9$  YUP

19. The lengths of the 2 legs of right triangle  $\triangle ABC$  shown below are given in inches. The midpoint of  $\overline{AB}$  is how many inches from A?

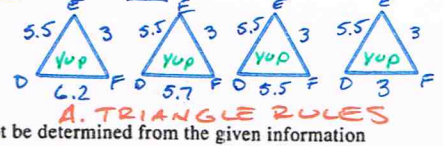


- A. 16  
 B. 20  
 C. 21  
 D. 28  
 E. 40

SLICKERATIONS

20. In  $\triangle DEF$ , the length of  $\overline{DE}$  is  $\sqrt{30}$  inches, and the length of  $\overline{EF}$  is 3 inches. If it can be determined, what is the length, in inches, of  $\overline{DF}$ ?

- F. 3  
 G.  $\sqrt{30}$   
 H.  $\sqrt{33}$   
 J.  $\sqrt{39}$   
 K. Cannot be determined from the given information



21. Laura plans to paint the 8-foot-high rectangular walls of her room, and before she buys paint she needs to know the area of the wall surface to be painted. Two walls are 10 feet wide, and the other 2 walls are 15 feet wide. The combined area of the 1 window and the 1 door in her room is 60 square feet. What is the area, in square feet, of the wall surface Laura plans to paint?

- A. 200  
 B. 340  
 C. 360  
 D. 390  
 E. 400

A. ADD UP AREAS  
 $8 \times 10 = 80$   
 $8 \times 10 = 80$   
 $8 \times 15 = 120$   
 $8 \times 15 = 120$   
 $400 - 60 = 340$   
 B. SUBTRACT WINDOW & DOOR

22. The length of a rectangle is 5 inches longer than the width. The perimeter of the rectangle is 40 inches. What is the width of the rectangle, in inches?

- F. 7.5  
 G. 8  
 H. 15  
 J. 16  
 K. 17.5

A. DRAW IT SOLVE IT  
 $P = 40 = 4W + 10$   
 $30 = 4W$   
 $7.5 = \frac{30}{4} = W$   
 SIDE NOTE  
 $L = W + 5$   
 $12.5 = 7.5 + 5$

23. 8% of 60 is  $\frac{1}{5}$  of what number?

- A. 0.96  
 B. 12  
 C. 24  
 D. 240  
 E. 3,750

A. ENOUGH TO MATH  
 $.08(60) = \frac{1}{5}x$   
 $4.8 = \frac{1}{5}x$   
 $24.0 = x$   
 B. SOLVE FOR X  
 C. MULT. BOTH SIDES BY 5

24. Armin is trying to decide whether to buy a season pass to his college basketball team's 20 home games this season. The cost of an individual ticket is \$14, and the cost of a season pass is \$175. The season pass will admit Armin to any home basketball game at no additional cost. What is the minimum number of home basketball games Armin must attend this season in order for the cost of a season pass to be less than the total cost of buying an individual ticket for each game he attends?

- F. 8  
 G. 9  
 H. 12  
 J. 13  
 K. 20

A. ENGLISH TO MATH  
 $175 \leq 14x$   
 $12.5 \leq x$