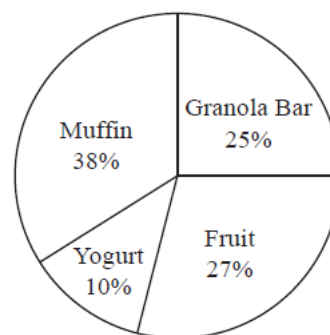


DNL 3^e – Team Challenge

Part A : Each correct answer is worth 5 points.

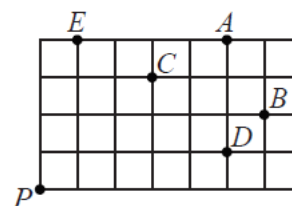
- The expression $2 \times 0 + 1 - 9$ equals
 (A) -8 (B) -6 (C) -7 (D) -11 (E) 0
- Kai will celebrate his 25th birthday in March 2020. In what year was Kai born?
 (A) 1975 (B) 1990 (C) 1995 (D) 2000 (E) 1955

- Yesterday, each student at Cayley S.S. was given a snack. Each student received either a muffin, yogurt, fruit, or a granola bar. No student received more than one of these snacks. The percentages of the students who received each snack are shown in the circle graph. What percentage of students *did not* receive a muffin?



- What percentage of students *did not* receive a muffin?
 (A) 27% (B) 38% (C) 52%
 (D) 62% (E) 78%
- The expression $(2 \times \frac{1}{3}) \times (3 \times \frac{1}{2})$ equals
 (A) $\frac{1}{6}$ (B) $\frac{1}{5}$ (C) 1 (D) 5 (E) 6
- If $10d + 8 = 528$, then $2d$ is equal to
 (A) 104 (B) 76 (C) 96 (D) 41 (E) 520
- The line with equation $y = x + 4$ is translated down 6 units. The y -intercept of the resulting line is
 (A) 6 (B) 4 (C) 10 (D) -6 (E) -2
- The three numbers 2, x , and 10 have an average of x . What is the value of x ?
 (A) 5 (B) 4 (C) 7 (D) 8 (E) 6

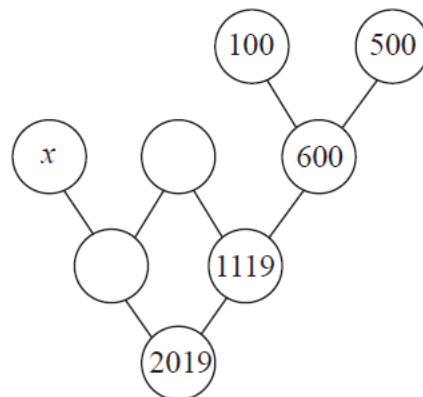
- Alain travels on the 4×7 grid shown from point P to one of the points A , B , C , D , or E . Alain can travel only right or up, and only along gridlines. To which point should Alain travel in order to travel the shortest distance?



- To which point should Alain travel in order to travel the shortest distance?
 (A) A (B) B (C) C
 (D) D (E) E
- If $(pq)(qr)(rp) = 16$, then a possible value for pqr is
 (A) 0 (B) 2 (C) 4 (D) 8 (E) 16
- Matilda and Ellie divide a white wall in their bedroom in half, each taking half of the wall. Matilda paints half of her section red. Ellie paints one third of her section red. The fraction of the entire wall that is painted red is
 (A) $\frac{5}{12}$ (B) $\frac{2}{5}$ (C) $\frac{2}{3}$ (D) $\frac{1}{6}$ (E) $\frac{1}{2}$

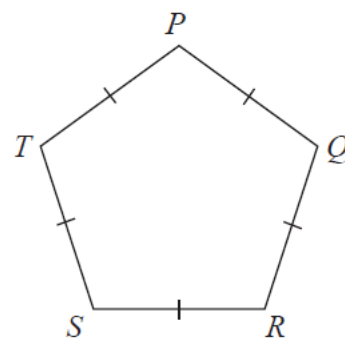
Part B: Each correct answer is worth 6.

11. In the diagram, numbers are to be placed in the circles so that each circle that is connected to two circles above it will contain the sum of the numbers contained in the two circles above it. What is the value of x ?



- (A) 481 (B) 381 (C) 281
(D) 581 (E) 681

12. In a regular pentagon, the measure of each interior angle is 108° . If $PQRST$ is a regular pentagon, then the measure of $\angle PRS$ is



- (A) 72° (B) 54° (C) 60°
(D) 45° (E) 80°

13. In the addition problem shown, m , n , p , and q represent positive digits. When the problem is completed correctly, the value of $m + n + p + q$ is

$$\begin{array}{r} n63 \\ 7p2 \\ + 58q \\ \hline m042 \end{array}$$

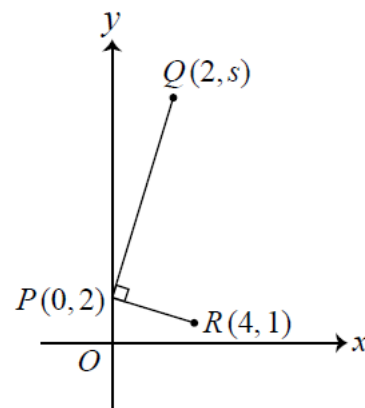
- (A) 23 (B) 24 (C) 21
(D) 22 (E) 20

14. The letters A, B, C, D, and E are to be placed in the grid so that each of these letters appears exactly once in each row and exactly once in each column. Which letter will go in the square marked with *?

A				E
		C	A	
E		B	C	
	*			
B			D	

- (A) A (B) B (C) C
(D) D (E) E

15. In the diagram, the line segments PQ and PR are perpendicular. The value of s is



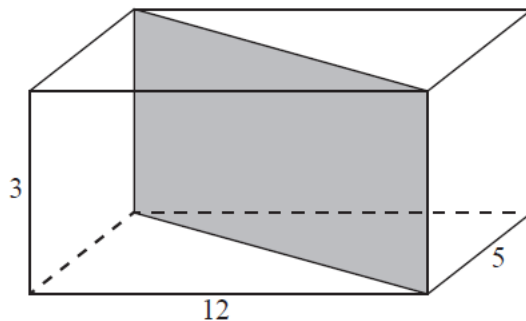
- (A) 6 (B) 9 (C) 10
(D) 12 (E) 9.5

16. Kaukab is standing in a cafeteria line. In the line, the number of people that are ahead of her is equal to two times the number of people that are behind her. There are n people in the line. A possible value of n is

- (A) 23 (B) 20 (C) 24 (D) 21 (E) 25

Part C : Each correct answer is worth 8 points.

17. A solid wooden rectangular prism measures $3 \times 5 \times 12$. The prism is cut in half by a vertical cut through four vertices, as shown. This cut creates two congruent triangular-based prisms. When these prisms are pulled apart, what is the surface area of one of these triangular-based prisms?



- (A) 135 (B) 111 (C) 114
(D) 150 (E) 90

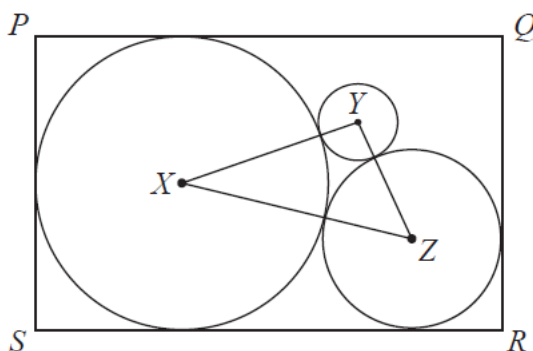
18. Carl and André are running a race. Carl runs at a constant speed of x m/s. André runs at a constant speed of y m/s. Carl starts running, and then André starts running 20 s later. After André has been running for 10 s, he catches up to Carl. The ratio $y : x$ is equivalent to

- (A) 20 : 1 (B) 2 : 1 (C) 1 : 3 (D) 3 : 1 (E) 1 : 2

19. If x and y are positive integers with $xy = 6$, the sum of all of the possible values of $\frac{2^{x+y}}{2^{x-y}}$ is

- (A) 4180 (B) 4160 (C) 4164 (D) 4176 (E) 4128

20. In the diagram, each of the circles with centres X , Y and Z is tangent to the two other circles. Also, the circle with centre X touches three sides of rectangle $PQRS$ and the circle with centre Z touches two sides of rectangle $PQRS$, as shown.



If $XY = 30$, $YZ = 20$ and $XZ = 40$, the area of rectangle $PQRS$ is closest to

- (A) 3900 (B) 4100 (C) 4050 (D) 4000 (E) 3950

21. In the multiplication shown, each of P , Q , R , S , and T is a digit. The value of $P + Q + R + S + T$ is

- (A) 14 (B) 20 (C) 16
(D) 17 (E) 13

$$\begin{array}{r} P Q R S T 4 \\ \times \quad \quad \quad \quad 4 \\ \hline 4 P Q R S T \end{array}$$