SOLUTIONS:

1. The distance from the Y-axis to point K is 1/3 of the distance from the X-axis to point K. If the coordinates of K are (-3, y), what is the distance between point K and X-axis?
A. 1/2
B. 1
C. 3
D. 4.5
E. 9

Point K has the coordinates (-3, y) means that it's somewhere on the line x=-3. Hence the distance from this point to the Y-axis is 3 units.

Since the distance from the Y-axis to point K is 1/3 of the distance from the X-axis to point K, then the distance from K to the X-axis is 9 units.

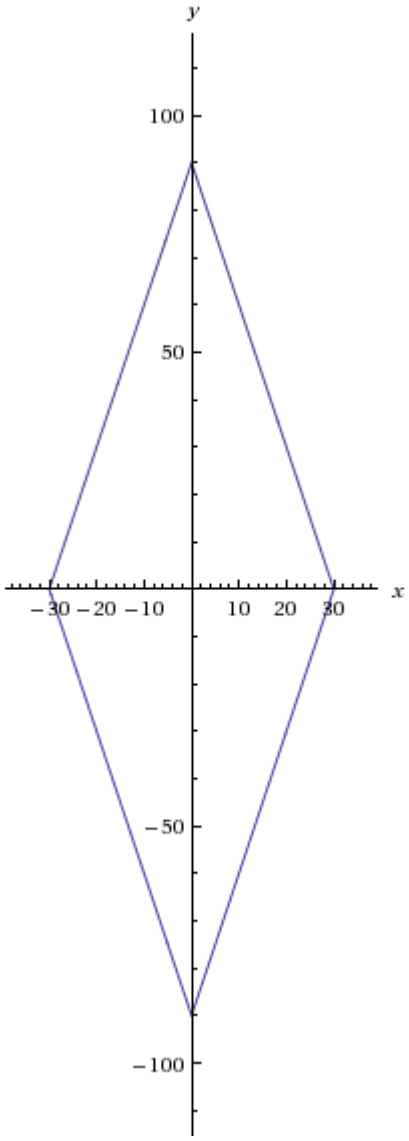
Answer: E.

2. What is the area of a region enclosed by |x/3|+|y/9|=10?
A. 675
B. 1350
C. 2700
D. 5400
E. 10800

Find the x and y intercepts.

When y=0, then x=30 or x=-30.
When x=0, then y=90 or x=-90.

So, we have 4 points: (30, 0), (-30, 0) (0, 90), (0, -90). When joining these points we get the rhombus:



The area of a rhombus is $\frac{d_1 * d_2}{2}$ (where d_1 and d_2 are the lengths of the diagonals), thus the area of the enclosed figure is 60*180/2=5,400.

Answer: D.

3. Three workers, A, B, and C, can complete a certain task in 10, 5 and x hours respectively. A starts working alone and 2 hours later B joins. After another 2 hours joins C. After that A, B, and C together complete the task in 15 minutes. What is the value of x?

A. 1
B. 1.25
C. 2
D. 2.5
E. 4

After 2 minutes $2*\frac{1}{10}=\frac{1}{5}$ of the taks will be done (as only A works);

After 4 minutes $\frac{1}{5}+2*(\frac{1}{10}+\frac{1}{5})=\frac{4}{5}$ of the task will be done and $\frac{1}{5}$ will be left to be done;

We are told that 1/5th of the task is done in 15 minutes (1/4th of an hour) by all three workers: $\frac{1}{4}*(\frac{1}{10}+\frac{1}{5}+\frac{1}{x})=\frac{1}{5}$. From which we can find that x=2 hours.

Answer: C.

4. A draining pipe can empty a pool in 4 hours. On a rainy day, when the pool is full, the draining pipe is opened and the pool is emptied in 6 hours. If rain inflow into the pool is 3 liters per hour, what is the capacity of the pool?
A. 9 liters
B. 18 liters
C. 27 liters
D. 36 liters
E. 45 liters

Let the rate of the draining pipe be x liters per hour. Then the capacity of the tank will be $C=time*rate=4x$;

Now, when raining, the net outflow is x-3 liters per hour, and we are told that at this new rate the pool is emptied in 6 hours. So, the capacity of the pool also equals to $C=time*rate=6(x-3)$;

Thus we have: $4x=6(x-3)$ --> $x=9$ --> [redacted]

Answer: D.

5. For a certain set of numbers, if x is in the set, then both -x^2 and -x^3 are also in the set. If the number 1/2 is in the set , which of the following must also be in the set ?

I. -1/64
II. 1/64
III. 1/2^(1/3)

A. I only,
B. II only,
C. III only,
D. I and II only
E. I, II and III

Since 1/2 is in the set, the so must be:
-x^2 = -1/4;
-x^3 = -1/8.

Since -1/4 is in the set, the so must be:
-x^3 = 1/64;

Since -1/8 is in the set, the so must be:
-x^2 = -1/64.

The only number we cannot get is 1/2^(1/3).

Answer: D.

6. A team contributes total of $399 from its members. If each member contributed at least $10, and no one contributed $19, what is the greatest number of members the club could have?
A. 37
B. 38
C. 39
D. 40
E. 41

Obviously the team could not have 40 or more members, since $10*40=$400>$399. What about 39? If 37 members contributes $10 each ($10*37=$370) and the remaining two members contributed for example, $11 and $18, respectively then the team would have is 37+1+1=39.

Answer: C.

7. Mary spent 64 percent of her salary on food (including meat) and 16% of her salary on meat. What percent of the salary spent on food were not spent on meat?
A. 16%
B. 25%
C. 32%
D. 48%
E. 75%

64% of her salary on food;
16% of her salary on meat;

64%-16%=48% on food but not on meat --> 48/64=3/4=75% of the salary spent on food were not spent on meat.

Answer: E.

8. Usually Holly leaves home to school at 9:00, however today she left home 20 minutes later. In order to be at school on time she increased her usual speed by 20% and still was at school 15 minutes later than usual. What is her usual time from home to school?
A. 15 minutes
B. 20 minutes
C. 25 minutes
D. 30 minutes
E. 210 minutes

Let the usual speed be s and usual time t minutes, then as the distance covered is the same we will have: $st=1.2s*(t-20+15)$ --> $t=30$ minutes.

Answer: D.

9. If x and y are integers and x + y = -12, which of the following must be true?
A. Both x and y are negative
B. xy > 0
C. If y < 0, then x > 0
D. If y > 0, then x < 0
E. x - y > 0

Look at option D: if y is positive, then x must be negative in order the sum of x and y to be negative.

Answer: D.

10. If n is a non-negative integer and the remainder when 3^n is divided by 4 is a multiple of 3, then which of the following must be true?

I. n^2 divided by 4 yields the reminder of 1
II. (-2)^n is less than 0
III. n is a prime number

A. I only
B. II only
C. III only
D. I and II only
E. II and III only

3^0=1 --> the remainder when 1 is divided by 4 is 1;
3^1=3 --> the remainder when 3 is divided by 4 is 3;

3^2=9 --> the remainder when 9 is divided by 4 is 1;
3^3=27 --> the remainder when 27 is divided by 4 is 3;
...

We can see that in order the condition to hold true n must be odd.

I. n^2 divided by 4 yields the reminder of 1 --> odd^2 divided by 4 always yields the reminder of 1. So, this statement must be true.

II. (-2)^n is less than 0 --> (-2)^odd<0. So, this statement must be true.

III. n is a prime number. Not necessarily true.

Answer: D.

11. Certain bowl contains 5 red marbles and 3 blue marbles only. One by one, every marble is drawn at random and without replacement. What is the probability that the seventh marble drawn is NOT blue?
A. 7/8
B. 3/4
C. 2/3
D. 5/8
E. 3/8

Basically we need to find the probability that the seventh marble drawn is red (so not blue).

Now, the initial probability of drawing red marble is 5/8. Without knowing the other results, the probability of drawing red marble will not change for ANY successive draw: second, third, fourth, ..., seventh. Thus the probability that the seventh marble is red is 5/8.

The same for blue marble: the probability of drawing blue marble is 3/8, the probability that for instance the 8th marble drawn is blue is still 3/8. There is simply no reason to believe WHY is any draw different from another (provided we don't know the other results).

Answer: D.