GRE Maths Questions

1) If both x and y are prime numbers, which of the following CANNOT be the difference of x and y?

(A) 1
(B) 3
(C) 9
(D) 15
(E) 23

**Answer:** Choice E is correct. This problem is solved fastest by process of elimination. Both 2 and 3 are prime and their difference is one (Eliminate Choice A). Both 5 and 2 are prime and their difference is 3 (Eliminate Choice B). Both 11 and 2 are prime and their difference is 9 (Eliminate C). Both 17 and 2 are prime and their difference is 15 (Eliminate D).

2) Car X and Car Y are five miles apart and are on a collision course. Car X is driving directly north and Car Y is driving directly east. If the point of impact is one mile closer to the current position of Car X than to the current position of Car Y, how many miles away from the point of impact is Car Y at this time?

(A) 1
(B) 2
(C) 3
(D) 4
(E) 5

**Answer:** Choice D is correct. This problem can be solved by using the Pythagorean theorem as Cars X and Y are 5 miles apart, which is the hypotenuse of a right triangle. Let d be the distance Car Y is from the point of collision. Then the distance Car X is from the collision is d-1. Solving for D: dd + (d-1)(d-1) = 25, d=4, -3. Since d denotes distance, we reject -3 as a valid answer.

3) In the diagram above, AD = BE = 6 and CD = 3(BC). If AE = 8, then BC = ?

(A) 6
(B) 4
(C) 3
(D) 2
(E) 1

**Answer:** Choice E is correct. Since AE is a line segment and all the lengths are additive, AE = AD + DE. We know that AD = 6 and AE = 8. So DE = AE – AD = 8 – 6 = 2. We also know that BE = 6. So BD = BE – DE = 6 – 2 = 4. We know BD is 4, but need to find BC.

Since CD = 3(BC), we can solve for BC: x + 3x = 4. x = 1.

4) If the length of rectangle A is one-half the length of rectangle B, and the width of rectangle A is one-half the width of rectangle B, what is the ratio of the area of rectangle A to the area of rectangle B?

(A) 1/4
(B) 1/2
(C) 1/1
(D) 2/1
(E) 4/1

**Answer:** Choice A is correct. This problem includes a common mistake: the ratio of areas is NOT the same as the ratio of lengths. Instead, the ratio of areas for similar polygons is equal to the square of the lengths of the lengths. If we use 4 and 2 as the length and width for rectangle A, its area is 8. Rectangle B would have an area of (8)(4) = 32, four times that of A.

5) If the area of a rectangle is 12, what is its perimeter?

(A) 7
(B) 8
(C) 14
(D) 16
(E) It cannot be determined from the information given.
**Answer:** Choice E is correct. The area of a rectangle does not tell us much about the perimeter. We can try substituting values for it, but more than one perimeter is possible based on the information given.

6) A cube and a rectangular solid are equal in volume. If the length of the edges of the rectangular solid are 4, 8, and 16, what is the length of an edge of the cube?

(A) 4
(B) 8
(C) 12
(D) 16
(E) 64

**Answer:** Choice B is correct. We have all of the dimensions to calculate the volume of the rectangular solid, which is 16 x 8 x 4. This is also the volume of the cube. So, the length of an edge of the cube is the cubic root of (16 x 8 x 4), or 8.

7) The distance between Athens and Carthage is 120 miles. A car travels from Athens to Carthage at 60 miles per hour and returns from Carthage to Athens along the same route at 40 miles per hour. What is the average speed for the round trip?

(A) 48
(B) 50
(C) 52
(D) 56
(E) 58
**Answer:** Choice A is correct. Average speed = Total distance / Total time. A car traveling at 40 mph will cover 120 miles in 3 hours. A car traveling at 60 mph covers the same 120 miles in 2 hours. The total travel time is therefore 5 hours.

For the entire round trip, the average speed = (120 + 120) / 5 = 48 mph.

8) If w is 10% less than x, and y is 30% less than z, they wy is what percent less than xz?

(A) 10%
(B) 20%
(C) 37%
(D) 40%
(E) 100%
**Answer:** Choice C is correct. We solve using simple equations:
w is 10% less than x w = x – 0.10x, or w = 0.9x
y is 30% less than z y = z – 0.30z, or y = 0.7z
wy = (0.9x)(0.7z) = 0.63xz , or xz – 0.37xz

9) How many different ways can three cubic boxes be painted if each box is painted one color and only the three colors pink, orange and yellow are available? (Order is not considered, ie, pink/orange/pink is considered the same as pink/pink/orange).

(A) 2
(B) 3
(C) 9
(D) 10
(E) 27
**Answer:** Choice D is correct. There are theoretically 27 color combinations (3 x 3 x 3), without restriction. If order is not considered, then there are just 10 distinct color combinations available.
PPP YYY OOO
PPY YYP OOP
PPO YYO OOY
PYO YPY OPY
PYY YPP OPP
PYP YPO OPO
POO YOY OYY
POY YOP OYP
POP YOO OYO

10) If x is an integer and y = -2x – 8, what is the least value of x for which y is less than 9?

(A) -9
(B) -8
(C) -7
(D) -6
(E) -5
**Answer:** Choice B is correct. From the wquation given, we simplify to: -2x-8 <> -8.5, or x = -8.

11) If w is 10% less than x, and y is 30% less than z, they wy is what percent less than xz?

(A) 10%
(B) 20%
(C) 37%
(D) 40%
(E) 100%
**Answer:** Choice E is correct. When we sketch the points on a graph, we note that Points A, B and C form a right triangle ACB. To find the perimeter, we find the lengths of the three sides and add them together.
A (-2, 7) B (3,- 5) C (-2, -5)
AC = 7-(-5) = 12
BC = 3 – (-2) = 5
Using the Pythagorean theorem to solve for hypotenuse AB,
AB squared = (12)(12) + (5)(5) = 13 = AB
Perimeter = 12 + 13 + 5 = 30

12) In the repeating decimal 0.097531097531…., what is the 44th digit to the right of the decimal point?

(A) 0
(B) 1
(C) 3
(D) 7
(E) 9
**Answer:** Choice E is correct. The pattern is the same 6 numbers in the same order: 0,9,7,5,3 and 1. The 44th digit will be a 9.

13) What is the greatest integer that will always evenly divide the sum of three consecutive even integers?

(A) 2
(B) 3
(C) 4
(D) 6
(E) 12
**Answer:** Choice D is correct. We can solve this by working with actual numbers. Starting with zero, we see that the sum is always a multiple of 6:
0 + 2 + 4 = 6, 2 + 4 + 6 = 12, 4 + 6 + 8 = 18 , 6 + 8 + 10 = 24, etc.

14) Decorative ribbon is cut into three equal parts. The resulting segments are then cut into 4, 6 and 8 equal parts, respectively. If each of the resulting pieces has an integer length, what is the minimum length of the ribbon?

(A) 24
(B) 36
(C) 48
(D) 54
(E) 72
**Answer:** Choice E is correct. Since the ribbon is cut into three equal parts, the minimum length is a multiple of three. Since one of the three pieces is then divided evenly into 8 pieces, the length of the ribbon must be at least (3)(8), or 24. Another piece is cut evenly into 6 pieces. Thus, we seek the least common multiple of 6 and 8. The smallest common multiple of 6 and 8 is 24, so the minimum length of the ribbon is 3(24) = 72.

15) The average (mean) of six numbers is 6. If 3 is subtracted from each of four of the numbers, what is the new average?

(A) 3/2
(B) 2
(C) 3
(D) 4
(E) 9/2
**Answer:** Choice D is correct. If 6 numbers have an average of 6, their sum is 36. Subtracting 3 from 4 of the numbers removes 3(4), or 12 from the sum. The new sum is 24 and the new mean is 24/6 = 4.

16) If chocolate, nuts and caramel are to be mixed in the ratio 3:5:7 respectively, and 5 tons of chocolate are available, how many tons of the mixture can be made? (Assume there is enough nuts and caramel to use all the chocolate.)

(A) 15
(B) 20
(C) 25
(D) 30
(E) 75

**Answer:** Choice C is correct. Since the ratio of chocolate to nuts to caramel is 3:5:7, for every three portions of chocolate we add, we get 3 + 5 + 7 or 15 portions of the mixture. Thus, the formula gives 15/3 or 5 times as much mixture as chocolate. If we have 5 tons of chocolate, we can make 5 x 5 or 25 tons of the mixture

17) If the degree measures of two angles of an isosceles triangle are in ther ratio 1:3, what is the degree measure of the largest angle if it is not a base angle?

(A) 26 degrees (B) 36 degrees (C) 51 degrees (D) 92 degrees (E) 108 degrees

**Answer:** Choice E is correct. Let x denote the base angles and y denote the largest angle. We know that x/y = 1/3, or y = 3x. We also know that x + x + y = 180. Combining equations, we have: 2x + 3x = 180, or x = 36. Since y is 3 times x, y is 108.

18) x(x – y) – z(x – y) =

(A) x – y
(B) x – z
(C) (x – y)(x – z)
(D) (x – y)(x + z)
(E) (x – y)(z – x)
**Answer:** Choice C is correct. since (x – y) is a common factor, we factor it out:
x(x – y) – z(x – y) = (x – y)(x – z)

19) A stock decreases in value by 20 percent. By what percent must the stock price increase to reach its former value?

(A) 15%
(B) 20%
(C) 25%
(D) 30%
(E) 40%
**Answer:** Choice C is correct. Although the stock must increase and decrese by the same amount, it does not increase and decrease by the same percent. When the stock first decreased, the amount of change was part of a larger whole. Let’s solve this by using $100 as the initial price of the stock:

The 20% decrease reduced the stock price to $80. For the stock to reach $100 again, there must be a $20 increase. $20 is what % of $80? 20/80 x 100 = 25%.

20) The population of a certain town increases by 50 percent every 50 years. If the population in 1950 was 810, in what year was the population 160?

(A) 1650
(B) 1700
(C) 1750
(D) 1800
(E) 1850
**Answer:** Choice C is correct. The population in 1950 was 150% (or 3/2) the 1900 population, making the 1900 population 2/3 of that in 1950. Simply multiply the population number by 2/3 every 50 years, down to 160 (for 1750).

810 (2/3) = 540 (2/3) = 360 (2/3) = 240 (2/3) = 160

1950 in 1900 in 1850 in 1800 in 1750