**Algebra**

1. If (a-b)2 = (a+b)2, what is the value of ab?

**A.** -4

**B.** -2

**C.** 0

**D.** 2

**E.** 4

(a+b)2 = (a-b)2

a2 + 2ab + b2 = a2 - 2 ab + b2

2 ab = -2 ab

4 ab = 0

ab = 0

**Arithmetic**

2. In physics, force = mass \* acceleration. Suppose you have an original force F and new force G in which the mass is increased by a factor of two and the acceleration is increased by a factor of four. What is the ratio of G:F?

**A.** 1:8

**B.** 1:4

**C.** 1:1

**D.** 4:1

**E.** 8:1

F = ma, G = (2m)(4a) so 8F = G

**Algebra**

3. If a2 = b2, which of the following is/are always true?

1. a = b

II. |a| = |b|

III. |a - b| = 0

**A.** I only

**B.** II only

**C.** I and II

**D.** I and III

**E.** I, II, and III

If a2 = b2, then a = + or - b.

**Algebra**

4. Which of the following statements is always true?

**A.** |(a+b)2| < |a2| + |b2|

**B.** |a2 + b2| > (a+b)2

**C.** |a2 + b2| >= |a+b|2

**D.** |a2 + b2 - 1| <= |a2| + |b2|

**E.** |a + b2| > |a2 - b|

Since |X + Y| is always less than or equal to |X| + |Y|, substitute a2 for X and b2 for Y to find |a2 + b2| is less than or equal to |a2| + |b2|

**Algebra**

5. Which of the following values of x is not in the domain of the function y = x / (x2-2x+1)

**A.** -3

**B.** -2

**C.** -1

**D.** 0

**E.** 1

Because it will make the function undefined.

**Algebra**

6. If a + b = y, what is a2+ 2ab + b2?

**A.** y

**B.** 2y

**C.** y2

**D.** 2y2

**E.** 4y2

(a + b)2 = a2+ 2ab + b2 so y = y2

**Algebra**

7. f 2(4x + 3) = 4(x - 1), what is x?

**A.** -3

**B.** -5/2

**C.** -1

**D.** 2

**E.** 4/3

Direct substitution

**Arithmetic**

8. If m & n = (m + n)(m - n), what is 2 & (2 & 2)?

**A.** 2

**B.** 3

**C.** 4

**D.** 6

**E.** 8

$$(2+(2+2)^{(2-2)})^{(2-(2+2)^{(2-2)})}$$

**Arithmetic**

9. A three-digit number is called "big" if any two of its digits are equal. How many three-digit numbers are "big?"

**A.** 112

**B.** 146

**C.** 214

**D.** 252

**E.** 316

100,101,110,111,112,113,114,115,116,117,118,119,121,122,131,133,

141,144,151,155,161,166,171,177,181,188,191,199

their number is 28, we have 900 number contain 3 digits so $28 × 9=252$

**Probability and statistics**

10. If a two-sided coin is flipped three times, what is the probability that at least one head will show up?

**A.** 1/8

**B.** 3/8

**C.** 1/2

**D.** 2/3

**E.** 7/8

Probability = 1 – all trails

= 1 – ($\frac{1}{2})^{3}= \frac{7}{8}$

**Probability and statistics**

11. Six children sit at a circular table. In how many orders can they sit at the table?

**A.** 6

**B.** 18

**C.** 64

**D.** 118

**E.** 120

Since they will sit in a table so there is no start and end for orders so we will divide by 6, $\frac{6!}{6}=120$

**Trigonometry**

12. A triangle has sides of length 7, 11, and X. Which of the following cannot be X?

**A.** 2

**B.** 4

**C.** 8

**D.** 12

**E.** 18

The sum of two sides of triangle cannot be less than the third side.

**Geometry**

13. A square, X, has sides of length n. Another square, Y, has sides of length 1.5n. How many X can fit into a single Y?

**A.** 1

**B.** 1.5

**C.** 2

**D.** 2.25

**E.** 4

X = n2 and Y = (1.5n)2 = 2.25n2,so Y = 2.25X

**Probability and statistics**

14. How many ways can Pete, Mary, Sue, and Joe stand in a line if Joe and Sue cannot stand next to each other?

**A.** 4

**B.** 6

**C.** 12

**D.** 16

**E.** 18

# of ways = Total ways - # of ways that Sue and Joe stand after each other, 24 – 6 = 18

**Arithmetic**

15. A number is called "round" if it contains at least one zero as a digit. How many three-digit numbers are "round?"

**A.** 153

**B.** 171

**C.** 178

**D.** 179

**E.** 215

100,101,102,103,104,105,106,107,108,109,110,120,130,140,150,160, 170,180,190 their number is 19, so 19 $×$ 9 = 171

**Trigonometry**

16. A regular polygon has 9 sides. What is the degree measure of the angle, within the polygon, between any two sides?

**A.** 60

**B.** 90

**C.** 120

**D.** 140

**E.** 165

Sum of angels = (n – 2)180

Polygon = (9 – 2)180 = 1260

1260 $÷$ 9 = 140

**Geometry**

17. A cubic box, X, has sides of length n. Another cubic box, Y, has sides of length 2n. How many boxes X could fit into a single box Y?

**A.** 2

**B.** 4

**C.** 8

**D.** 16

**E.** 32

X = n3 and Y = (2n)3 so Y = 8n3, Y = 8X

**Algebra**

18. Which of the following lines does not intersect y = 5 x + 2?

**A.** -5x + 2y = 4

**B.** -2x + 5y = -3

**C.** 10x - y = 1

**D.** 3x + y = 17

**E.** 5x - y = -29

They has the same slope

**Arithmetic**

19. How many numbers less than 1000 are divisble by 3?

**A.** 300

**B.** 310

**C.** 311

**D.** 333

**E.** 500

1000 $÷$ 3 = 333.333 so 333

**Arithmetic**

20. If A $ B = A \* B - ( A + B), what is 3 $ (2 $ 1)?

**A.** -5

**B.** -3

**C.** 0

**D.** 1

**E.** 4

3 $×$ (2 $×$ 1 – (2 + 1)) – (3 + (2 $×$ 1 – (2 + 1)) = - 5

**Submit my answers**