

Quantitative comparisons practice

**This file contains 621 quantitative comparison questions
with full answers and explanations!**

**The questions were written and answered by professional
test prep teachers and designed to give you the best practice
possible.**

Good luck on your test.

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1.

A: Distance from runner A to Runner B after 9 hours of running at a constant rate

B: 45 kilometers

AI: Runner A and runner B start running from the same spot. The first runs south at a rate of 3 kilometers per hour and the second runs west at a rate of 4 kilometers per hour.

The best answer is C.

The runners actually form a triangle, where the hypotenuse is the distance between them and the sides of the triangle are $(9 \times 3 = 27)$ and $(9 \times 4 = 36)$.

The distance between them will be $\sqrt{27^2 + 36^2} = 45$ kilometers.

2.

A: The distance between car X and car Y after 3 minutes.

B: The distance between car X and car Z after 2 minutes.

AI: Three cars leave from the same place at different directions. Car X travels north at a rate of 1 Km per minute, car Y travels west at a rate of $1\frac{1}{3}$ km per minute and car Z travels south at a rate of 2 Km per minute.

The best answer is B.

Calculate the distances of A and B.

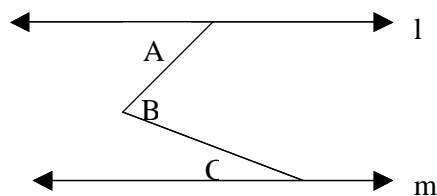
A: The two cars form a triangle where the distance is the hypotenuse.

After three minutes car X traveled 3 Km while car Y traveled 4 Km, the hypotenuse will be 5 Km, which is the value of column A.

B: Each car is traveling in a different direction and therefore the distance between the cars is the sum of both distances. Car X traveled 2 Km and Car Z traveled 4, the total is 6 Km, which is greater than column A.

Lines and angles

3.



A: B

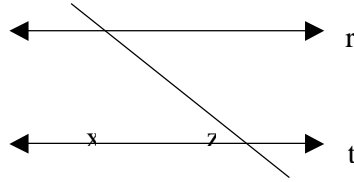
B: A + C

AI: A, B and C are three angles as drawn. M and l are parallel lines.

The best answer is C.

The easiest way to see that the columns are equal is to draw another parallel line that crosses the angle B. The upper angle that the line forms is equal to A and the lower angle is equal to C, both complete the angle B.

4.



A: $x + z$.

B: 135 degrees.

AI: In the drawing above, x , z and 45 are angles. r and t are parallel lines.

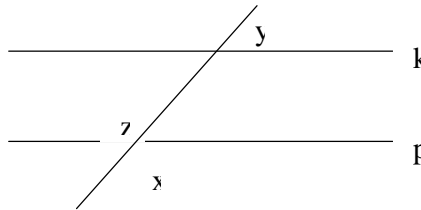
The best answer is C.

45 is a vertical angle to the triangle and therefore the sum $x + z + 45 = 180$.

We can also write the equation: $45 = 180 - x - z \Rightarrow x + z = 180 - 35 = 135$.

The columns are equal.

5.



A: $z + y$

B: $360 - (x + y)$

AI: k and p are two parallel lines. x , z and y are angles.

The best answer is C.

The line that crosses the two parallel lines is a transversal line and so $x + y = 180$ and x is equal to z (vertical angles).

$A = z + y = x + y = 180$.

$B = 360 - (x + y) = 360 - (180) = 180$. And therefore the answer is C.

Triangles

6.

A: 7

B: The length of the third side

AI: The length of two sides of a triangle is 16 and 9

The best answer is B.

Any side of a triangle must be greater than the difference of the other two sides and therefore the third side is greater than the difference ($16 - 9 = 7$).

7.

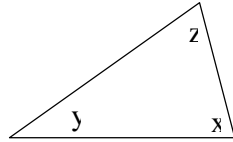
A: $\sqrt{2}$

B: The ratio of the diagonal to a side of a rectangle

The best answer is D.

Only in a square the ratio is $1:1:\sqrt{2}$, since this is a rectangle and not a square the ratio cannot be distinctly determined.

8.



A: $x + y$

B: z

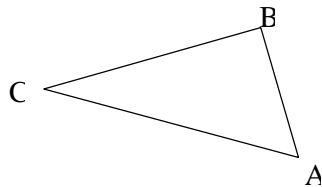
AI: x , y and z are three angles in a triangle

The best answer is D.

If $x = 10$, $y = 10$ and $z = 160$, $A < B$.

If $x = 60$, $y = 70$ and $z = 50$, $A > B$ and therefore the answer is D.

9.



A: BC

B: AB

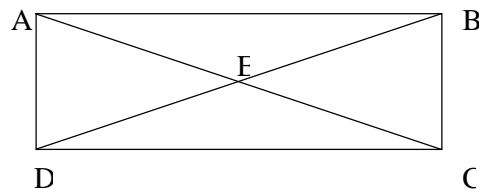
AI: the angle $BAC = 44$ degrees and the angle $CBA = 85$ degrees.

The best answer is B.

The side in front of the larger angle is also greater.

IF $BAC = 44$ and $CBA = 85$, $ACB = 180 - 44 - 85 = 51$ degrees and therefore the side which is in front of ACB is greater than that of BAC and the answer is B.

10.



A: The area of EBC

B: The area of AEB

AI: $ABCD$ is a rectangle

The best answer is C.

Calculate the area of each of the triangles. Define X and Y as the length and the width of the rectangle.

$$A = \frac{X}{2} \times Y \times 0.5 = \frac{XY}{4}.$$

$$B = \frac{X}{2} \times Y \times 0.5 = \frac{XY}{4} \text{ and therefore the answer is C.}$$

Notice that each of the individual triangles has the same area.

1.

A: The perimeter of an octagon, each of whose sides is Z
B: The perimeter of a 30-60-90 triangle whose larger leg is $6Z$

The best answer is B.

$A = 8Z$ since the shape is an octagon with eight legs.

If the larger leg is $6Z$, the smaller one is $3Z$ and already the perimeter is bigger than $8Z$ and thus the answer is B.

2.

A: The area of a right isosceles triangle whose shorter leg is X

B: The area of a square whose perimeter is $4X$

The best answer is B.

$A = X^2/2$ since the triangle is an isosceles and the area can be calculated using the two shorter sides.

$B = X^2$ since each side of the square is $(4X / 4 = X)$ and the area is the multiplication of the sides.

3.

A: 40

B: The perimeter of a rectangle whose area is 120

The best answer is B.

The perimeter of a rectangle can be as large as we want, but the smallest perimeter would be if the rectangle would be a square. In that case, each side would be $\sqrt{120}$, which is more than 10 and therefore the perimeter is over 40.

4.

A: The volume of Mike's cylinder

B: The volume of Tiffany's cylinder

AI: Mike and Tiffany each roll a piece of 25 X 30 cardboard to form a cylinder.

Mike attaches the two 25 centimeters sides together and Tiffany attaches the two 30 centimeters sides together.

The best answer is A.

The volume of a cylinder is $p \times R^2 \times H$.

If Mike attaches the two 25 centimeters sides together then the radius of the cylinder is bigger since $30 = 2 \times p \times R$ and therefore the radius of Mike's cylinder is bigger.

Since the radius is being powered by two the one with the larger radius wins and therefore A is the answer.

5.

A: The volume of a cube whose edges are 7.5
 B: The volume of a box whose edges are 6, 7 and 10.

The best answer is A.

A = The volume is $(7.5)^3 = (56.25)^2$, which is a little over 420.

B = The volume is $6 \times 7 \times 10 = 42 \times 10 = 420$ and therefore A is greater.

6.

A: X

B: Y

AI: X is the surface area of a cube in inches squared and Y is the volume of the box in inches cubed.

The best answer is D.

Plug in numbers. Take the side of the cube 1, then $X = 6$ and $V = 1$.

Take the side of the cube 8, then $X = 384$ and $V = 512$ and therefore the answer is not distinct.

7.

A: The volume of a cube whose edge is X

B: The volume of a sphere whose radius is X

The best answer is B.

$A = X^3$.

$B = \frac{4}{3}\pi \times X^3$ and therefore the answer is B.

To those of you, who don't know the volume of a sphere, try to visualize the two shapes; the cube can easily fit inside the sphere since the diameter of the sphere is $2X$ and so its volume must be bigger.

8.

A: S is the slope of one of the edges of a triangle

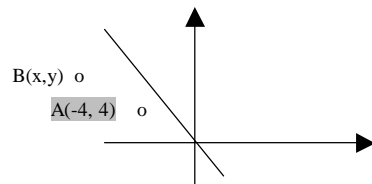
B: 1

The best answer is D.

You don't know the position of the triangle and therefore the slope of one of his edges can be anything, even 0 or 1.

When the answer is not distinct, the answer is D.

9.

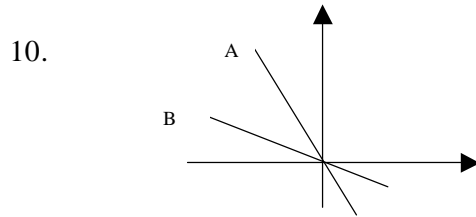


A: 0

B: $X - Y$

The best answer is A.

We can see that the line has a 45 degrees angle which means that all the points to the left of it have a greater X-coordinate than a Y-coordinate in absolute value. Take a representative point for X and Y, for example (-8, 6). In this case $X - Y = -14$, which is smaller than 0 and therefore the answer is A.

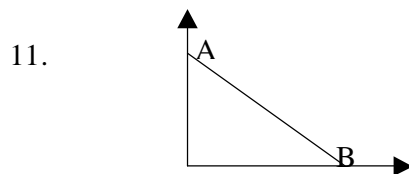


A: The slope of line B
B: The slope of line A

The best answer is A.

We can see that line A is steeper than line B but their slopes are negative.

Let's say that line A has a slope of -2 and line B has a slope of $-1/2$ and therefore A is the answer.



A: Y
B: Q

AI: The coordinates of A are (X, Y) and the coordinates of B are (Q, W).

The slope of the line is $-3/4$.

The best answer is A.

Since A is on the vertical axis, $X = 0$ and since B is on the horizontal axis, $W = 0$.

Use the slope formula: $\frac{0 - Y}{Q - 0} = -0.75 \Rightarrow Y = 0.75Q$ and therefore Q is greater and the

answer is B.

Probability questions

12.

A: The probability of getting a head after five consecutive tails

B: The probability of getting a tail after four consecutive heads

AI: Seven fair coins are flipped

The best answer is C.

The coins have an attribute of a lack of recollection, in other words, each time you flip the coin the result is independent on the previous ones. Since the coin is a fair coin, the probability of column A and column B are the same.

The coin doesn't "know" that it landed on the same side 5 times.

13.

A: The probability that an even number is drawn out
B: The probability that an odd number is drawn out
AI: All the numbers from 1 to 103 inclusive are each written on a card and placed in a box. One card is drawn out.

The best answer is B.

The first number is odd and the last number is odd and therefore there is one more odd number than an even number. Theoretically, the probability of drawing an odd number is greater and therefore the answer is B.

14.

A: The probability of randomly pulling a red ball
B: The probability of randomly pulling a blue ball
AI: In a vase there are 4 red balls, 2 green balls and 5 blue balls.

The best answer is B.

The probability of pulling a red ball is 4 out of $(4 + 2 + 5 = 11)$, $4/11$.
The probability of pulling a blue ball is 5 out of 11, which is greater.

15.

A: The probability of randomly choosing 2 consecutive roses
B: $\frac{1}{4}$
AI: A vase contains 6 roses, 6 Lilies and 2 violets

The best answer is B.

The probability of choosing two consecutive roses is the multiplication of the probabilities: (Choosing a rose)(Choosing a rose out of what's left).
 $A = (6/14)(5/13) = 30/182 = 15/91$, which is smaller than $\frac{1}{4}$ and therefore the answer is B.

16.

A: The probability of randomly pulling a short stick and then a long stick
B: The probability of randomly pulling a short stick twice
AI: In a box there are 10 short sticks and 10 long sticks

The best answer is A.

The probability of choosing two consecutive short sticks is the multiplication of the probabilities: (Choosing a short stick)(Choosing a short stick out of what's left).
 $B = (10/20)(9/19) = 9/38$.
The probability of column A is a little different, after we pulled a short stick, there are 10 long sticks left and so the entire probability is $(10/20)(10/19) = 10/38$ and therefore column A is greater.

17.

A: The probability of getting 11 consecutive heads
B: The probability of not getting 11 consecutive heads
AI: A fair coin is tossed 11 consecutive times

The best answer is C.

Since the coin is fair, the probability of getting a head or a tail in each toss is always $\frac{1}{2}$ and therefore the probability of getting 11 heads is equal to the probability of getting 11 consecutive tails.

18.

A: The number of ways to arrange 5 people in 5 seats

B: The number of ways to arrange 5 people in 4 seats

The best answer is C.

Use the counting principle: If there are 5 seats the first seat has 5 possibilities, the second has 4, the third 3 and so on. The combination is the multiple of 5-4-3-2-1.

Using 4 seats, the number of combinations is 5-4-3-2, which is equal to the first combination.

19.

A: The number of ways you can divide 6 different candies to 4 different people

B: The number of ways you can divide 7 different candies to 3 different people

The best answer is A.

Use the counting principle in this one. Take A for example; there are 4 people, the first can get 6 candies, the second 5 and so on. The number of combinations is the multiplication of $6 \times 5 \times 4 \times 3 = 360$ ways.

$B = 7 \times 6 \times 5 = 210$ ways only and therefore A is greater.

20.

A: The probability that 3 people chosen at random were born in the same month

B: The probability that 2 people chosen at random were born in the same day of the week

The best answer is B.

$A = (1)(1/12)(1/12) = 1/144$.

$B = (1)(1/7)$ and therefore the answer is B.

21.

A: The probability that 4 people chosen at random are males

B: The probability that 3 people chosen at random were born in the same day of the week

The best answer is A.

$A = (1/2)(1/2)(1/2)(1/2) = (1/2)^4 = 1/32$.

$B = (1)(1/7)(1/7) = 1/49$, which is smaller than column A.

22.

A: The probability that a number chosen at random from the primes between 200 and 399 is odd.

B: 0.89

The best answer is A.

Every prime number (except 2) is odd and therefore the probability in column A is equal to 1, which is greater than B.

Some Algebra

23.

A: The product of all the positive divisors of 23

B: The sum of all the positive divisors of 23

The best answer is B.

23 has two divisors, 1 and 23.

$$A = 1 \times 23 = 23.$$

$$B = 1 + 23 = 24.$$

24.

A: The sum of all the positive divisors of 20

B: The product of all the positive divisors of 20

The best answer is B.

20 has the following positive divisors: 1, 2, 4, 5, 10 and 20.

Their sum is much smaller than their product and therefore B is the answer.

25.

A: $101(X + Y)$

B: $101X + Y$

The best answer is D.

Subtract $101X$ from both columns to get $101Y$ against Y , if $Y=0$ the columns are equal, otherwise they're not and therefore the answer cannot be determined.

26.

A: The average (arithmetic mean) of all the positive multiples of 3 less than 16

B: The average (arithmetic mean) of all the positive multiples of 4 less than 21

The best answer is B.

A = the average of 3, 6, 9, 12, 15 which is the middle number. $A = 9$.

B = the average of 4, 8, 12, 16, 20 which is the middle number. $B = 12$.

27.

A: The number of 5-cent stamps that he used

B: The number of 7-cent stamps that he used

AI: Ruth put exactly 50 cents worth of postage on an envelope using only 5-cent stamps and 7-cent stamps.

The best answer is D.

Let X be the number of 5-cent stamps that he used and Y the number of 7-cent stamps that he used. We can write the following equation: $5X + 7Y = 50$.

There are two combinations: $X=3, Y=5$ and $X=10, Y=0$ and therefore the answer cannot be determined.

1.

A: The amount Tim paid for the car

B: The amount Din paid for the car

AI: Tim and Din bought the same new car. Tim got a 10% discount from the dealership and added 7% tax. Din added the 7% tax and only then got a 10% discount.

The best answer is C.

Lets pick up numbers. Lets say the car costs \$1,000.

Tim got a 10% discount and so the price is \$900 and added 7% tax to \$963.

Din added the 7% tax to \$1,070 and then got a 10% discount to \$963 and therefore the answer is C.

2.

A: 5,000

B: $Y - X$

AI: X is the sum of integers from 101 to 150 and Y is the sum of integers from 201 to 250

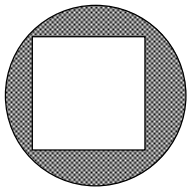
The best answer is C.

$X = (101 + 102 + 103 + 104 + \dots + 150)$.

$Y = (201 + 202 + 203 + 204 + \dots + 250)$.

$Y - X = (201 - 101) + (202 - 102) + \dots + (250 - 150) = 100 + 100 + \dots + 100 = 100 \times 50 = 5,000$. And therefore the answer is C.

3.



A: $\frac{R}{\sqrt{2}}$

B: a

AI: The side of the square that is inside the R radius circle is $a\sqrt{p}$.

The shaded region is equal to the white one.

The best answer is C.

The area of the square is $(a\sqrt{p})^2 = pa^2$.

The area of the shaded region is $pR^2 - pa^2$.

Since the areas are equal we can write the equation: $pa^2 = pR^2 - pa^2 \Rightarrow 2a^2 = R^2$.

And therefore $a = \frac{R}{\sqrt{2}}$.

4.

A: X

B: Y

AI: X and Y are negative integers.

$$XY = 9$$

The best answer is D.

Since the following combinations fit the terms in the question: $X=1$, $Y=9$ or $X=3$, $Y=3$, the answer is not distinct and so we cannot determine which is greater.

5.

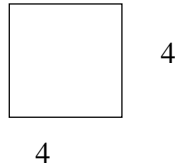
A: 88% of X

B: $\frac{7}{8}X$

The best answer is A.

$1/8$ is $(100/8 = 12.5\%)$ and therefore $7/8$ is 87.5% of X, which is less than 88%.

6.



A: The area of the quadrilateral

B: 16

The best answer is D.

Since we don't know that the quadrilateral is a rectangle or a square (we know nothing of its angles), the area cannot be found. As far as we're concerned the quadrilateral can also be a parallelogram and therefore more data is needed in order to calculate the area.

7.

A: X

B: $\left(\frac{21}{33}\right)^7$

AI: $X^7 = \frac{21}{33}$

The best answer is X.

The fraction given is too complicated for any calculations. Take $\frac{1}{2}$ for example instead. $X^7 = \frac{1}{2} \Rightarrow X = (1/2)^{-7} = 2^7 = 128$.

On the other hand, $(1/2)^7$ is $1/128$ and therefore the answer is A.

8.

A: Q

B: W

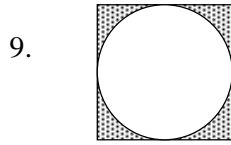
AI: The circumference of a square is Q and the area is W

The best answer is D.

Define X as the side of the square.

$$Q = 4X \text{ and } W = X^2.$$

We cannot determine which is greater. If $X = \frac{1}{2}$, Q is bigger but if $X = 8$ for example, W is bigger.



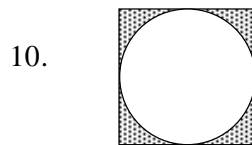
- A: The area of the shaded region
 B: The area of the white region
 AI: The white circle is inscribed inside the square

The best answer is B.
 Define X as the side of the circle.

The area of the white circle is $p \times \left(\frac{X}{2}\right)^2 = \frac{pX^2}{4}$.

The area of the shaded region is $X^2 - \frac{pX^2}{4} \approx \frac{X^2}{4}$.

And therefore the answer is B.



- A: The circumference of the shaded region
 B: The circumference of the white region
 AI: The white circle is inscribed inside the square

The best answer is A.
 There is no need to calculate anything.
 The circumference of the shaded region includes the circumference of the circle and therefore column A is greater.

11.
 A: The number of prime numbers from 2 to 10 inclusive
 B: 3

The best answer is A.
 The prime numbers in the specified range are 2, 3, 5 and 7.

12.
 A: AB
 B: 1
 AI: $A + B = \frac{3}{4}$

The best answer is B.
 There are few possibilities: A or B is negative and the other is positive, one of them is zero or they're both positive fractions. In either case, AB will be smaller than 1 and so column B is greater.

13.

A: $A + B$

B: 35

AI: $AB = 35$.

The best answer is D.

From the additional information we can conclude that there are two possible combinations: $A=35, B=1$ or $A=7, B=5$. Each case resolves in a different answer and so the answer is D.

14.

A: The average (arithmetic mean) of A, B and C

B: The average (arithmetic mean) of A, B, C and A

AI: $C > B > A$

The best answer is A.

Pick up easy numbers for this one. $A=1, B=2$ and $C=3$.

$A = (1+2+3)/3 = 2$.

$B = (1+2+3+1)/4 = 1.75$ and therefore column B is smaller.

15.

A: $-(X + Y) - Z$

B: $-(X - Y) - Z$

AI: $X < Y < 0 < Z$

The best answer is A.

Compare the two columns: $-X - Y - Z$ vs. $-X + Y - Z \hat{=}$ 0 vs. $2Y$ and since $Y < 0$ column B is smaller and the answer is A.

16.

A: $-(B - A - C)$

B: $A + B + C$

AI: $C > 1, B < 1$ and $A > 0$.

The best answer is D.

Subtract $A + C$ from both columns to get: Column A = $-B$ and Column B = B .

Now since B can be positive or negative the answer cannot be determined because if B is negative column A is greater and otherwise B is greater.

17.

A: $\frac{2}{1-X}$

B: $2 - 2X$

AI: $X > X^2$

The best answer is A.

Since $X > X^2$, X is a positive number and so divide each wing by X to get $X < 1$. Pick a number for X , for example $X = \frac{1}{2}$ and plug it in.
 $A = 4$ and $B = 1$ and therefore column A is greater.

18.

A: $W - Z$

B: $X - Y$

AI: $X < W$, $Z < Y$

The best answer is A.

Move variables from one column to the other: $A = Y - Z$, which is positive and $B = X - Y$, which is negative and therefore column A is greater.

19.

A: 0

B: Z

AI: $X > Y$, $YZ > XZ$

The best answer is A.

If $X > Y$ then Z must have changed the sign in the inequality $YZ > XZ$ and so Z must be negative.

20.

A: X^4

B: X^5

AI: $X \times |Y| < -X$

The best answer is A.

In the extra information, since a positive number is multiplying X and the result is smaller than $-X$ itself, X must be negative.

Since X is negative, X^4 results in a positive number and therefore column A is greater.

21.

A: $(5^X)^3$

B: $5^X 5^6$

AI: $2 < X < 3$

The best answer is B.

Pick up a number for X , for example $X = 2.5$.

$A = 5^{2.5 \times 3} = 5^{7.5}$.

$B = 5^{2.5+6} = 5^{8.5}$, which is greater than column A.

22.

A: $X(Y - X)$

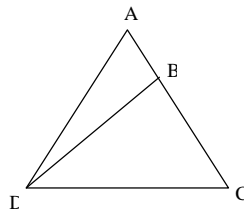
B: XY

AI: $X \neq 0$

The best answer is B.

Subtract XY from both sides to get: $A = -X^2$, $B = 0$ and since X cannot be zero, A is a negative number, which is smaller than B .

1.



A: The measurement of the angle DAC

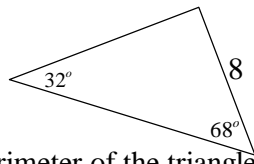
B: The measurement of the angle DBC

The best answer is B.

The angle DBC is an outer angle to the triangle DBA and therefore it's equal to the sum of the two inner angles, which are not adjacent to it.

If $DBC = DAC + BDA$ then $DBC > DAC$.

2.



A: The perimeter of the triangle

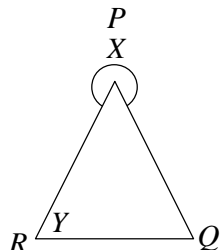
B: 24

The best answer is A.

The third angle in the triangle is $(180 - 32 - 68 = 80)$ degrees.

The side 8 is in front of the angle 32, which is the smallest one in the triangle and therefore the other sides must be greater than 8 and so their sum must be greater than 24 (8×3).

3.



A: $X/2 - 90$

B: Y

AI: The triangle is an isosceles

X and Y are outer and internal angles respectively

The best answer is C.

We need to find a connection between X and Y.

Since the triangle is an isosceles its angles are Y, Y and $180 - 2Y$.

Focus on the upper corner of the triangle, the sum of the angles around it should be 360 degrees and therefore we can write: $X + 180 - 2Y = 360$ \Rightarrow

$X - 2Y = 180$ $\Rightarrow Y = X/2 - 90$ and so the columns are even.

4.

A: The number of sunflowers in the shop

B: The total number of daffodils and roses in the shop

AI: In a flower shop there are three types of flowers: roses, daffodils and sunflowers. The ratio between the number of roses to the number of flowers that are not roses is 1:3. The ratio between the number of daffodils to the number flowers that are not daffodils is 1:2.

The best answer is B.

From the ratio 1:3 we can conclude that the roses are a quarter of the flowers in the shop. From the ratio 1:2, the daffodils are a third of the flowers in the shop. $\frac{1}{3} + \frac{1}{4} = \frac{7}{12}$, which is more than half and therefore column B is greater.

5.

A: The height of John

B: The height of Kristy

AI: The average height in the class didn't change after John and Walter left and Kristy and Julia came.

The best answer is D.

From the additional data we can only conclude that the total height of John and Walter is equal to that of Kristy and Julia but we don't know how it divides among the kids and so the answer is D.

6.

A: $X^5 - X^3$

B: $X^4 - X^2$

AI: $X > 1$

The best answer is A.

Plug in a number for X. For example $X = 2$.

Column A = $2^5 - 2^3 = 32 - 8 = 24$.

Column B = $2^4 - 2^2 = 16 - 4 = 12$.

7.

A: The price of a movie ticket

B: The price of a slice of pizza

AI: Travis received an allowance.

With a fifth of the money he bought a ticket to a movie, and with a quarter of what's left he bought a slice of pizza.

The best answer is C.

The easiest way is to plug in numbers.

Let's say that he got 100 dollars. A fifth (\$20) was spent on the ticket.

A quarter of \$80 was spent on the pizza, which is \$20 so the columns are equal.

8.

A: X

B: 1

AI: $\frac{X}{Y} = \sqrt{\frac{X}{Y}}$

X and Y are positive.

The best answer is D.

There are only two numbers that are equal to their own square root- zero and one.

Since X and Y are positive, X/Y is equal to 1. X and Y can be both 5 or even 1, the answer cannot be determined.

9.

A: Y/X

B: 1

$$\text{AI: } \frac{X}{Y} = \sqrt{\frac{X}{Y}}$$

X and Y are positive.

The best answer is C.

There are only two numbers that are equal to their own square root- zero and one.

Since X and Y are positive, X/Y is equal to 1. Y/X is also 1 and therefore the answer is C.

10.

A: T

B: 9

$$\text{AI: } (T - 9)^2 \leq 16$$

The best answer is D.

Simplify the expression: $(T - 9)^2 \leq 16 \Rightarrow T - 9 \leq 4 \Rightarrow T \leq 13$.

T can be 12 or even -347 and therefore the answer cannot be determined.

11.

A: 1

$$\text{B: } (|X| - X) \cdot (|X| + X); X \neq 0$$

The best answer is A.

Open the parenthesis: $(|X| - X) \cdot (|X| + X) = X^2 + |X|X - |X|X - X^2 = 0$ and so column A is greater.

12.

A: X - Y

B: 0

$$\text{AI: } (X + 3)^2 = (Y - 2)^2$$

The best answer is B.

You can remove the power from both sides of the equation to get:

$X + 3 = Y - 2 \Rightarrow X - Y = -5$ and so column B is greater.

13.

A: The difference between Dorothy and Amber's grade point average

B: 18

AI: The average grade point average of Dorothy and Amber is greater by 10 points from Amber's grade point average.

The best answer is A.

Since no numbers are given, we'll make them up.

Let's say that the grade point average (G.P.A) of Amber is 5.

The average G.P.A of Amber and Dorothy is therefore 15 and the sum of their grades is $(15 \times 2 = 30)$. $30 - 5 = 25$, which is Dorothy's G.P.A and the difference in their grades is $(25 - 5 = 20)$, which is greater than column B.

14.

A: $K \cdot (\sqrt{K})^3$

B: $K^2 \cdot \sqrt{K}$

AI: $K > 1$

The best answer is C.

Simplify each of the columns:

Column A = $K \times K^{1.5} = K^{2.5}$.

Column B = $K \times K^{0.5} = K^{1.5}$.

Both columns are equal to one another.

15.

A: A

B: B

AI: $6B + 24A = 84$

A and B are positive.

The best answer is D.

There are many options for A and B that will result in 84 and therefore the answer cannot be determined distinctively.

16.

A: X

B: 60 degrees

AI: X, Y and Z are three angles in a triangle.

The best answer is D.

Take two sets of numbers: X=20, Y=20 and Z=140 or

X=60, Y=60 and Z=60. We can see that in both cases the result is different and so the answer is D.

17.

A: Y

B: 60 degrees

AI: X, Y and Z are three angles in a triangle.

$$Z > Y > X.$$

The best answer is B.

The only case that Y could be 60 degrees is when the triangle is an equilateral. In every other case $Y < 60$ and so column B is greater.

18.

A: The amount of alcohol in a liter of cocktail, which consists of 50% Tequila and 30% Vodka

B: The amount of alcohol in a liter of cocktail, which consists of 30% Tequila and 50% Vodka

AI: The concentration of alcohol in Tequila is half of the concentration in Vodka. A cocktail consists of Tequila, Vodka and water only.

The best answer is B.

In both columns there is 1 liter of cocktail, which consists of $(100\% - 30\% - 50\% = 20\%)$ water. Since the amount of alcohol in Vodka is twice than that in Tequila, the cocktail in column B consists of a greater percent of Vodka and therefore it has more alcohol

19.

A: The side of the triangle

B: The base of the triangle

AI: Triangle ABC is an isosceles, which one of its angles is 40 degrees and it's perimeter is 20 inches.

The best answer is D.

We have two options to create such a triangle: 40, 40 and 100 or 70, 70 and 40. In the first case the side is greater than the base and in the second case it's the opposite and so the answer cannot be determined.

20.

A: 320

B: The number of different combinations that Ruth can dress assuming that she wears a shirt, pants and shoes or boots

AI: Ruth has 10 pairs of pants, 8 shirts, 3 pairs of shoes and one pair of boots

The best answer is C.

The number of combination consists of 10 pants, 8 shirts, 3 shoes + 1 boots.

The calculation is simple: $10 \times 8 \times 4 = 320$ combinations.

21.

A: The weight of Courtney (In Kg)

B: 56

AI: The average weight of Tiffany and Jennifer is 48 Kg.

The average weight of Tiffany, Jennifer and Courtney is 50 Kg.

The best answer is B.

The easiest way is to try the answer.

Say that Courtney weighs 56 Kg (column B), the average weight of Courtney, Tiffany and Jennifer would be $(56 + 48)/2 = 52$, this conflicts the additional data and therefore Courtney must weigh less than 56 and thus column B is greater.

22.

A: The number of candies that Jacob took at the most

B: 23

AI: Three friends have 60 candies together.

Michael took more than a third of the candies while Paul took only 17.

The best answer is B.

If Michael took more than a third, the situation where Jacob took the most is if Michael took the least amount of candies, thus 21 candies.

It turns out that Jacob can take $(60 - 21 - 17 = 22)$ candies, which is smaller than column B.

23.

A: The perimeter of the triangle divided by three

B: The average (arithmetic mean) of the sides of the triangle

AI: The triangle is a right triangle

The best answer is C.

Take a known group of sides in a right triangle, for example: 3, 4 and 5.

Column A = $(3 + 4 + 5)/3 = 4$.

Column B = 4 and therefore the columns are equal.

24.

A: The average amount of stamps that Josh and Roy have before giving Sharon any stamps

B: The amount of stamps that Sharon has after receiving them from Josh and Roy

AI: Josh and Roy have stamps while Sharon has none. They decided to give Sharon half of the amount that Josh has and half of the amount that Roy has.

The best answer is C.

Let X be the number of Stamps that Josh had prior to giving Sharon stamps and Y the number of stamps that Roy had prior to giving Sharon stamps.

Column A = $(X + Y)/2$.

Column B = $X/2 + Y/2$, which is equal to the amount in column A.

25.

A: $A \times C \times E$
 B: $B \times D \times F$
 AI: $A < B < C < D < E < F$

The best answer is D.

Take two cases: 1) $A=1, B=2, C=3, D=4, E=5$ and $F=6$, in this case column A equals 15 while column B equals 48.

2) $A=-2, B=-1, C=0, D=1, E=2$ and $F=3$, in this case column A equals 0 while column B equals -3. The answer is dependent on the selection of the parameters and therefore it is not distinct.

26.

A: X
 B: 0

AI: $3X = \frac{1}{3X}$

The best answer is D.

The additional data can be written as $9X^2 = 1 \Rightarrow X^2 = 1/9 \Rightarrow X = 1/3$ or $-1/3$ and so 0 is right in the middle so the answer cannot be determined.

27.

A: $M + N$
 B: MN

AI: $\frac{1}{23} < N < M < \frac{1}{22}$

The best answer is A.

Since it's hard to find numbers to replace M and N, use your logic.

In column A, we take M and increase its value by adding a positive number.

In column B, we take M and reduce its value by dividing it using a fraction and therefore column A is greater.

28.

A: The probability of pulling a black ball
 B: $1/5$

AI: A jar contains balls in different colors. The number of black balls is five times smaller than the number of the other colored balls.

The best answer is B.

Don't be mistaken, the answer is not B.

Let's say there're 5 black balls and 25 balls in other colors.

The probability of pulling a black ball is 1 out of 30, which is $1/6$.

$1/5 > 1/6$ and so the answer is B.

29.

A: The diameter of the circle
 B: p

AI: The circumference of a circle is p^2

The best answer is C.

The circumference of the circle is $2pR$ or pD , which is equal to p^2 and therefore the diameter is equal to p and so the columns are equal.

30.

A: X

B: Y

AI: $X + Y < |X| + 4$

The best answer is D.

Plug in numbers that validated the inequality. For example:

$(X, Y) = (0, 0)$ and $(2, 3)$.

In the first case $X=Y$ and in the second case $X<Y$ and so the answer cannot be determined.

31.

A: \sqrt{X}

B: \sqrt{Y}

AI: $0 < X < Y < 1$

The best answer is B.

Plug in some numbers: $X=1/9$ and $Y=1/4$.

Column A = $1/3$ and column B = $1/2$ and so the answer is B.

32.

A: $X - Y$

B: 13

AI: $1 < X < 8$ and $-4 < Y < 4$

The best answer is B.

Find the range of numbers that $X - Y$ can get.

The minimum is when X is the largest and Y is the smallest: $X=8$, $Y=-4$ and so the maximum is 12. The minimum is found in the same way, it's -3.

We can see that $(X - Y)$ cannot be 13 and therefore column B is greater.

33.

A: Y

B: 10

AI: 40% of Y is equal to 60% of $(Y + 20)$

The best answer is B.

Translate the percentages to an abstract form: $\frac{40}{100}Y = \frac{60}{100}(Y + 20)$.

This expression can be written as: $4Y = 6(Y + 20) \Rightarrow Y = -10$.

34.

A: $U + V$

B: $U - V$

AI: $\frac{2}{3} < U < 1$

$0 < V < \frac{1}{2}$

The best answer is A.

You can subtract U from both sides, $A = V$ and $B = -V$.

V is positive and therefore column A is greater than column B.

35.

A: X^5

B: $X^2 + X^3$

AI: $X > 0$

The best answer is D.

Take two cases: $X = 1$ and $X = 2$.

In the first case: column A = 1 and column B = 2.

In the second case: column A = 32 and column B = 12.

We got two different answers for X 's that are valid and so the answer cannot be determined.

36.

A: The probability that the product of the numbers that will be received from three tosses will be even

B: The probability that the product of the numbers that will be received from three tosses will be odd

AI: A coin is marked with 1 on one side and with 2 on the other side

The best answer is A.

There are $2^3 = 8$ combinations.

Column B: The only case in which the result will be odd is if all the tosses turn out 1, there is a probability of $(\frac{1}{2})^3 = \frac{1}{8}$ that this would happen.

Column A: The probability here completes $\frac{1}{8}$ to 1 and therefore it's $\frac{7}{8}$.

We can see that column A is greater.

37.

A: 6

B: $2W$

AI: $\frac{\frac{5}{14} + W}{4} = \frac{6}{7}$

The best answer is B.

Simplify the expression: $\frac{5}{14} + W = \frac{24}{7} \Rightarrow W = \frac{24}{7} - \frac{5}{14} = \frac{48-5}{14} = \frac{43}{14}$

W is a little over 3 and therefore 2W are a little over 6 and so column B is greater.

38.

A: The number of cookies that Ethan can bake while Heather bakes 14 cookies

B: 20

AI: While Heather bakes 8 cookies, Ethan bakes 12 cookies.

The best answer is A.

The ratio between Ethan and Heather is 3:2.

And so when Heather bakes 14 cookies, Ethan can bake $(14 \times 3/2 = 21)$ cookies and so column A is greater.

39.

A: X

B: $\sqrt[Y]{X^Y}$

AI: X, Y < 0

The best answer is C.

Simplify the expression in column B to: $X^{Y/Y} = X$ and so both columns are equal.

40.

A: $|R - 7|$

B: $|R + 7|$

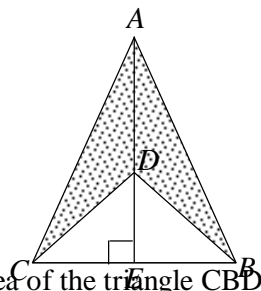
AI: $R < -1$

The best answer is A.

Plug in a number for R. For example $R = -2$.

Column A = 9 while column B = 5 and therefore column A is greater.

41.



A: The area of the triangle CBD

B: The dotted area

AI: $AD = DE$

The best answer is C.

Focus on the triangle ABC and CBD. Both have the same base yet ABC has double the height, thus its area is doubled. The area of the dotted area is the area of ABC minus the area of CBD and therefore the dotted area is equal to the area of the triangle CBD.

42.

A: The sum of the numbers in group X
 B: The sum of the numbers in group Z
 AI: Group X has 11 numbers with an average of 44.
 Group Z has 24 numbers with an average of 24.

The best answer is B.

The sum is simply the amount of numbers multiplied by the average.

The sum of the numbers in group X is $11 \times 44 = 484$ and the sum of the numbers in group Z is $24 \times 24 = 576$, which is greater.

43.

A: 3Q of 15 in percent terms

B: 25Q

AI: Q is a natural positive number.

The best answer is B.

3Q out of 15 in percent terms is equal to $\frac{3Q}{15} \times 100 = \frac{100Q}{5} = 20Q$, which is smaller than 25Q since Q is defined positive.

44.

A: X

B: -1

AI: $5 \times 5^{2X-3} = 25^{4X+1} \times \sqrt{5}$

The best answer is A.

The expression given to us can be easily simplified.

$$5 \times 5^{2X-3} = 25^{4X+1} \times \sqrt{5} \Rightarrow 5 \times 5^{2X-3} = 5^{2(4X+1)} \times 5^{1/2} = 5^{8X-2} = 5^{8X+2.5}$$

Compare the powers of both sides: $2X - 2 = 8X + 2.5 \Rightarrow 6X = -4.5$

$\Rightarrow X = -3/4$ and therefore X is greater.

45.

A: Y

B: 14

AI: X and Y are two consecutive numbers.

$$X^2 - Y^2 = 27$$

The best answer is B.

Simplify the expression: $X^2 - Y^2 = (X - Y)(X + Y) = 1(X + X - 1) = 2X - 1$.

$2X - 1 = 27 \Rightarrow 2X = 28 \Rightarrow X = 14$ and $Y = 13$ and therefore column B is greater.

46.

A: The sum of the digits $X + Y$

B: The double digit number XY

AI: XY is a positive double digit number

The best answer is B.

Plug in some numbers. Say $XY = 54 \Rightarrow X + Y = 9$.

Take a smaller number: $XY = 11 \Rightarrow X + Y = 2$.

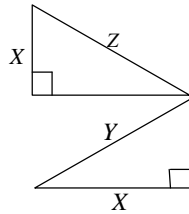
No matter which number you choose, the sum of the two digits cannot surpass the number itself and so the answer is B.

47.

A: The area of the triangle:

B: The area of the triangle:

AI: $Z < Y$



The best answer is B.

The height in the triangle of column A is $\sqrt{Z^2 - X^2}$.

The height in the triangle of column B is $\sqrt{Y^2 - X^2}$.

We know that $Z < Y$ and so the height of the triangle in column B is greater and so is the area of the triangle since the bases are the same length (X).

48.

A: X

B: 3

AI: $Y = \left(\sqrt{5\sqrt{7}}\right)^X$

Y is a positive integer greater than 1.

The best answer is A.

Simplify the expression:

$$Y = \left(\sqrt{5\sqrt{7}}\right)^X = \left[\left(5 \cdot 7^{\frac{1}{2}}\right)^{\frac{1}{2}}\right]^X = \left(5^{\frac{1}{2}} \cdot 7^{\frac{1}{4}}\right)^X = 5^{\frac{X}{2}} \cdot 7^{\frac{X}{4}}$$

In we want Y to be a positive integer we must eliminate the fraction-power and therefore X must be dividable by 4 and 2.

Every number that is dividable by 4 is greater than 3 and so column A is greater.

49.

$$\text{A: } X + Y + Z + W$$

$$\text{B: } 8$$

$$\text{AI: AI: } (X + Y)(Z + W) = 21$$

X, Y, Z and W are positive integers.

The best answer is A.

There is only one combination of numbers that will result in 21 and it's 3 and 7. $(X + Y) = 3$ and $(Z + W) = 7$ or vice-versa.

The expression in column A is equal to $3 + 7 = 10$ and so column A is greater.

50.

$$\text{A: } \sqrt{0.05} \times \sqrt{20}$$

$$\text{B: } \sqrt{0.06} \times \sqrt{30}$$

The best answer is B.

$$\text{Column A} = \sqrt{0.05} \times \sqrt{20} = \sqrt{0.05 \times 20} = \sqrt{1} = 1.$$

$$\text{Column B} = \sqrt{0.06} \times \sqrt{30} = \sqrt{0.06 \times 30} = \sqrt{1.8} > 1 \text{ and therefore column B is greater than column A.}$$

1.

$$A: Y - X$$

$$B: X - Y$$

$$AI: Y < X$$

The best answer is B.

These kinds of questions are best solved by plugging in some numbers.

For example: $X=2$ and $Y=1$.

Column A = -1 while column B = 1 and therefore the answer is B.

2.

$$A: XYZ$$

$$B: X + Y + Z$$

AI: X, Y and Z are negative integers.

The best answer is D.

Try two sets of numbers: (-1, -1, -1) and (-4, -4, -5).

The first set will give: $A = -1$ and $B = -3$ → column A is greater.

The second set will give: $A = -80$ and $B = -13$ → column B is greater.

When you get two different answers, mark D since the answer cannot be determined.

3.

$$A: X - 1$$

$$B: 1 - X$$

$$AI: -1 > X$$

The best answer is B.

Replace X with any number smaller than -1, for example $X = -2$.

Column A = -3 and column B = 3 and therefore the answer is B.

4.

$$A: \frac{1}{X+Y}$$

$$B: X + Y$$

AI: X and Y are negative integers.

The best answer is A.

Plug in numbers for X and Y, for example: $X=-1$ and $Y=-2$.
Column A = $-1/3$ and column B = -3 and so column A is greater.

5.
A: X/Y
B: Y/X
AI: $0 < X < 1$
 $-1 < Y < 0$

The best answer is D.
Plug in numbers for X and Y. For example: $X = 1/2$ and $Y = -1/2$.
Column A = -1 and column B = -1 . It seems like the answer is C.
Plug in different numbers: $X = 1/2$ and $Y = -1/4$.
Column A = -2 and column B = $-1/2$ and so the answer cannot be determined.

6.
A: $1 - K$
B: $\frac{1}{1-K}$
AI: $0 < K < 1$

The best answer is B.
Replace K with a number in the specified range: $K = 1/2$.
Column A = $1 - 1/2 = 1/2$.
Column B = $1/(1 - 1/2) = 2$. And so column B is greater.

7.
A: $\sqrt[2]{X^3}$
B: \sqrt{X}
AI: $X > 1$

The best answer is A.
Column A can be written as $X^{3/2}$.
Column B can be written as $X^{1/2}$.

Since $X > 1$, column A is greater because it makes X bigger while column B makes X smaller.

8.

A: A^3

B: A^2

AI: A is a positive integer

The best answer is D.

Take two cases: $A = 1$ and $A = 2$.

In the first case, column A and B are equal while in the second case column A is greater and therefore the answer cannot be determined.

9.

A: $3Y$

B: $9Y^2$

AI: $0 < Y < 1/3$

The best answer is A.

Plug in a number, for example $Y = 1/4$.

Column A = $3/4 = 12/16$.

Column B = $9/16$ and therefore A is greater.

10.

A: $A - (-7)$

B: $B - (-3)$

AI: $0 < B < A$

The best answer is A.

Column A = $A + 7$ and column B = $B + 3$.

Since A is greater column A must also be greater than column B.

11.

A: $X - (-9)$

B: $Y - (12)$

AI: $0 < Y < X$

The best answer is D.

Plug in two sets of numbers: (2, 1) and (10, 1)

In the first set of numbers, $A = 11$ and $B = 13$ and so B is greater.

In the second set of numbers, $A = 19$ and $B = 13$ and so A is greater.

The answer cannot be determined and so the mark is D.

12.

A: $X - (-6)$

B: $Y - (-4)$

AI: $Y < X < 0$

The best answer is A.

Plug in numbers for X and Y, for example: $X = -1$ and $Y = -2$.

Column A = 5 and column B = 2 and so column A is greater.

13.

A: $\frac{Y}{Y - X}$

B: $\frac{X}{X - Y}$

AI: $0 > Y > X$

The best answer is B.

Plug in numbers for X and Y, for example: $X = -2$ and $Y = -1$.

Column A = $\frac{-1}{1} = -1$ and column B = $\frac{-2}{-3} = \frac{2}{3}$ and so the answer is B.

14.

A: $\frac{Y - X}{X}$

B: $\frac{X - Y}{Y}$

AI: $0 < Y < X$

The best answer is B.

Plug in numbers for X and Y, for example: $X = 2$ and $Y = 1$.

Column A = $-1/2$ and column B = 1 and so column B is greater.

15.

A: $X - (Y + Z)$

B: $X - Y + Z$

AI: $X < Y < 0 < Z$

The best answer is B.

The easiest way is to plug in some numbers.

$X = -2$, $Y = -1$ and $Z = 5$.

Column A = $-2 - (4) = -6$.

Column B = $-2 + 1 + 5 = 4$ and so this column is greater.

B. Fractions

16.

A: $\frac{1}{3} + \frac{1}{5}$

B: $\frac{1}{2} + \frac{1}{4}$

The best answer A.

$$\text{Column A} = \frac{5+3}{15} = \frac{8}{15} = \frac{32}{60}.$$

$$\text{Column B} = \frac{4+2}{8} = \frac{3}{4} = \frac{45}{60} \text{ and so this column is greater.}$$

17.

A: $\frac{3}{7} + \frac{2}{5}$

B: $\frac{2}{3} + \frac{1}{5}$

The best answer is B.

$$\text{Column A} = \frac{3}{7} + \frac{2}{5} = \frac{15+14}{35} = \frac{29}{35} = \frac{87}{105}.$$

$$\text{Column B} = \frac{2}{3} + \frac{1}{5} = \frac{10+3}{15} = \frac{13}{15} = \frac{91}{105} \text{ and so this column is greater.}$$

18.

A: $\frac{4}{X} - \frac{X^3}{6}$

B: $\frac{72X - 3X^5}{18X^2}$

AI: $X \neq 0$

The best answer is C.

Take the expression in column B: divide both the numerator and the

denominator by $3X$ to get: $\frac{24 - X^4}{6X} = \frac{4}{X} - \frac{X^3}{6}$ and so both columns are

equal and the answer is C.

19.

A: $\left[\left(\frac{1}{3}\right)^2\right]^3$

$$B: \left(\frac{1}{3}\right)^5$$

The best answer is B.

The power of $1/3$ in column A is 6 while in column B its 5 and we know that dealing with fractions, the smallest the power the largest the expression and so column B is greater.

20.

$$A: \frac{Y^2}{X^2}$$

$$B: \frac{Y}{X}$$

$$AI: X^2Y^3 > 0$$

$$XY < 0.$$

The best answer is A.

From $X^2Y^3 > 0$, we know that Y is positive and using the data that $XY < 0$ we can conclude that X is negative.

The expression in column A is positive.

The expression in column B is negative and so column A is greater.

C. Absolute value

21.

$$A: |X| + |Y|$$

$$B: |X + Y|$$

$$AI: X < 0 < Y < 1$$

The best answer is A.

Plug in numbers that fit, for example: $X = -1$ and $Y = \frac{1}{2}$.

Column A = 1.5 and column B = $\frac{1}{2}$ and so column A is greater.

22.

$$A: |Y - 7|$$

$$B: |7 - Y|$$

$$AI: Y < -2$$

The best answer is C.

The easiest way is to plug some numbers.

For example: $Y = -4$.

Column A = 11 and column B = 11 and so both columns are equal.

23.

A: $|Y - 7|$

B: $|7 + Y|$

AI: $Y < -7$

The best answer is C.

The easiest way is to plug some numbers.

For example: $Y = -8$.

Column A = 15 and column B = 1 and so column A is greater.

24.

A: $|X - 4|$

B: $|Y - 7|$

AI: $Y < X < 0$

The best answer is B.

The easiest way is to plug in numbers.

For example: $X = -1$ and $Y = -2$.

Column A = 6 and column B = 9 and so column B is greater.

25.

A: $|R + 5|$

B: $R + 5$

AI: $R < 0$

The best answer is D.

Take $R = -5$, both columns end up zero.

Take $R = -10$, column A is greater and so the answer cannot be determined.

26.

A: $|S + 3|$

B: $S + 3$

AI: $S < -3$

The best answer is A.

Take a representative number, for example $S = -5$.

Column A = 2 and column B = -2 and therefore column A is greater.

27.

A: $|Z - 17|$

B: $Z - 17$

AI: $Z > 17$

The best answer is C.

Both expressions will always be positive and so the absolute value has no meaning.

Both columns are equal.

28.

A: $|X \cdot Y|$

B: 12

AI: $Y^2 = 12$

$X^2 = 3$

The best answer is B.

From the additional data we can conclude that: $Y = \pm\sqrt{12}$ and $X = \pm\sqrt{3}$.

The expression in column A = $|\pm\sqrt{36}| = 6$ and therefore column B is greater.

29.

A: 1

B: X

AI: $32 \cdot 2^x < 2^{|x|}$

The best answer is A.

Simplify the expression: $32 \cdot 2^x < 2^{|x|} \Rightarrow 2^{5+x} < 2^{|x|} \Rightarrow 5 + X < |X|$.

Plug in $X = 1$, we can see that the inequality is wrong and so X must be smaller than 1.

Therefore column A is greater than column B.

30.

A: -2

B: Y

AI: $81 \cdot 3^y < 3^{|y|+2}$

The best answer is D.

Simplify the expression: $81 \cdot 3^Y < 3^{|Y|+2}$ ⇒

$$3^{4+Y} < 3^{|Y|+2} \Rightarrow 4+Y < |Y|+2 \Rightarrow 2+Y < |Y|.$$

Only Y smaller than -1 will validate this inequality and therefore -2 is one of them.

Y can be -2 or even -8 and so the answer is not distinct.

31.

A: Y

B: 0

AI: $XY < |XY| < X$

The best answer is B.

X is bigger than an absolute value and therefore X is positive.

XY is negative and therefore Y must be negative.

Column B is greater than column A since 0 is bigger than any negative number.

32.

A: $X \cdot |X|$

B: $-X^2$

AI: $X < 0$

The best answer is C.

The easiest way if you don't see the answer right away is to plug in numbers.

Take X= -2, column A = -4 and so is column B.

33.

A: 1

B: a

AI: $|a+b| < b$

The best answer is A.

b is positive since it is larger than an absolute value.

a can't be positive, because then the left hand side would be larger than the right hand side. a can't be zero because then both sides would be equal ⇒ the only option left is that a must be negative and so column A is greater.

34.

A: 0

B: T

AI: $|T| = T$

The best answer is D.

From the additional data we can conclude that T is greater or equal to zero and therefore we cannot determine which column is greater.

35.

A: X^3

B: X^2

AI: $X \cdot |Y| < 0$

The best answer is B.

Since $X \cdot |Y| < 0$, X must be the factor that makes the inequality negative.

The expression in column A is negative while the expression in column B is positive and thus greater.

D. Powers and simplifications

36.

A: $(Y - 2)^2$

B: $2 - Y$

AI: $0 < Y < 1$

The best answer is A.

$(Y - 2)^2$? $2 - Y$

$-(Y - 2)(2 - Y)$? $2 - Y$

$2 - Y$? 1

$2 - Y$ is greater than Y in the specified range and so the answer is A.

37.

A: $1^{X^2} + 1^Y$

B: $1^{Y^2} + 1^X$

AI: $X > 0$

$Y \geq 1$

The best answer is C.

1 by any power is 1 and therefore the columns must equal to one another.

38.

A: $(W + 1)^2$

B: $(W + 2)^2$

The best answer is D.

Simplify the expressions:

$W^2 + 2W + 1$? $W^2 + 4W + 4$ subtract common items from both sides.

$$0 \quad ? \quad 2W + 3$$

We don't know if W is positive or not and therefore the answer cannot be determined.

39.

$$A: W - Z$$

$$B: X - Y$$

$$AI: X < W$$

$$Z < Y$$

The best answer is A.

Add $Y - W$ to both columns to get: $A = Y - Z$ and $B = X - W$.

These are easier to compare, $Y > Z$ and so column A is greater.

40.

$$A: 5^X \cdot (-5)^{2X}$$

$$B: (-5)^X \cdot 5^{2X}$$

AI: X is a positive and odd number.

The best answer is A.

Column A = $(+)(+)$ since (-5) is powered by an even power.

Column B = $(-)(+)$ and so column A is greater than column B.

41.

$$A: (-5)^X$$

$$B: (-5)^{X+1}$$

AI: X is a positive and even integer

The best answer is A.

Column A = $(-5)^X$ and column B = $(-5)^X(-5)$.

Plug in $X = 2$ to get:

$A = 25$ and $B = -125$ and so column A is definitely greater.

42.

$$A: 0$$

$$B: Z$$

$$AI: X < Y$$

$$ZX < ZY$$

The best answer is B.

If Z was negative the inequality $ZX < ZY$ would be opposite and therefore we can conclude that Z is positive and thus greater than zero.

Column B is greater than column A.

43.

$$A: 0$$

$$B: P^2 - 1$$

$$AI: 3^{P+2} = 81$$

The best answer is C.

$$3^{P+2} = 81 = 3^3 \Rightarrow P + 2 = 3 \Rightarrow P = 1.$$

Column A = 0.

Column B = $1 - 1$.

Both columns are equal and so the answer is C.

44.

A: 5

B: Y

$$\text{AI: } 2^{Y-1} = 32$$

The best answer is B.

$$32 = 2^5 = 2^{Y-1} \Rightarrow 5 = Y - 1 \Rightarrow Y = 6.$$

Column A = 5.

Column B = 6.

Column B is greater than column A and so the answer is B.

45.

A: 3

B: Q

$$\text{AI: } 33^{(Q+3)} = 1$$

The best answer is A.

Any number to the power of zero is 1 and therefore we want that $Q + 3 = 0$ and so $Q = -3$.

Column A = 3 and column B = -3 and the answer is A.

46.

$$\text{A: } \left(\sqrt{A}\right)^{\sqrt{9}+1}$$

$$\text{B: } \left(A^3\right)^{\left(\frac{1}{3}+\sqrt{\frac{1}{9}}\right)}$$

The best answer is C.

Simplify each of the expressions.

$$\text{Column A} = \left(\sqrt{A}\right)^{\sqrt{9}+1} = A^{\frac{1}{2} \cdot 4} = A^2.$$

$$\text{Column B} = \left(A^3\right)^{\left(\frac{1}{3}+\sqrt{\frac{1}{9}}\right)} = A^{3 \cdot \frac{2}{3}} = A^2.$$

We can see that both columns are equal.

47.

$$\text{A: } 5^x \cdot 5^2$$

B: $(5^x)^2$

AI: $X < -2$

The best answer is

Simplify each of the expressions.

$A = 5^{x+2}$.

$B = 5^{2x}$.

Plug in $X = -4$ for example.

$A = 5^{-2} = 1/25$.

$B = 5^{-8} = 1/(5^8)$, which is a lot smaller than column A and so the answer is A.

48.

A: $(3^2)^x$

B: $3^2 \cdot 3^x$

AI: $1 < X < 2$

The best answer is B.

$3^{2x} ? 3^{2+x}$

$2x ? 2+x$

$x ? 2$

2 is greater than X and therefore column B is greater.

49.

A: $(6)^{\frac{1}{3}}$

B: $\sqrt[3]{6^{19}}$

The best answer is C.

Take the expression in column B and simplify it:

$\sqrt[3]{6^{19}} = 6^{\frac{19}{3}} = 6^{6\frac{1}{3}}$.

We can see that the columns are equal.

50.

A: 3^6

B: 6^3

The best answer is A.

I think the easiest way here is to write the expressions in the following form:

$A = 3^3 \times 3^3$

$B = (2 \times 3)^3 = 2^3 \times 3^3$, we can see that the expression in column A is greater.

51.

A: 5^6

B: $5^7 - 5^1$

The best answer is B.

Divide both sides by 5^6 :

$$1 \quad ? \quad 5 - 5^{-5}$$

$$5^{-5} \quad ? \quad 4$$

4 is much greater than 5^{-5} and therefore the answer is B.

52.

$$A: (A + 4)^2$$

$$B: (A - 4)^2$$

$$AI: 1 < A < 4$$

The best answer is A.

$$(A + 4)^2 \quad ? \quad (A - 4)^2$$

$$A^2 + 8A + 16 \quad ? \quad A^2 - 8A + 16 \quad \text{subtract } A^2 + 16 \text{ from both sides.}$$

$$8A \quad ? \quad -8A$$

$$16A \quad ? \quad 0$$

A is positive and so column A (16A) is greater.

53.

$$A: 8X - 3Y$$

$$B: 6X + 5Y$$

$$AI: X > 2$$

$$Y = 0.5$$

The best answer is A.

First replace Y with 0.5:

$$8X - 1.5 \quad ? \quad 6X + 2.5 \quad \text{Add } 1.5 - 6X \text{ to both sides.}$$

$$2X \quad ? \quad 4.$$

Since X is greater than 2, column A is greater than column B.

54.

$$A: X$$

$$B: -1$$

$$AI: \frac{6 - 2X}{4} = 1 - 2X$$

The best answer is A.

$$\text{Simplify the expression in the additional data: } \frac{6 - 2X}{4} = 1 - 2X \Rightarrow 6 - 2X = 4 - 8X.$$

$$\Rightarrow 6X = -2 \Rightarrow X = -1/3, \text{ which is larger than } -1 \text{ and therefore column A is greater.}$$

55.

$$A: 13 + 2X$$

$$B: 3.5X + 7$$

$$AI: X > 5$$

The best answer is B.

$$13 + 2X \quad ? \quad 3.5X + 7 \quad \text{subtract } (7 + 2X) \text{ from both sides.}$$

$$6 \quad ? \quad 1.5X.$$

The expression in column B can be 9 and up and therefore column B is greater.

56.

A: $7 - 3Y$

B: $2Y - 13$

AI: $Y \leq 3$

The best answer is A.

$7 - 3Y \quad ? \quad 2Y - 13$ Add $3Y + 13$ to both sides.

$20 \quad ? \quad 5Y$

Column B can be 15 at most and therefore column A is greater.

57.

A: $a^{X+1} \cdot b^{X-1}$

B: $\frac{1}{b^2}$

AI: $a \cdot b = 1$

The best answer is C.

From the extra data we know that $a = 1/b$.

Simplify the expression in column A:

$$a^{X+1} \cdot b^{X-1} = \left(\frac{1}{b}\right)^{X+1} \cdot b^{X-1} = b^{-X-1} \cdot b^{X-1} = b^{-2} = \frac{1}{b^2}.$$

We can see that both columns are equal.

58.

A: Y

B: $\frac{1}{4}$

AI: $XY = 2$

$$X^3Y^3Z^3 = X^4Y^5Z^3$$

$$Z \neq 0$$

The best answer is A.

Take $X^3Y^3Z^3 = X^4Y^5Z^3$ and divide both sides by Z^3 : $X^3Y^3 = X^4Y^5$ \Rightarrow

Replace XY with 2: $2^3 = 2^4Y$ $\Rightarrow Y = \frac{1}{2}$ and therefore column A is greater.

59.

A: X

B: $\frac{1}{2}$

AI: $X^X \cdot X^{2X} = (X^2)^3$

$$X > 1$$

The best answer A.

$$X^X \cdot X^{2X} = (X^2)^3 \Rightarrow X^{3X} = X^6.$$

Compare the powers: $3X = 6 \Rightarrow X = 2$.

Column A is greater than column B.

60.

A: 160

B: $\frac{3^{10} \cdot 6^8}{18^7}$

The best answer is B.

There is only one way to solve this problem (guessing doesn't count):

$$\frac{3^{10} \cdot 6^8}{18^7} = \frac{3^{10} \cdot 6^8}{(6 \cdot 3)^7} = \frac{3^{10}}{3^7} \cdot \frac{6^8}{6^7} = 3^3 \cdot 6 = 27 \cdot 6 = 162.$$

Column B is greater than column A.

1.

$$\text{A: } \frac{1}{3} + \frac{5}{6} + \frac{1}{4}$$

$$\text{B: } \frac{6}{7} + \frac{6}{14} + \frac{1}{4}$$

The best answer is B.

Take each column and reduce it to one variable.

Since both sides have the variable $\frac{1}{4}$ subtract it from both sides.

$$\text{Reduce column A to } \frac{1}{3} + \frac{5}{6} = \frac{8+20}{24} = \frac{28}{24} = \frac{14}{12} = \frac{7}{6}.$$

$$\text{Column B can be written as } \frac{6}{7} + \frac{6}{14} = \frac{12+6}{14} = \frac{18}{14} = \frac{9}{7}.$$

Again, it's still hard to compare and so we'll find another common denominator.

$$\frac{7}{6} = \frac{49}{42}$$

$$\frac{9}{7} = \frac{54}{42}$$

⇒ And so column B is greater.

2.

$$\text{A: } \frac{4}{5} + \frac{4}{5}$$

$$\text{B: } \frac{4}{5} \times \frac{4}{5}$$

The best answer is A.

A can be simplified to $\frac{8}{5}$.

B can be simplified to $\frac{16}{25}$, which is definitely smaller than column A.

3.

$$\text{A: } \frac{6}{21} + \frac{12}{15} + \frac{9}{24}$$

$$\text{B: } \frac{1}{2} + \frac{1}{3} + \frac{14}{15}$$

The answer is B.

We can write column B as $\frac{12}{24} + \frac{7}{21} + \frac{14}{15}$. We can see that all the variables in column

B are greater than those in column A and therefore the answer is B.

4.

A: 14 percent of 50

B: 15 percent of 51

The best answer is B.

$$\text{A can be written as } \frac{14}{100} \times 50 = \frac{700}{100} = 7.$$

B can be written as $\frac{15}{100} \times 51 = \frac{765}{100}$, and therefore column B is greater.

5.

A: 17 percent of 300

B: 15 percent of 312

The best answer is A.

A can be written as $\frac{17}{100} \times 300$ and B can be written as $\frac{15}{100} \times 312$.

Since the denominator of both columns is the same we can only compare the numerator, divide both numerators by 15 to get:

A: 17×20 , which is 340 and B: 312.

We can see that A is greater.

6.

A: Q^5

B: $3Q^2$

AI: $2Q^3 = -432$

The best answer is B.

In this question you don't really need to calculate the actual numbers only pay attention to signs. From the additional data we can conclude that Q is negative since the power is odd. A will result in a negative number but B has an even power and so the result is positive.

7.

A: $3X$

B: X^2

AI: $X^4 = 81$

The best answer is D.

From the additional data we can conclude that X is 3 or -3.

If $X = 3$, then A is greater but if $X = -3$, B is greater and so the answer cannot be determined.

8.

A: P^2

B: $2P$

AI: P is a prime number between 1 and 4 inclusive

The best answer is D.

Since P can be 2 and also 3, the answer cannot be determined.

If $P = 2$, $A = 4$ and $B = 4$ but if $P = 3$, $A = 9$ and $B = 6$ and therefore the answer cannot be determined.

9.

A: Y

B: 5

AI: $-5 < Y < 5$

The best answer is B.

The range of Y does not include 5 and therefore 5 is a number that is always greater than Y.

10.

A: B

B: 2

AI: $A < B < C$

A, B and C are positive prime numbers.

$C = 3$

The best answer is C.

From the additional data we can conclude that $A = 1$, $B = 2$ and $C = 3$ and therefore both columns are equal.

11.

A: The unit's digit of X

B: 3

AI: In a three digit positive integer X, the hundreds' digit is four times the units' digit.

The best answer is B.

If the hundreds' digit is four times the units' digit, then the unit digit can be 2 or smaller (if its 3, then the hundreds' digit is bigger than 9, which is not possible) and therefore column B must be greater.

12.

A: The units' digit

B: 9

AI: In the three digits number Y, the units' digit is two times greater than the tens' digit and four times greater than the hundreds' digit.

The best answer is B.

Using the additional information, we have two options: 124 and 248, in both cases 9 is greater than the unit's digit and so the answer is B.

13.

A: The perimeter of a square with an area of 20

B: The perimeter of a square with side 4.5

The best answer is A.

The question is about, which square has the largest side.

The square of column A has a side of $\sqrt{20}$.

The square of column B has a side of 4.5 and so the area is $(4.5)^2 = 20.25$ and therefore its perimeter is also greater.

14.

A: The area of a square with side 2

B: The area of a circle with a radius of 1.5

The best answer is B.

The area of the square is 4, compare it with the area of the circle.

The area of the circle is $p \times R^2$, which is equal to approximately $3.14 \times (1.5)^2 = 3.14 \times 2.25 > 4$ and therefore column B is greater.

15.

A: $X + Y$

B: $2Y$

$$\text{AI: } 1.5X = \frac{6}{7}Y = \frac{3}{2}Z$$

Z is negative

The best answer is B.

Replace X and Y with Z.

$$X = Z, Y = \frac{21}{12}Z.$$

Column A is equal to $Z + \frac{21}{12}Z = \frac{33}{12}Z$ and column B is equal to $\frac{42}{12}Z$, which is greater and so B is the answer.

16.

A: $Q + 2W - P$

B: $2P + 2Q$

$$\text{AI: } 0.5Q = 1.5W = 2P$$

The best answer is

Replace Q and W with P.

$$Q = 4P, W = 4P/3.$$

Column A can be written as $4P + 8P/3 - P = P/3$.

Column B can be written as $2P + 8P = 10P$, which is greater than column A.

17.

A: The average (arithmetic mean) of the two numbers.

B: 3

AI: The product of two integer numbers is 15.

The best answer is D.

If the product of the two numbers is 15 then they can be 15 and 1 or 3 and 5, the average of both pairs is bigger than 3 and so it seems like the answer is A. Don't be mistaken, you were not told that the numbers were positive and so they can also be -5 and -3, with an average smaller than 3.

18.

A: The average (arithmetic mean) of the two numbers.

B: $3\frac{1}{3}$

AI: The product of two positive numbers is 10

The best answer is D.

The product of the two numbers is 10 and so they can be 2 and 5, 1 and 10 and even $\sqrt{10}$ and $\sqrt{10}$. In the first two cases the average is bigger than column B but the average of the third case is $\sqrt{10}$, which is smaller than $3\frac{1}{3}$ and so the answer is D.

19.

A: The average (arithmetic mean) of the three numbers.

B: 5

AI: The product of three integer positive numbers is 12.

The best answer is B.

There are many combinations of numbers which their product is 12:

(1, 1, 12), (3, 4, 1), and (6, 2, 1).

The average of all three combinations is smaller than 5.

20.

A: The remainder is when $n + 2$ is divided by 8

B: 7

AI: The remainder when $n-1$ is divided by 10 is 0, and the remainder when $n+1$ is divided by 18 is 4.

The best answer is C.

Using the additional data we can conclude that n is equal to 21.

According to column A, the remainder is $(23/8 = 7)$, which is equal to column B.

21.

A: The remainder is when $n - 3$ is divided by 6

B: 4

AI: The remainder when $n+1$ is divided by 9 is 5, and the remainder when $n-1$ is divided by 5 is 2.

The best answer is C.

Using the additional data we can conclude that n is equal to 13.

According to column A, the remainder is $(10/6 = 4)$, which is equal to column B.

22.

A: The remainder is when $n + 7$ is divided by 17

B: 9

AI: The remainder when $n+3$ is divided by 9 is 4, and the remainder when $n-1$ is divided by 5 is 1.

The best answer is A.

Using the additional data we can conclude that n is equal to 37 for example.

According to column A, the remainder is $(44/17 = 10)$, which is greater than column B.

23.

A: X

B: 4

AI: The average (arithmetic mean) grade point average of X students is 86.

The average of these X students together with a score of 92 is 88.

The best answer is B.

Let's write the average of the X students with the extra grade:

$$\frac{86X + 92}{X + 1} = 88 \Rightarrow 86X + 92 = 88X + 88 \Rightarrow 2X = 4 \Rightarrow X = 2.$$

24.

A: Y

B: 3

AI: The average (arithmetic mean) age of Y family members is 20.

When a new baby was born (assume that his age is 0), the new average was 15.

The best answer is C.

Use the average formula: $\frac{20Y + 0}{Y + 1} = 15 \Rightarrow 20Y = 15Y + 15 \Rightarrow Y = 3.$

25.

A: $12^6 + 12^7$

B: 13×12^6

The best answer is C.

Remember, compare don't calculate.

A can be written as $12^6 + 12 \times 12^6 = 13 \times 12^6$, which is equal to column B.

26.

A: $8^7 \times 4^3$

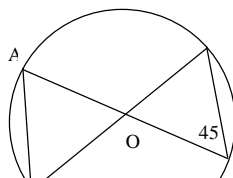
B: 4^{12}

The best answer is A.

A can be written as $2^{3 \times 7} \times 2^{2 \times 3} = 2^{27}.$

B can be written as $2^{2 \times 12} = 2^{24}$, which is smaller than column A.

27.



A: AB

B: BO

AI: O is the centre of the circle

The best answer is A.

Don't let the proportions of the drawing fool you.

Since O is the centre of the circle, both triangles are isosceles and so the angle which is closer to the origin is $(180 - 45 - 45 = 90)$. AB is the side that is in front of the 90 degree angle and so it's the hypotenuse.

28.

A: The original number of Girls in the playground

B: 16

AI: After 5 girls leave the playground; there are three times as many boys than girls.

After 25 more boys leave the playground, there are twice as many girls than boys.

The best answer is B.

Let G be the number of girls and B the number of boys.

We can write the following equations:

$$3(G - 5) = B \text{ and } 2(B - 25) = G - 5.$$

From these two equations, we can find that $G = 15$ and so the answer is B.

29.

A: The original number of cats in the yard

B: The original number of dogs in the yard

AI: After 7 dogs leave the yard, there are two times as many cats than dogs. After a further 16 cats leave the yard, there are two and a half as many dogs as cats.

The best answer is A.

Let D be the number of dogs in the yard and C the number of cats.

We can write the following equations:

$$2(D - 7) = C \text{ and } (D - 7) = 2.5(C - 16)$$

Solving these equations, $D = 17$ and $C = 20$.

And therefore the answer is A.

30.

A: The number of yellow papers in the pile

B: 120

AI: There are at least 120 blue papers in the piles of papers.

The ratio between the number of blue papers to yellow papers is 7 to 6.

The best answer is D.

There could be 120 blue papers in the pile and there could also be 500 for example. If there are 120 there'll be less than 120 yellow papers but if there'll be 500 for

example, there'll be more than 120 and therefore more sufficient data is required to answer the question.

31.

A: The number of cookies in the jar

B: 45

AI: There are at least 45 doughnuts in the jar. The ratio between the number of cookies to the number of doughnuts in the jar is 12 to 13.

The best answer is A.

The number of doughnuts is more than 45 and using the ratio, the number of cookies is larger than the number of doughnuts and therefore the answer must be A.

32.

A: The number of crystal glasses in the kitchen cupboard

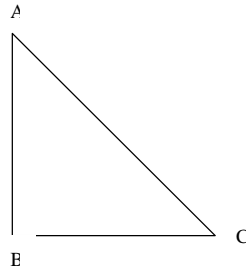
B: The number of ceramic glasses in the kitchen cupboard

AI: There are at least 70 crystal glasses and no more than 70 ceramic glasses in the kitchen cupboard

The best answer is D.

The number of crystal glasses is 70 and up and the number of ceramic glasses is 70 and down. There could be 70 of each, which will make C the answer and there could be 50 ceramic and 80 crystal for example and then the answer would be A. Since the answer is not distinct, more data is required.

The following questions refer to the figure below (33 – 35):



33.

A: The measurement of the angle BAC

B: The measurement of the angle ACB

The best answer is D.

We are not given any data on the triangle and therefore we cannot determine the size of any angle.

34.

A: The measurement of the following angles: BAC and ACB

B: 90 degrees

AI: The triangle is an isosceles

The best answer is D.

Again, the only information is that the triangle is an isosceles, which is insufficient in this case. The measurement of ABC is not necessarily 90 degrees and therefore we cannot determine if $BAC + ACB$ are larger or smaller than 90 degrees.

35.

A: The measurement of BAC

B: 90 degrees.

AI: ABC is a right triangle, where the measurement of ABC is 90 degrees.

The best answer is B.

Since the triangle is a right one, the sum of the other two angles sums up to 90 degrees and therefore BAC cannot be 90 degrees by itself.

36.

A: -0.00506

B: -0.00605

The best answer is A.

In negative numbers, the smaller the number is in absolute value, the larger it is. The absolute value of A is smaller than that of B and therefore it is larger.

37.

A: -0.0033

B: -0.000333

The best answer is B.

In negative numbers, the smaller the number is in absolute value, the larger it is. The absolute value of B is smaller than that of A since it is closer to zero and therefore it is larger.

38.

A: X

B: Y

AI: $-X - Y = 156$

$X = 2Y$

The best answer is B.

Replace X with 2Y in the first equation to get: $-2Y - Y = 156 \Rightarrow Y = -52$

And so $X = -104$. We can see that Y is larger.

39.

A: $W^2 + Y^2$

B: $Q^2 + R^2$

AI: W is positive, Y is negative, Q is positive and R is negative.

$$Y > R > W > Q$$

The best answer D.

Pay no attention to the first line of the extra data since all the variables have a positive power. Take two sets of numbers: Y, R, W and Q = 4, 3, 2 and 1 respectively, in this case, A = 20 and B = 10.

Take Y, R, W and Q = -1, -2, -3 and -4 respectively. In this case A = 10 and B = 20 and therefore the answer is not distinct and cannot be determined.

40.

$$A: \sqrt{7^2 + 8^2}$$

$$B: \sqrt{6^2 + 9^2}$$

The best answer B.

Simplify each of the statements to the following:

$$A = \sqrt{49 + 64} = \sqrt{113} \text{ and } B = \sqrt{36 + 81} = \sqrt{117}. \text{ And therefore the answer is B.}$$

1.
A: $(X + Y)^2$
B: $2XY$

The best answer is D.

Open the expression in column A to $X^2 + 2XY + Y^2$, now subtract $2XY$ from both sides and so we compare $X^2 + Y^2$ with 0. In all cases except for one (where X and Y are zero) A would be greater than B and so the answer cannot be determined.

2.
A: $(X + Y)(X - 2Y)$
B: $XY + 8$

The best answer is D.

Open the parenthesis in column A: $X^2 - 2XY + YX - 2Y^2 = X^2 - XY - 2Y^2$.

Subtract $XY - 8$ from both sides to get:

$A = X^2 - 2XY - 2Y^2 - 8$ and $B = 0$.

We don't know anything about X and Y and so the answer cannot be determined properly.

3.
A: Y
B: 5
AI: In the two digits number XY, the value of the digit X is twice the value of the digit Y.

The best answer is B.

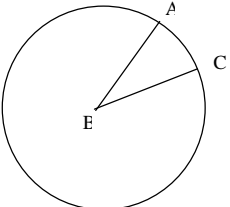
There are few possibilities for the number XY: 21, 42, 63 and 84. As you can see, the largest value that Y can be is 4 and therefore 5 is always greater.

4.
A: Y
B: 4
AI: In the two digits number XY, the value of the digit X is the square root of the digit Y.
 $Y < 5$

The best answer is D.

There are the following options for the double digit XY: 11 and 24.

Since in the first case the answer is B and in the other its C, the final answer should be D.

- 5.
- 

A: The area of the circle

B: $15p$

AI: The area of the section ABC is p

The measurement of the angle ABC is 24 degrees.

The best answer is C.

Since the measurement of the angle ABC is 24 degrees, there are $(360/24 = 15)$ equivalent sections in the circle and therefore the area of the circle is $15p$ and therefore the answer is C.

6.

A: The number of pencils that David bought

B: $\frac{2X - 45 + 2y}{3}$

AI: William bought X yellow colored pencils and Y red ones.

David bought 15 pencils fewer than two third of the total number of Pencils that William bought.

The best answer is C.

Translate the phrase into variables: The number of pencils that David bought is equal

to: $\frac{2}{3}(X + Y) - 15$, which can also be written as $\frac{2X - 45 + 2y}{3}$ and therefore both columns are even.

7.

A: $\frac{4S + 4Q - 36}{3}$

B: The amount of cloths that Tamara bought.

AI: Tammy bought S skirts and Q shirts. Tamara bought 12 cloths more than four thirds of the amount Tammy bought.

The best answer is B.

Translate the phrase into variables. Tamara bought $\frac{4}{3}(S + Q) + 12$, which can also be written as $\frac{4S + 4Q + 36}{3}$. This expression is definitely greater than that in column A.

8.

A: Y

B: 3

AI: $125 \times 18 \times 12 \times Y = 20 \times 3 \times 6 \times 9 \times 25$

The best answer is C.

The expression given can be simplified to:

$25 \times 5 \times 3 \times 6 \times 4 \times 3 \times Y = 4 \times 5 \times 3 \times 6 \times 3 \times 3 \times 25$ ~~e~~ Divide by common variables.

It turns out that $Y = 3$ and therefore the answer is C.

9.

A: X

B: 37

$$\text{AI: } -\frac{4}{X} + \frac{1}{8} = \frac{2}{3X}$$

The best answer is A.

Simplify the expression, multiply by $24X$ to get: $-96 + 3X = 16 \Rightarrow X = 37\frac{1}{3}$.

10.

A: The length of side BC

B: 14

AI: The perimeter of an isosceles ABC is 36 and the length of side AB is 10.

The best answer is B.

There are two options to build the triangle: 10, 10 and 16 or 10, 13 and 13.

In either case, 14 is bigger than any of the sides and therefore B is the answer.

11.

A: 0

B: The value of Y when $X = 4$

AI: $X = (Y + 2)^2$

The best answer is C.

First, do the obvious and replace X with 4, the expression becomes: $4 = (Y + 2)^2$. $2 = Y + 2 \Rightarrow Y = 0$.

12.

A: The value of X when $Y = 7$

B: 9.5

AI: $X = \sqrt{Y^2 + 36}$

The best answer is B.

Replace Y with 7 to get: $X = \sqrt{85}$, which is between 9 and 9.5 and therefore the answer is B.

13.

A: The time it took car A to travel from point A to point B

B: The time it took car B to travel from point A to point B

AI: The average speed of car A is 30 miles per hour and the average speed of car B is 25 percent faster. Car A left 12 minutes after car B.

The best answer is A.

Don't be mistaken, some of the given data is irrelevant since it has no correlation with the question. The information given to you on the time of departure should not be used; you are interested in the time between the points. Car A is slower and therefore it would take her more time to get from point A to point B.

14.

A: The number of meters traveled by a beetle that traveled for four hours at an average speed of 1.5 meters per minute

B: The number of meters traveled by a turtle that traveled for two minutes at an average speed of 2.5 meters per minute

The best answer is A.

Use the distance formula; Distance = speed x time.

The distance of the beetle is equal to $4 \times 1.5 = 6$ and the distance of the turtle is $2 \times 2.5 = 5$ and therefore the answer is A.

15.

A: The weight of one ton of feathers

B: The weight of one ton of lead

The best answer is C.

This question is a little tricky since reading it draws a picture in our head of a stack of feathers verses a stack of lead. Both columns claim the weight of each of the components and therefore the answer is C.

16.

A: The number of eggplants in a bag that weighs 4 pounds

B: The number of strawberries in a bag that weighs 3 pounds

The best answer is D.

You cannot assume that an eggplant weighs more than a strawberry since that information was not given to you in the question. These kinds of questions give us a misleading picture in our head which should be neglected.

17.

A: The number of packages that can be made from a pile of 135 pencils

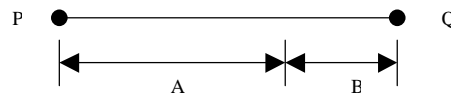
B: 12

AI: Each package contains a dozen pencils

The best answer is B.

If each package contains a dozen pencils (meaning 12 pencils), then by dividing 135 by 12 we'll get the number of whole packages that can be made. ($135/12 = 11$ with a remainder of 3) and therefore 11 packages can be made.

18.



A: The distance from P to Q

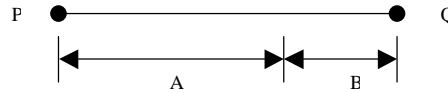
B: 22

AI: $A + 2B = 18$

The best answer is B.

The distance from P to Q is equal to $A + B$. We know that A and B are both positive from the drawing and that $A + 2B$ is smaller than 22 and therefore $A + B$ must also be smaller than 22.

19.



A: 14

B: The distance from P to Q back and forth

AI: $3A + 3B = 21$

The best answer is C.

The distance from P to Q is $A + B$, which is equal to 7 and therefore the distance back and forth is twice 7, thus 14.

20.

A: $A - B$

B: $B - A$

AI: $A < B$

The best answer is B.

Pick up numbers, say $A=1$ and $B=2$: Column A = -1 and column B = 1.

Just to be sure pick up negative numbers also, $A=-2$ and $B=-1$: column A = -1 and column B = 1 and therefore B is the answer.

21.

A: $X - Y$

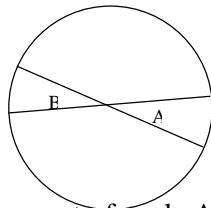
B: $Y - X$

AI: $X \leq Y$

The best answer is D.

For any combination except $X=0$ and $Y=0$, the answer would be B yet this combination is valid and so D is the proper answer in this one.

22.



A: The measurement of angle A

B: The measurement of angle B

AI: The intersection of the two lines is not in the centre of the circle

The best answer is C.

When two lines are crossed two identical angles are formed- vertical angles.

These angles are equal incoherently to where the intersection is and therefore the answer is C.

23.

$\frac{1}{4}$	$\frac{3}{5}$
Y	X

A: X

B: Y

AI: The sum of the variables in the first diagonal equal to those in the second diagonal

The best answer is A.

We can write that: $\frac{1}{4} + X = Y + \frac{3}{5}$ **à** $X - Y = \frac{3}{5} - \frac{1}{4} = \frac{7}{20}$, which is positive and therefore X is larger than Y.

1.

$$\begin{array}{l} \text{A: } \frac{\frac{2}{3} \times \frac{1}{5}}{\frac{7}{4} \times \frac{1}{2}} \\ \text{B: } \frac{\frac{1}{2} \times \frac{7}{4}}{\frac{2}{3} \times \frac{1}{5}} \end{array}$$

The best answer is

Simplify each of the expressions.

Column A can be written as: $\frac{2 \times 1 \times 4 \times 2}{3 \times 5 \times 7 \times 1} = \frac{16}{105}$.

Column B can be written as: $\frac{1 \times 7 \times 3 \times 5}{2 \times 4 \times 2 \times 1} = \frac{105}{16}$, which is bigger than one and thus greater than column A.

2.

$$\begin{array}{l} \text{A: } \frac{8.008}{4} \\ \text{B: } \frac{10.001}{5} \end{array}$$

The best answer is A.

Column A is simple, the result of the expression is 2.002.

In column B there are two numbers to be divided: 10 and 0.001. The first results in 2 and the second results in 0.0002 and so column B is equal to 2.0002, which is smaller than column A.

3.

$$\text{A: } 2.5 \times 3.5 \times 8.8 \times 4.5$$

$$\text{B: } 5 \times 3.5 \times 4.4 \times 9$$

The best answer is B.

Don't calculate, compare.

Simplify column B into; $2.5 \times 2 \times 3.5 \times 4.4 \times 4.5$

Simplify column A into; $2.5 \times 2 \times 3.5 \times 4.4 \times 2 \times 4.5$

Divide by common items.

Column A = 2 and column B = 4 and therefore the answer is B.

4.

A: The distance from nest M to nest O

B: 10 miles

AI: A flock of birds flies north from nest M to nest N at an average speed of 8 miles per hour and then west from nest N to nest O at an average speed of 3 miles per 30 minutes.

The best answer is C.

Draw a sketch of the path, you can see that the birds form a right triangle with three corners: M, N and O.

The distance from M to O can be calculated using the Pythagoras principle as followed: $MO = \sqrt{8^2 + (2 \times 3)^2} = 10$ miles and therefore the answer is C.

5.

A: $(5 - \sqrt{13})(-\sqrt{13} - 5)$

B: $(\sqrt{13} - 5)(\sqrt{13} + 5)$

The best answer is C.

Remember the expression: $(X + Y)(X - Y) = X^2 - Y^2$.

Now use this formula in both cases to get:

A: $(-\sqrt{13})^2 - (5)^2 = 13 - 25 = -12$.

B: $(\sqrt{13})^2 - 5^2 = -12$ and therefore both columns are equal.

6.

A: $0.5 - \left(\frac{1}{2}\right)^n$

B: 0

AI: n is a positive integer greater than zero

The best answer is D.

When $n=0$, column A equals to zero but in all the other cases it doesn't and therefore the answer cannot be determined.

7.

A: $3 - \left(\frac{2}{7}\right)^x$

B: 0

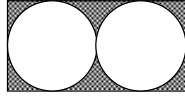
AI: X is a negative integer

The best answer is B.

X can be -1, -2, -3 and smaller.

Take $X = -1$, in this case column A = $3 - 3.5 = -0.5$. All other X's give even a smaller result and therefore column B is greater.

8.



A: The area of the shaded region

B: The area of one and a half circles

AI: Two circles with the same radius are blocked inside a rectangle.

The best answer is B.

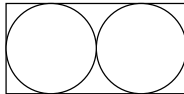
The area of the circle is $p \times R^2$ and therefore the area of one and a half circles is equal to $1.5 \times p \times R^2$.

The area of the rectangle is $(4R)(2R) = 8R^2$.

The area of the shaded region is approximately $8R^2 - 2 \times 3.14R^2 = 1.7R^2$

Column A = $1.7R^2$ and column B = approximately $4.7R^2$ and therefore the answer is B.

9.



A: The perimeter of the rectangle

B: The circumference of the two circles

AI: Two circles with the same radius are blocked inside a rectangle.

The best answer is B.

The circumference of the two circles is $2 \times (2 \times p \times R) = 4pR \approx 12.56R$.

The perimeter of the rectangle is $2(4R) + 2(2R) = 12R$ and therefore column B is greater.

10.

A: $4 + 4^2 + 4^3 + 4^4$

B: 4^5

The best answer is B.

Don't try to solve these columns, instead compare.

$4^5 = 4 \times 4^4 = 4^4 + 4^4 + 4^4 + 4^4$, which is definitely greater than column A.

Lets do some questions according to subjects...

Algebra

11.

A: Y^2

B: $|Y|$

AI: $-1 < Y < 0$

The best answer is B.

Take a representative number: $Y = -1/2$.

Column A = $1/4$ and column B = $1/2$ and therefore the answer is B.

12.

A: $(A + B)^2$

B: $(A - B)^2$

AI: A and B are different from zero.

The best answer is D.

Simplify both columns and subtract common items.

$$A = A^2 + 2AB + B^2.$$

$$B = A^2 - 2AB + B^2.$$

Compare between $2AB$ to $-2AB$. There is no room to compare since we don't know if A and/or B are positive or negative.

13.

A: $3X$

B: $2Y$

AI: $X > Y$

The best answer is A.

If $X > Y$ then $3X$ is definitely greater than $2Y$ and so the answer is A.

14.

A: $3Y$

B: $2X$

AI: $X > Y$

The best answer is D.

Take two sets of numbers: $(X, Y) = (2, 1)$ and $(3, 2)$.

For the first pair, $A = 3Y = 3$ and $B = 2X = 4$ ⇒ Column B is greater.

For the second pair, $A = 3Y = 6$ and $B = 2X = 6$ ⇒ Both columns are equal and therefore the answer cannot be determined.

15.

A: $\frac{X - Y}{X}$

B: $\frac{Y - X}{Y}$

AI: $0 > X > Y$.

The best answer is B.

Column A: The numerator of the fraction is positive and the denominator is negative and therefore the whole expression is negative.

Column B: The numerator is negative and so is the denominator and so the whole expression is positive and greater than column A.

16.

A: $|X - 7|$

B: $|Y - 8|$

AI: $0 > X > Y$.

The best answer is B.

Both variables are negative, where Y is “more” negative.

Since we subtract from Y a larger number, the result will definitely be smaller than that in column A but don’t forget the absolute value, which makes it greater.

17.

A: $|X - 7|$

B: $|Y - 8|$

AI: $0 > Y > X$.

The best answer is D.

Take two sets of numbers: $(X, Y) = (-2, -1)$ and $(-15, -10)$.

For the first pair: $A = 9$ and $B = 9$ and for the second pair: $A = 22$ and $B = 18$ and therefore the answer cannot be determined.

18.

A: 27^3

B: 3^{27}

The best answer is B.

Column A can be written as $3^{3 \times 3} = 3^9$ and thus column B is greater.

19.

A: $B(B - A)$

B: $A(A - B)$

AI: $0 > A > B$

The best answer is A.

Column A: The variable out side the parenthesis is negative and the expression in side the parenthesis is negative and therefore the entire expression is positive.

Column B: : The variable out side the parenthesis is negative and the expression in side the parenthesis is positive and therefore the entire expression is negative.

20.

A: $16X^2$

B: $4X$

AI: $0 < X < \frac{1}{4}$

The best answer is B.

Input a number for X, for example: $X = \frac{1}{8}$.

Column A = $16 \times \left(\frac{1}{8}\right)^2 = \frac{1}{4}$.

Column B = $\frac{1}{2}$.

21.

A: $\left(A^4\right)^{\frac{1}{3}+\frac{1}{6}+\frac{1}{8}}$

B: $\left(\sqrt[3]{A}\right)^{\frac{14}{3}}$

AI: $A > 0$.

The best answer is B.

Column A can be simplified to: $A^{4\left(\frac{5}{8}\right)} = A^{\frac{20}{8}} = A^{\frac{5}{2}}$.

Column B can be simplified to: $\left(\sqrt[3]{A}\right)^{\frac{14}{3}} = A^{\left(\frac{2}{3}\right)} \times A^{\left(\frac{14}{3}\right)} = A^{\frac{16}{3}}$.

The power of A in column B is greater than that in column A and therefore the answer is B.

22.

A: $\frac{1}{|X+Y|}$

B: $\frac{1}{|Y|} + \frac{1}{|X|}$

AI: $X > Y; (X, Y \neq 0); X \neq -Y$

The best answer is D.

There isn't enough data on the unknowns and so we'll input numbers.

Take $X=2$, $Y=1$: Column A = $\frac{1}{3}$ while column B = $\frac{3}{2}$, the answer is B.

Take $X=2$, $Y=-3$: Column A = $\frac{1}{5}$ while column B = $\frac{5}{6}$, the answer is A.

We received two different answers and so the answer is D.

23.

A: $|Q + 4|$

B: $|Q - 1|$

AI: $Q < -5$

The best answer is B.

Input a number for Q, for example $Q = -8$.

$A = 4$ and $B = -9$ and therefore column B is bigger.

24.

A: X^2

B: $(X - Y)^2$

AI: $X > 0 > Y$

The best answer is B.

Column B can be written as $X^2 - 2XY + Y^2$.

Subtract X^2 from both columns to get 0 in column A and $Y^2 - 2XY$ in B.

Add $2XY$ to both columns: Now we compare $2XY$ Vs. Y^2 . The first is negative and the second is positive and therefore Column B is greater.

25.

A: $A - B$

B: $A + B$

AI: $A < -10$ and $B < -1$.

The best answer is A.

$A - B \quad ? \quad A + B$ subtract A from both sides.

$-B \quad ? \quad B$

Now, B is negative and therefore column A will be positive, which is greater.

26.

A: $R + \frac{1}{R+1}$

B: $R+1 + \frac{1}{R}$

AI: $R > 1$.

The best answer is B.

Plug in a number for R, for example $R = 2$.

Column A = $2 + 1/3$.

Column B = $2 + 1 + 1/2$, which is greater than column A.

27.

A: $W^2 - S^2$

B: $S - W$

AI: $S > W > 3.5$

The best answer is A.

$W^2 - S^2$? $S - W$

$(W - S)(W + S)$? $-(W - S)$ divide both sides by $(W - S)$

$(W + S)$? -1

Both W and S are positive and therefore column A is greater.

Problems

28.

A: A

B: 70 percent of B

AI: $B = 130\% \cdot A$

A and B are positive numbers.

The best answer is A.

Replace A with 100 (for example) $\Rightarrow Y = 130$.

Column A = 100.

Column B = 70% of 130, which is 91 and therefore column A is greater.

29.

A: 75% of X

B: Y

AI: $X = 125\% \cdot Y$

X and Y are positive numbers.

The best answer is B.

Replace Y with 100 $\Rightarrow X = 125$.

Column B = 100.

Column A = 75% of 125, which is less than 100 and therefore the answer is B.

30.

A: 28%

B: The percent of guys Mary went out with that didn't dye their hair

AI: 30% of the boys that Mary went out with are bold.

60% of the boys with hair that Mary went out with, dye their hair.

The best answer is C.

Input 100 as the number of boys that Mary went out with.

30% are bold, thus 30 boys. The number of not bold boys is $(100 - 30 = 70)$ boys. Out of these 70, 60% dye their hair, thus 42 boys. The rest (28) is the percent of boys that don't dye their hair and therefore the answer is C.

31.

A: The number of different sets that can be made where the color of the hat is identical to the color of the shirt

B: The number of different sets that can be made where the color of the hat is different from the color of the shirt

AI: In a certain closet, three green hats, a black shirt, a green shirt and a blue shirt.

The best answer is B.

Column A: Three hats multiplied by one green shirt is three combinations only.

Column B: 3 sets from the black shirt with all the hats and 3 more from the blue shirt with all the hats. 6 sets in total and therefore this column is greater.

32.

A: The number of possibilities of choosing a pair of a boy and a girl.

B: The number of possibilities of choosing a pair of two boys.

AI: There are 7 boys and 6 girls.

The best answer is A.

Column A: $7 \times 6 = 42$ is the number of possibilities.

Column B: For the first boy there are 7 options and for the second one there are 6, and again there are 42 possibilities. Don't forget to divide by 2 because there is no meaning to the order of the possibilities.

33.

A: The number of possibilities of choosing a couple of cards

B: The number of possibilities of choosing three cards

AI: There are 5 cards in the deck.

The best answer is C.

The cards can be divided into two groups of 2 and 3.

When you pick up two cards there are 3 left, which are actually also chosen.

In the same manner, when you choose 3 cards, there are 2 left and therefore the number of possibilities is the same.

34.

A: $\frac{1}{2}$

B: The probability that George will choose a shirt and pants in different colors

AI: George has red shirt and a blue shirt.

George has a red pair of pants and a brown one as well.

The best answer is B.

Lets enumerate all the options in column B:

(Red, Red), (Red, Brown), (Blue, Red), (Blue, Brown).

Three out of four combinations fit the criteria's of column B and therefore the answer is B.

35.

A: The probability that the sum of the numbers that will be received from two tosses will be even

B: The probability that the sum of the numbers that will be received from two tosses will be odd

AI: A coin is marked with 0 on one side and with 1 on the other

The best answer is C.

Write all the combinations:

(1,1) → even

(0,0) → even

(0,1) → odd

(1,0) → odd

The probability for an even sum and an odd sum is $\frac{1}{2}$.

36.

A: The sum of all the natural numbers from 1 to 40 inclusive

B: 810

The best answer is A.

Use the arithmetic progression formula.

The sum is $= \frac{40 \times (40 + 1)}{2} = 20 \times 41 = 820$, which is greater than column B.

37.

A: 27

B: The number of germs at 17:30

AI: A germ multiplies it self every round hour. 3 germs were placed in a small plate at 14:30.

The best answer is A.

At 14:30 there were 3 germs.

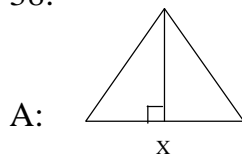
At 15:00 there were 6 germs.

At 16:00 there were 12 germs.

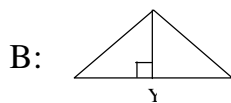
At 17 there were 24 germs, which is smaller than 27.

Geometry

38.



The height of the triangle to side X



The height of the triangle to side Y

AI: The areas of the triangles are equal

$$Y < X$$

The best answer is B.

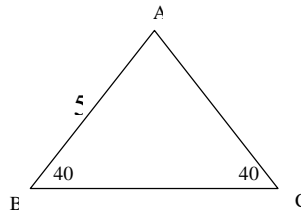
The area of the triangle in column A is $\frac{X \cdot h_A}{2}$.

The area of the triangle in column B is $\frac{Y \cdot h_B}{2}$.

Compare the two areas: $X \cdot h_A = Y \cdot h_B$.

Now since $X > Y$, the height of the triangle in column A is smaller than that in column B.

39.



A: BC

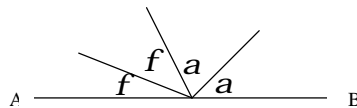
B: 5

The best answer is A.

The sum of the angles in the triangle is 180 and therefore the measurement of the angle BAC is $(180 - 40 - 40 = 100)$ degrees).

The side in front of the angle 100 is the largest and therefore BC is larger than 5.

40.



A: 90 degrees

B: $a + f$

AI: AB is a straight line

The best answer is C.

Since AB is a straight line the sum of the angles upon him equals to 180 and thus we can write the following equation: $2a + 2f = 180 \Rightarrow a + f = 90$.

41.

A: The difference between the lengths of the large side to the short one

B: The length of the short side

AI: The sum of two long sides in a rectangle is 4 times bigger than the short side in the same rectangle.

The best answer is C.

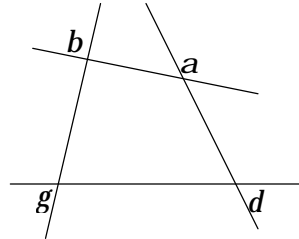
Name the long side X and the short side Y.

From the additional data we can write: $2X = 4Y \Rightarrow X = 2Y$.

Column A = $X - Y = Y$.

Column B = Y, and therefore the two columns are equal.

42.



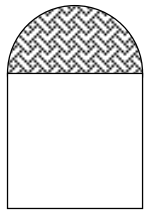
A: 180 degrees

B: $a + b + g + d$

The best answer is B.

All the angles in the drawing are vertices angles to the quadrilateral in the centre. The sum of the angles in the quadrilateral is equal to $a + b + g + d$ and is also equal to 360 degrees and therefore column B is greater.

43.



A: 1.5 meters squared

B: The area of the shaded region (half a circle)

AI: The side of the white square is 2 meters

The best answer is B.

The diameter of the circle is 2 meters and so the radius is 1 meter.

The area of the shaded region is $\frac{1}{2} \pi \cdot 1^2 \approx 1.57$ meters squared and so column B is greater.

44.

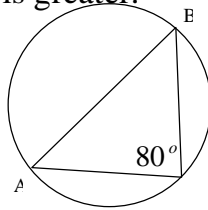
A: The area of a triangle with a side of 6 inches and a respective height of p inches

B: 9 inches squared

The best answer is A.

Find the area of the triangle: $\frac{6 \cdot p}{2} = 3 \cdot p$, which is more than 9 and therefore column A is greater.

45.



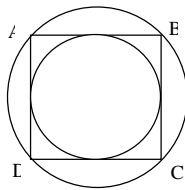
A: The diameter of the circle

B: The length of AB

The best answer is A.

The largest line in the circle is the diameter and the angle in front of it is 90 degrees. Since the angle in front of the line is smaller than 90 degrees, the line must be smaller than the diameter.

46.



A: The circumference of the inner circle

B: Half the circumference of the outer circle

AI: A circle is blocked by a square, which is also blocked by an outer circle

The best answer is A.

Let R be the radius of the inner circle.

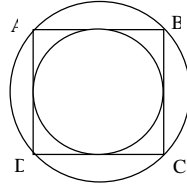
The circumference of the inner circle is $2\pi R$.

The side of the square is $2R$ and so its diagonal is $2\sqrt{2}R$, which is also the diameter of the outer circle.

The circumference of the outer circle is $\pi D = \pi 2\sqrt{2}R$ and half of it would be

$\pi \sqrt{2}R \approx 4.4R$. We can see that the circumference of the inner circle is greater than this expression and therefore the answer is A.

47.



A: $(2r)^2$

B: R^2

AI: The radius of the inner circle is r and that of the outer circle is R .

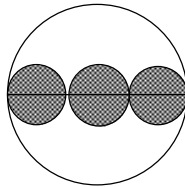
The best answer is A.

The ratio between the area of the circle that is blocked by a square to the area of the circle that blocks the square is always 1:2 and therefore the ratio between the radii is $1:\sqrt{2}$.

Column A = $(2r)^2 = 4r^2$.

Column B = $(r\sqrt{2})^2 = 2r^2$, which is smaller than column A.

48.



A: The area of the shaded region

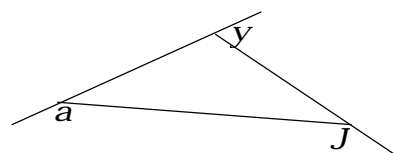
B: The area of the white region, divided by two

AI: Three identical circles are blocked inside a large circle

The best answer is C.

The radius of the big circle (R) is equal to 6 radii of the smaller circles (r). Column A = $3 \times (\pi \cdot r^2)$.

Column B = $\frac{1}{2}(\pi \cdot (3r)^2 - 3\pi r^2) = 3\pi r^2$ and so both columns are even.



49.

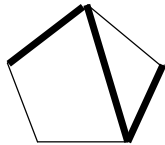
A: 270 degrees

B: $a + y + J$

The best answer is B.

The sum of all the outer angles to a polygon is always 360 degrees and therefore in this case $a + y + J = 360$ and so column B is greater.

50.



A: The length of the blackened line

B: 30 Cm

AI: The circumference of the pentagon is 50 Cm

The best answer is A.

If one side of the pentagon is $(50/5 = 10)$ Cm then the emphasized line is made up of 2 line segments and one diagonal. Now, we know that any diagonal in a pentagon is larger than the side and therefore the required circumference is more than $(10 + 10 + 10)$ and therefore the answer is A.

1.

A: A

B: $1/A$

AI: $A > 0, A \neq 1$

The best answer is D.

Take two cases: $A = 3$ and $A = 1/3$.

In the first case, column A = 3 and column B = $1/3$.

In the second case, column A = $1/3$ and column B = 3.

Since the answer changed, D is the right answer.

2.

A: $\frac{X}{Y}$

B: $\frac{X+1}{Y+1}$

AI: $X, Y > 0$

The best answer is D.

Take two cases: $X=1, Y=1$ and $X=2, Y=3$.

In the first case, column A = 1 and so is column B.

In the second case, column A = $2/3$ and column B = $3/4$.

Since the answer changed, D is the right answer.

3.

A: $\frac{2X+7}{23}$

B: $\frac{5X+11}{46}$

AI: $X > -4$

The best answer is B.

Multiply both columns by 46 and compare:

$4X + 7$? $5X + 11$ Subtract $4X + 7$ from both sides.

0 ? $X + 4$

Since $X > -4$, column B is greater than column A.

4.

A: $A \cdot B$

B: $A \div B$

AI: A and B are positive odd integers.

The best answer is D.

If $A = B = 1$, both columns are equal but in any other case the columns are not even and therefore the answer cannot be determined.

D is the right answer in such a case.

5.

A: $\frac{X \cdot Y}{Z}$

B: $\frac{X \cdot Z}{Y}$

AI: $X < 0 < Y < Z$

The best answer is A.

Multiply both columns by YZ (Y and Z are both positive).

$XY^2 \quad ? \quad XZ^2$ Divide by X , remember to flip the result in the end since

X is negative.

$Y^2 \quad ? \quad Z^2$

Z is bigger than Y and so the answer is suppose to be column B. Don't forget we multiplied both sides by X and therefore the real answer is column A.

6.

A: $16^3 \times 32^2 \times 8$

B: $64^2 \times 4^3 \times 16$

The best answer is A.

Translate all the numbers to a base of 2.

Column A = $2^{12} \times 2^{10} \times 2^3 = 2^{25}$.

Column B = $2^{12} \times 2^6 \times 2^4 = 2^{22}$.

We can see that column A is greater.

7.

A: X^Y

B: Y^X

AI: $Y > X$

The best answer is D.

Take two cases: $X=0$, $Y=1$ and $X=-2$, $Y=0$:

In the first case, column A = 0 and column B = 1.

In the second case, column A = 1 and column B = 0.

Since the answer changed, D is the right answer.

8.

A: $(X + Y)(X - Y)$

B: $X^2 + Y^2$

AI: $Y < 0$ and $X > 0$

The best answer is B.

Simplify column A = $X^2 - Y^2$.

Subtract X^2 from both sides: A = $-Y^2$ and B = Y^2 .

Column A is negative and column B is positive and therefore B is the right answer.

9.

A: $X^2 + 4$

B: $X + 8$

AI: $X > 1$

The best answer is D.

Replace X with two numbers: 2 and 10.

For X = 2: column A = 8 and column B = 10.

For X = 10: column A = 104 and column B = 18.

Since the answer changed, D is the right answer.

10.

A: $\frac{7X + 9 + Y}{3X}$

B: $\frac{7Y + X + 9}{3Y}$

AI: $X - Y = Y - X$

$X, Y \neq 0$

The best answer is C.

The additional data tells us that $2X = 2Y \Rightarrow X = Y$.

Replace X with Y in both columns or the opposite to see that both

columns are equal to : $\frac{7X + X + 9}{3X} = \frac{8X + 9}{3X}$.

And therefore the answer is C.

11.

A: $C + 3$

B: $C - 3$

The best answer is A.

No matter what C is, adding 3 to its value will surely make it larger and so the answer is A.

12.

A: XZ

B: YZ

AI: $X > Y$

$Z < 0$

The best answer is B.

Plug in easy numbers: $X=2$, $Y=1$ and $Z=-1$.

Column A = -2 and column B = -1 and therefore column B is greater.

13.

A: $P/121$

B: $P/212$

AI: $P < 0$

The best answer is B.

Lets say $P = -(121)(212)$.

Plug it into both columns:

Column A = -212 and column B = -121.

The number in column B is greater than that in column A.

14.

A: $(-13)X$

B: $(-3)X$

AI: $X \neq 0$

The best answer is D.

If X is a negative number, column A is greater, otherwise column B is greater and therefore the answer is not distinct.

15.

A: $\frac{2}{\sqrt{3}}$

B: $\frac{\sqrt{3}}{2}$

The best answer is A.

Multiply both columns by $\sqrt{3}$.

Column A = 2 and column B = $3/2 = 1.5$.

We can see that column A is greater.

16.

A: $\frac{7}{\sqrt{5}}$

B: $\frac{\sqrt{16.2}}{1.5}$

The best answer is A.

Multiply both columns by $\sqrt{5}$.

Column A = 7.

$$\text{Column B} = \frac{\sqrt{16.2}}{1.5} = \frac{\sqrt{16.2} \cdot \sqrt{5}}{1.5} = \frac{\sqrt{16.2 \times 5}}{1.5} = \frac{\sqrt{81}}{1.5} = \frac{9}{1.5} = 6.$$

And therefore column A is greater.

17.

A: $\frac{7}{\sqrt{3}}$

B: $\sqrt{5\frac{1}{3}} \times 1\frac{3}{4}$

The best answer is C.

Multiply both columns by $\sqrt{3}$.

Column A = 7.

$$\text{Column B} = \sqrt{5\frac{1}{3}} \times 1\frac{3}{4} \times \sqrt{3} = \sqrt{3 \times 5\frac{1}{3}} \times 1\frac{3}{4} = \sqrt{16} \times 1\frac{3}{4} = 4 \times \frac{7}{4} = 7.$$

We can see that both columns are equal and thus the answer is C.

18.

A: $X + Z$

B: $Y + Z$

AI: $X > Y$

The best answer is A.

Subtract Z from both sides and then you compare between X and Y.

We know that $X > Y$ and therefore Column A is greater.

19.

A: $X - Y$

B: $W - Z$

AI: $X + Z > W + Y$

The best answer is A.

Take the expression from the extra data and manipulate it:

$X + Z > W + Y \Rightarrow X - Y > W - Z$ and therefore column A is greater than column B.

20.

A: Z^9

B: Z^{10}

AI: $0 < Z < 1$

The best answer is A.

When dealing with a fraction, remember, the smallest the power the larger is the result. The power of the fraction (Z) in column A is smaller and thus the number there is greater.

21.

A: $\frac{2XY - X^2 - Y^2}{-3}$

B: $\frac{1}{3} \cdot (X - Y)^2$

The best answer is C.

Simplify the expression in column A:

$$\frac{2XY - X^2 - Y^2}{-3} = \frac{X^2 - 2XY + Y^2}{3} = \frac{(X - Y)^2}{3}.$$

We can see that the expressions in both columns are equal.

22.

A: $\frac{2X^2 + 2Y^2 + 4XY}{4}$

B: $\frac{(X + Y)^2}{4}$

The best answer is A.

Simplify the expression in column A:

$$\frac{2X^2 + 2Y^2 + 4XY}{4} = \frac{2 \cdot (X^2 + 2XY + Y^2)}{4} = \frac{(X + Y)^2}{2}.$$

The expression in the parenthesis in both columns is positive.
Since the denominator in column B is greater, the answer is A.

23.

A: $\sqrt{\sqrt{5}}$

B: $\sqrt{5^{\frac{3}{2}}}$

The best answer is B.

Column A = $\sqrt{\sqrt{5}} = \sqrt{5^{\frac{1}{2}}} = 5^{\frac{1}{4}}.$

Column B = $\sqrt{5^{\frac{3}{2}}} = 5^{\frac{3}{4}}.$

The bigger the fraction in these cases, the larger the result and therefore column B is greater.

24.

A: Y

B: Y^2

AI: $Y < 1$

The best answer is D.

Take two different cases: $Y = 0$ and $Y = -2$.

In the first case, both columns are equal to zero.

In the second case, column A = -2 and column B = 4.

Since we got a different answer each time, D is the right answer.

25.

A: $B + A - C$

B: $C + A - B$

AI: $A > B > C$

The best answer is A.

Subtract A from both sides.

Column A = $B - C$.

Column B = $C - B$.

Since $B > C$, column A is greater.

26.

A: $\frac{Z}{X - Y}$

B: $\frac{X - Y}{Z}$

AI: $X - Y > 0$

$X - Y > Z$

$Z < 0$

The best answer is D.

Let's take two representative cases: $(X - Y) = 3$, $Z = -6$ and $(X - Y) = 4$, $Z = -1$.

In the first case, column A = -2 and column B = -1/2.

In the second case, column A = -1/4 and column B = -4.

Since we got different results each time, D is the right answer.

27.

A: $(333)(327)$

B: $(329)(331)$

The best answer is B.

The best way to solve this question is by using the formula:

$(X - Y)(X + Y) = X^2 - Y^2$.

Column A = $(330 + 3)(330 - 3) = 330^2 - 3^2$.

Column B = $(330 - 1)(330 + 1) = 330^2 - 1^2$.

Now the answer is obvious, column B is greater.

28.

A: $(914)(980)$

B: $(950)(944)$

The best answer is B.

The best way to solve this question is by using the formula:

$(X - Y)(X + Y) = X^2 - Y^2$.

Column A = $(947 - 33)(947 + 33) = 947^2 - 33^2$.

Column B = $(947 + 3)(947 - 3) = 947^2 - 3^2$.

Now the answer is obvious, column B is greater.

29.

A: $S^{\sqrt{16}}$

B: $(T^{16})^{0.25}$

AI: $|S| > |T|$

The best answer is A.

First simplify both columns:

Column A = S^4 and column B = T^4 .

Since the power is even, the numbers can even be even, it's the absolute value that was interested in and therefore column A is greater.

30.

A: $\left(Q^{\frac{1}{2}}\right)^{10}$

B: $P^{\sqrt{\frac{50}{2}}}$

AI: $|P| > |Q|$

The best answer is D.

Simplify the expressions in both columns:

Column A = Q^5 and column B = P^5 .

Since the power is odd, the absolute value is not enough to determine which is bigger. If for example one of the numbers is negative, we wouldn't see it using the absolute value criteria.

More data is required to determine the answer.

31.

A: $\frac{X^{11}}{X^7}$

B: $\frac{Y^{-6}}{Y^{-10}}$

AI: $|Y| > |X|$

The best answer is B.

Simplify both columns:

Column A can be written as X^4 .

Column B can be written as Y^4 .

Since the power is even, the numbers can even be even, it's the absolute value that was interested in and therefore column B is greater.
If one of the numbers is negative, the even power will transform it into a positive number.

Relations between groups and overlapping

32.

A: 25

B: The number of students that are excellent students and married

AI: There are 75 students in the faculty.

35 are excellent students and 55 are married.

The best answer is D.

No information was given to us about the overlapping between the groups and as far as we are concerned, all the excellent students can be married.

We can also take the minimum case of overlapping: $(55 + 35 - 75 = 15)$.

The answer cannot be determined since not enough data was supplied.

33.

A: The minimum number of customers that are satisfied with the service and

that are not in a hurry

B: 0

AI: In a supermarket there are 80 customers,

45 are in a hurry and 35 are satisfied of the service.

The best answer is C.

The sum of the two groups is smaller than the whole and therefore the minimum overlapping can be zero and so the answer is C since both columns are equal.

34.

A: The number of left handed dancers that don't know how to dance the Waltz

B: 5

AI: There are 120 dancers in the club, 80 are left handed and 50 don't know how to dance Waltz.

The best answer is A.

Let's find the minimum and the maximum cases of overlapping.

The maximum is when all the dancers who don't know how to dance the Waltz are left handed, thus 50.

The minimum overlapping is $(50 + 80 - 120 = 10)$.

Since both cases are larger than 5, column A is always greater than column B.

35.

A: 10

B: The maximum number of horses that are not brownish yet domesticated

AI: In a horse ranch 95 horses. 45 horses are domesticated and 55 are brownish.

The best answer is B.

There are 55 brownish horses and therefore $(95 - 55 = 40)$ are not brownish.

This group can be contained inside the domesticated group and therefore the maximum number of horses that are not brownish yet domesticated is 40.

Column B is greater than A.

36.

A: 70%

B: The percent of Americans that are proud citizens and that own a car

AI: 35% of the Americans aren't proud citizens and 80% own a car

The best answer is A.

$(100 - 35 = 65\%)$ of the citizens are proud citizens.

The largest overlapping between the proud citizens and the citizens that own a car is 65% and therefore 70% is larger.

Column A is greater than column B.

Percent Comparison Questions

37.

A: The money George spent

B: The money Gloria spent

AI: George spent 50% of his allowance. Gloria spent 30% of her allowance.

The difference between the money they spent is 35 dollars.

The best answer is D.

We can't compare percentages of different wholes.

We don't know how much money each had prior to the spending process and therefore we cannot calculate anything.

38.

A: The percent of Michael Jackson fans in Alabama

B: The percent of Michael Jackson fans in North Carolina

AI: 10% of the guys and 30% of the girls in Alabama are fans of Michael Jackson. In North Carolina 35% of the guys and 45% of the girls are Michael Jackson fans.

The best answer is B.

The percent of Michael Jackson fans in Alabama is somewhere between 10% and 30% while in North Carolina, its between 35% and 45% and therefore column B must be greater than column A.

39.

A: \$34,000

B: The price of the car after the holidays

AI: The price of a car is \$34,000. During the holidays, there is a 12% decrease in the car's price. After the holidays the price increases by 12%.

The best answer is A.

This is an important principle to remember, an increase and then a decrease of a number (by the same percent) always results in a smaller number.

Let's work with easier numbers just to understand. Let's say the price of the car is 30,000 and the decrease and increase was by 10%:

During the holidays, the car costs: 27,000

After the holidays, the car costs: 29,700, which is lower than 30,000!

40.

A: Jim's income today

B: \$3,000 per month

AI: Jim had an average paycheck of \$3,000 per month.

Last month Jim got promoted and his income grew by 15%.

Today, his income decreased by 15%.

The best answer is B.

This is an important principle to remember, an increase and then a decrease of a number (by the same percent) will always results in a smaller number and therefore his income decreased past \$3,000 and so column B is greater.

41.

A: The entire weight of all the lions in the zoo

B: The entire weight of all the zebras in the zoo

AI: In the local zoo, there are 20% more lions then zebras. The average weight of a lion is lower by 20% than that of a zebra.

The best answer is B.

Let's make up numbers, say that there are 10 zebras in the zoo and that each weighs 100 pounds ~~e~~ there are 12 lions and each weigh 80 pounds.

The total weight of the lions is $12 \times 80 = 960$ pounds.

The total weight of the zebras is $10 \times 100 = 1000$ pounds.

Column B is greater than column A.

42.

A: The cost of a sporting good in sport store A

B: The cost of a sporting good in sport store B

AI: In Somalia there is a 22% tax on all sporting goods.

Sport store A sells sporting goods with a 25% discount on the price after tax. Sport store B sells sporting goods with a 25% discount on the price before tax.

The best answer is C.

Let P be the price of a sporting good prior to the discount and the tax.

The price in store A will be $= P \times 122\% \times 75\%$.

The price in store B will be $= P \times 75\% \times 122\%$.

The order of the multiplication doesn't change the result and therefore both columns are equal.

Ratio Comparison Problems

43.

A: The old ratio between the fans

B: The new ratio between the fans

AI: The ratio between "Bullets" fans and "Pirates" fans is 1:4.

One fan joined each group of fans.

The best answer is A.

If we want to keep the same ratio we need to add 4 fans to one group and 1 to the other. Since we added only one fan for each of the groups, the ratio between the groups got smaller.

It was 1:4, now its 2:5.

Note: Zahi, I had a dilemma in this question- is 2:5 a smaller ratio than 1:4 or the opposite. If it's a mistake, please fix it.

44.

A: The ratio between the number of stamps that Jill has in her collection to the number of stamps that Joe has

B: The ratio between the number of stamps that Joe has in her collection to the number of stamps that Jill has

AI: Joe has 70 stamps in his collection more than Jill.

Jill has 126 stamps in her collection.

The best answer is B.

A ratio is actually a fraction.

The ratio in column A is smaller than 1 since Jill has less stamps.

The ratio in column B is greater than the ratio in column A since the ratio in column B is greater than 1.

45.

A: The original ratio

B: The new ratio

AI: In the aviation camp, the ratio between the number of cadets to the number of instructors is 6:3. One cadet and two instructors joined the camp.

The best answer is C.

The people who joined the camp are according to the ratio.

If at first it was 3:6 or 1:2 now its $(3 + 1):(6+2) = 1:2$ and therefore the ratio didn't change and the columns are equal.

46.

A: 1:1

B: The new ratio

AI: The ratio between the number of boys to the number of girls in the pool is 3:7. Seven boys and three girls joined the pool.

The best answer is D.

At first, the 3 referred to the boys and 7 to the girls. The new kids that came to the pool came also in a ratio of 3:7, but in favor of the boys this time and thus we cannot compare between the ratios.

Its also easy to look at it in a different way, there could have been 30 boys and 70 girls and so if kids joined the pool not in this ratio, it would have been impossible to find the new ratio.

47.

A: The distance ratio between Mike and Spike

B: The distance ratio between Slay and Mike

AI: Slay, Spike and Mike are having a skateboard race. The ratio between their speeds is 6:3:2 respectively. The ratio between their traveling time is 4:6:12 respectively.

The best answer is A.

The ratio between their distances is actually the ratio between their times multiplied by their ratio of speeds.

The ratio of distances is: 24:18:24 or 4:3:4.

And therefore the ratio in column A = $\frac{4}{3}$ and the ratio in column B = 1.
 $\frac{4}{3} > 1$ and therefore column A is greater.

Digits and letters

48.

A: X

B: Y

AI: X, Y and Z are different digits.

$$Y + Z = XX.$$

The best answer is B.

AA is a double digit number and since its made out a sum of two digits

à A=1. Y can't be zero because then Z would have to be larger than 9 and it cant be 1 because all the digits are different.

The conclusion is that Y must be greater than 1 and so column B is greater.

49.

A: B

B: 7

AI: A, B and C are different digits.

$$AB = 5C.$$

The best answer is B.

AB is a double digit number that is a factor of 5 and therefore the units' digit (B) is either 0 or 5. In either case B is smaller than 7 and so column B is greater.

50.

A: 2

B: C

AI: A, B and C are three different digits.

$$AC = 3B$$

The best answer is B.

AC is a double digit number that is a factor of 3 and therefore the units' digit (B) is either 3 or 6 or 9. In either case C is larger than 2 and so column B is greater.

51.

A: X

B: Y

AI: X and Y are different digits.

$$X \cdot X = YX$$

The best answer is A.

There are only two possibilities for the digit A: 5 and 6.

If $X = 5 \Rightarrow Y = 2$.

If $X = 6 \Rightarrow Y = 3$.

Either way, Y is smaller than X and therefore column A is greater.

Note: the following is the hardest question I've written in the GRE

52.

A: A

B: C

AI: A, B, C, D and E are different digits.

$$A + B < 10.$$

$$\begin{array}{r} AB \\ + BC \\ \hline 1DE \end{array}$$

The best answer is B.

The result has a hundreds digit and therefore $A + B$ is bigger than 10, since the data says otherwise there's only one option- that the 1 from the adding of B and C jumped to $A + B$ and therefore $B + C > 10$.

If $A + B < 10$ and $C + B > 10 \Rightarrow C$ must be bigger than A and therefore column B is greater than column A.

1.

A: A

B: The average (arithmetic mean) of A, B and C

AI: $B = A/2$

$C = 2A$

The best answer is D.

Calculate the average: $(A + A/2 + 2A)/3 = 3.5A/3$.

Since we don't know if X is positive, negative or even zero we can't determine which column is greater.

2.

A: X

B: The average (arithmetic mean) of X, Y and Z

AI: $Y = X/3$

$Z = 3X$

X is a positive integer

The best answer is B.

Calculate the average: $(X + X/3 + 3X)/3 = \frac{4\frac{1}{3}X}{3}$, which is greater than X since X is a positive integer.

3.

A: The average price per day that Josh spent on hotels during his first 5 days

B: The average price per day that Josh spent on hotels during the whole trip

AI: Josh went for a trip in Europe. In the first three days of his trip he stayed

At a 85 Euro per night hotel. On the next two days he stayed at a 100

Euro per night hotel. On his last night he slept in a 120 Euro hotel.

The best answer is B.

Since on his last day, Josh spent the largest amount of money on the hotel, this day is above average and so the average with out the last day is definitely smaller than the average with the last day.

Therefore column B is greater than column A.

4.

A: The average running time in the first 5 days

B: The average running time from Sunday to Friday inclusive

AI: On Sunday Ross ran for 12 minutes.

In the next 4 days, Ross ran 2 minutes extra each day from the previous one. On Friday, Ross ran for 16 minutes.

The best answer is C.

On Sunday, Ross ran 12 minutes. On Monday 14, Tuesday 16, Wednesday 18, Thursday 20 and Friday 16.

Calculate the average for column A: $(12+14+16+18+20)/5 = 16$ minutes.

Since on Friday he ran exactly 16 days the average doesn't change and therefore both columns are equal.

5.

A: The average (arithmetic mean) of the series

B: $Z - 1$

AI: $X < Y < Z < W$ are an arithmetic progression.

The difference between the variables is 2.

The best answer is C.

The average of the series is the median number. Since there is an even number of variables, the average is $(Y + Z)/2$ which is also equal to $(Z - 2 + Z)/2 = Z - 1$ and therefore both columns are equal.

6.

A: The average level of water in the entire month

B: The level of water on the 15th of March

AI: There are 30 days in March.

The level of water rises by 1.5 centimeters every day.

The best answer is A.

There are 30 days in March, which is an even number of days.

The average level of water in the entire month is the average of the median days, thus the 15th and the 16th. The average of those two days is greater than the level in the 15th only and therefore column A is greater than column B.

7.

A: The average height of the plant over a period of an **entire** week

B: The height of the plant on Wednesday

AI: A creeper plant grows tall by 2 inches every day.

The best answer is C.

The average height of the plant over a period of an entire week is actually the height of the plant in the median day, thus Wednesday.

Therefore both columns are even.

8.

A: The number of foxes in the wild group

B: The number of foxes in the tamed group

AI: The average weight of a fox in a wild group is 25 Kg's.

The average weight of a fox in a tamed group is 30 Kg's.

The average weight of a fox among both groups together is approximately 28.5 Kg's.

The best answer is B.

If there were the same number of foxes in both groups, the average would be 27.5.

Since the average is higher, there are more foxes in the tamed group where the average weight is higher.

9.

A: The number of children in the forth grade
 B: The number of children in the fifth grade
 AI: The average height of all the forth graders in the school is 1.35 meters.
 The average height of all the fifth graders in the school is 1.48 meters.
 The average weight of the two classes together is approximately 1.4 meters.

The best answer is A.

If there were the same number of children in both classes, the average would be approximately 1.41. Since it's lower, there are more children in the forth grade, where the average height is lower.

10.

A: The concentration of chlorite in the final solution

B: 32%

AI: Two solutions are mixed together, one quantity of the first and two quantities of the second. The first with 40% chlorite and the second with 28% chlorite.

The best answer is C.

The final solution contains: 1 dose of 40% chlorite, 1 dose of 28% chlorite and another dose of 28% chlorite.

The percent of chlorite in the final solution is $(28 + 28 + 40)/3 = 96/3 = 32\%$ and therefore both columns are equal.

11.

A: The concentration of the final solution

B: $\frac{A + 2B}{2}$

AI: Two solutions are mixed together, one quantity of the first and two quantities of the second. The first with a concentration of A and the second with a concentration of B.

The best answer is B.

The final solution contains: 1 dose of A, 1 dose of B and another dose of B.

The concentration of the final solution is $(A + B + B)/3 = \frac{A + 2B}{3}$ and therefore

column B is greater since its denominator is smaller.

12.

A: The average (arithmetic mean) of 372, 375, 378 and 375.

B: 376.5

The best answer is B.

Since 375 appears twice, set it as the estimated average.

There are two additional numbers: 372 and 378, both have the same deviation from the average in different directions and so the average stays as it is on 375.

Column B is greater.

13.

A: X

B: 4

AI: The average (arithmetic mean) of 10, 24, 25, 30 and X is 15.

The best answer is B.

Use the average formula: $\frac{10 + 24 + 25 + 30 + X}{5} = 15 \Rightarrow$

$89 + X = 75 \Rightarrow X = -14$ and therefore column B is greater.

14.

A: The average height of the remaining 14 buildings

B: 36 meters

AI: The average height of 15 buildings is 35 meters.

One of the buildings, that his height is $\frac{3}{5}$ of the average, fell down.

The best answer is C.

The height of the building that fell is $\frac{3}{5} \cdot 35 = 21$ meters.

The difference from the average is $(35 - 21 = 14)$ and so the entire average changed by $14/14 = 1$ meters up.

The new average is 36 meters and so the columns are equal.

15.

A: 80

B: The average height of the entire 5 buildings

AI: The average height of 3 sky scrapers is 70 meters.

The average height of 2 more is 90 meters.

The best answer is A.

Calculate the average: $\frac{3 \cdot 70 + 2 \cdot 90}{5} = \frac{390}{5} = 78$ meters and so column A is greater.

Combinations and Probability

16.

A: The number of combinations of arranging 5 people in a row

B: The number of combinations of choosing 2 people out of a group of twelve with out referring to order

The best answer is A.

Column A = in the first place there are 5 options, in the second there are 4 left and so on. All together, there are $5 \times 4 \times 3 \times 2 \times 1 = 120$ combinations.

Column B = the first is out of 12 and the second pick is out of 11 but the order doesn't matter and therefore there are $\frac{12 \cdot 11}{2} = 6 \cdot 11 = 66$ combinations.

17.

A: The probability of picking a red ball and a blue one right after it

B: The probability of picking two consecutive blue balls

AI: A bucket contains X blue balls and X red ones

The best answer is A.

The first pick in both columns is identical in terms of probability.

The second pick is the interesting one.

Column A: the probability of picking a blue after red is $\frac{X}{2X-1}$.

Column B: the probability of picking a blue after blue is $\frac{X-1}{2X-1}$.

The denominator is the same in both yet the numerator in A is greater and so is the column.

18.

A: The probability of receiving a sum of 6 with two tosses of fair dices

B: The probability of receiving a result of 6 with one dice

The best answer is B.

Column A: There are 36 options using two dices, 5 of them will result in the sum of 6: 3-3, 2-4, 4-2, 5-1 and 1-5 and therefore the probability is $5/36$.

Column B: The probability of receiving 6 is $1/6$.

$1/6 > 5/36$ and so column B is greater.

19.

A: The number of three digits numbers that none of the digits repeats itself

B: 720

The best answer is B.

The first digit can't be 0 and so there are 9 possibilities.

The second digit can be anything but the first, thus 9 possibilities.

The third has only 8 left.

The number of combinations is $9 \times 9 \times 8 = 648$ and therefore column B is greater.

20.

A: The probability of receiving a sum of 10

B: The probability of receiving a sum of 8

AI: Jeremy tosses a dice twice with the following numbers on it:

1, 3, 5, 7, 9 and 11.

The best answer is A.

There are 36 results in total (6×6).

Column A: there are 5 results with a sum of 10: 3-7, 7-3, 5-5, 9-1, 1-9 and so the probability here is $5/36$.

Column B: there are 4 results with a sum of 8: 1-7, 7-1, 5-3, 3-5 and so the probability here is $4/36$, which is smaller.

Column A is greater.

21.

A: The probability of receiving a sum of 10

B: The probability of receiving a sum of 12

AI: Jeremy tosses a dice twice with the following numbers on it:

1, 2, 4, 6, 8 and 10.

The best answer is B.

There are 36 results in total (6×6).

Column A: there are 4 results with a sum of 10: 4-6, 6-4, 2-8, 8-2.

and so the probability here is $4/36$.

Column B: there are 5 results with a sum of 8: 4-8, 8-4, 6-6, 10-2, 2-10 and so the probability here is $5/36$, which is greater.

Column B is greater.

22.

A: The probability of receiving "heads" at least once

B: $5/8$

AI: A fair coin is tossed three times

The best answer is A.

The probability of receiving "heads" at least once is equal to one minus the probability of not receiving "heads" at all.

The required probability is $1 - (0.5 \times 0.5 \times 0.5) = 7/8$.

Column A is greater than column B.

23.

A: The probability of picking two balls with the same color out of the box one after the other

B: $1/2$

AI: A box contains: 3 red balls, 2 blue balls and 4 yellow ones.

The best answer is B.

Column A: There are three options:

1. The probability of two red balls: $\frac{3}{9} \cdot \frac{2}{8} = \frac{1}{12}$.

2. The probability of two blue balls: $\frac{2}{9} \cdot \frac{1}{8} = \frac{1}{36}$.

3. The probability of two yellow balls: $\frac{4}{9} \cdot \frac{3}{8} = \frac{1}{6}$.

The total probability in column A = $\frac{1}{12} + \frac{1}{36} + \frac{1}{6} = \frac{5}{18}$.

Column B is greater than column A.

24.

A: The number of possibilities of choosing 11 soccer players from the bench

B: 72

AI: There are 13 players on the bench

The best answer is A.

This probability is equal to the probability of choosing two players that wouldn't play.

The first player has 13 possibilities and the second has 12, pay attention that the order

doesn't count and therefore there are $\frac{13 \cdot 12}{2} = 78$ combinations. Column A is greater

than column B.

25.

A: The number of possibilities of choosing 5 basketball players from the bench

B: 21

AI: There are 7 players on the bench

The best answer is A.

This probability is equal to the probability of choosing two players that wouldn't play.

The first player has 7 possibilities and the second has 6, pay attention that the order

doesn't count and therefore there are $\frac{7 \cdot 6}{2} = 21$ combinations. The columns are equal

to one another.

26.

A: The probability that Clark will get "heads" twice

B: The probability that Louis will get "tails" twice

AI: Louis and Clark, each, toss a fair coin twice.

The best answer is C.

Column A = $0.5 \times 0.5 = 0.25$.

Column B = $0.5 \times 0.5 = 0.25$.

The columns are equal and therefore the answer is C.

27.

A: The probability of failing the test three consecutive times

B: The probability of passing the test once out of three times

AI: The ratio between passing the test and failing it is 1:3.

The best answer is B.

Translate the ratio to probability terms.

The probability of passing is $\frac{1}{4}$ and failing to fail $\frac{3}{4}$.

Column A = $(\frac{3}{4})^3 = \frac{27}{64}$.

Column B = one minus the probability of failing the test three times =
 $1 - \frac{27}{64} = \frac{37}{64}$, which is greater.

28.

A: The probability that 4^X is even

B: $\frac{1}{2}$

AI: X is a positive integer

The best answer is A.

Since X is a positive integer, 2^X will always be even no matter if X is even or odd.

The probability in column A is 1.

29.

A: The probability of receiving a sum of 7 tossing two fair dices

B: The probability of receiving a sum of 8 tossing two fair dices

The best answer is B.

There are 36 possibilities in total (6×6).

There are 6 cases in which the sum is 7: 3-4, 4-3, 2-5, 5-2, 1-6, 6-1 and therefore the probability in column A = $6/36 = 1/6$.

There are 7 cases in which the sum is 8: 1-7, 7-1, 6-2, 2-6, 3-5, 5-3, 4-4 and therefore the probability in column B = $7/36$, which is greater than column A.

30.

A: The probability that the arrow will miss the target twice and will hit on the third time

B: The probability that the arrow will hit the target twice and will miss once

AI: The probability of hitting a target with an arrow is 0.6

The best answer is B.

The probability of hitting is 0.6 and therefore the probability of missing is ($1 - 0.6 = 0.4$).

The probability in column A = $(0.4)(0.4)(0.6) = 0.096$.

The probability in column B = $(0.6)(0.6)(0.4) = 0.144$, which is greater than column A and therefore the answer is B.

1.

A: The time it would take Ronnie to built 2 doghouses

B: The time it would take Bonnie to built 1 doghouse

AI: The output of Ronnie is twice the output of Bonnie building
Doghouses

The best answer is C.

Since the output of Ronnie is twice the output of Bonnie, it takes Ronnie X hours to build a doghouse while it takes Bonnie 2X.

Column A = 2X.

Column B = 2X.

The columns are equal and the answer is C.

2.

A: The time it would take Biff to eat 4 ice-creams

B: The time it would take George to eat 6 ice-creams

AI: Biff can eat 1 ice-cream in the same time that George can
2 ice-creams

The best answer is A.

Let's say it takes Biff X minutes to eat one ice-cream.

It takes George X/2 to eat one ice-cream.

Column A = 4X.

Column B = 3X.

Column A takes more time and therefore it's greater.

3.

A: 1

B: The time it would take 17 dogs to bury 17 bones

AI: 5 dogs bury 15 bones in 3 hours

The best answer is C.

$$Data \Rightarrow \frac{Work1}{Time1 \times Worker s1} = \frac{Work2}{Time2 \times Worker s2} \Leftarrow Question$$

$$Data \Rightarrow \frac{15}{3 \times 5} = \frac{17}{Time \times 17} \Leftarrow Question$$

Time = 1 x 1 = 1 and therefore the columns are equal.

4.

A: The number of liters that 7 sprinklers can sprinkle in one hour

B: 100

AI: 6 sprinklers can sprinkle 3 liters in 2 minute

The best answer is A.

$$Data \Rightarrow \frac{Work1}{Time1 \times Worker s1} = \frac{Work2}{Time2 \times Worker s2} \Leftarrow Question$$

$$Data \Rightarrow \frac{3}{2 \times 6} = \frac{Liters}{60 \times 7} \Leftarrow Question$$

$$\Rightarrow \text{Liters} = \frac{60 \cdot 7 \cdot 3}{2 \cdot 6} = 105 \text{ liters.}$$

Column A is greater than column B.

5.

A: The number of liters that 5 cows can give during half an hour

B: The number of liters that 6 cows can give during 20 minutes

AI: 3 cows can give 7 liters of milk in one hour

The best answer is A.

$$\text{Data} \Rightarrow \frac{\text{Work1}}{\text{Time1} \times \text{Worker s1}} = \frac{\text{Work2}}{\text{Time2} \times \text{Worker s2}} \Leftarrow \text{Question}$$

$$\text{Column A: Data} \Rightarrow \frac{7}{60 \times 3} = \frac{\text{Liters}}{30 \times 5} \Leftarrow \text{Question} \Rightarrow \text{Liters} = \frac{150 \cdot 7}{180} \approx 5.8$$

$$\text{Column B: Data} \Rightarrow \frac{7}{60 \times 3} = \frac{\text{Liters}}{20 \times 6} \Leftarrow \text{Question} \Rightarrow \text{Liters} = \frac{120 \cdot 7}{180} < 5.8 \text{ and}$$

therefore column A is greater.

6.

A: The amount of water in the pool after two hours

B: The amount of water in the pool after three hours

AI: Pipe A can fill a pool in 4 hours.

Pipe B can fill a pool in 6 hours.

Pump C can empty a pool in 3 hours.

In the morning the pool is half full.

The best answer is B.

The output of pipe A is $\frac{1}{4}$, the output of pipe B is $\frac{1}{6}$ and the output of pump C is $-\frac{1}{3}$. Together, the output is $(\frac{1}{4} + \frac{1}{6} - \frac{1}{3} = \frac{1}{12})$.

Since the entire output is positive the pool will be filled as the time progresses and therefore after 3 hours there'll be more water in the pool.

7.

A: The amount of garbage in the tanker at 12:15

B: The amount of garbage in the tanker at 9:40

AI: A garbage tanker is filled every 30 minutes with 25 Kg of garbage.

The tanker is emptied completely every round hour.

The whole process starts at 8:00 O'clock.

The best answer is

Column A: The garbage tanker is emptied every round hour and therefore at 12:00 it was emptied. At 12:15 it hasn't been filled yet and so it contains nothing.

Column B: The tank was emptied at 9:00 but it was filled at 9:30 and therefore at this hour it contains 25 Kg of garbage, this column is greater.

8.

A: The amount of fruit that the orange tree yields during 4 months

B: The amount of fruit that the apple tree yields during 8 months

AI: The amount of fruits that the apple tree yields every month is by 50% smaller than the amount of fruits that the orange tree yields in a month.

The best answer is C.

Let's say that the apple tree yields X apples in one month \Rightarrow the orange tree yields 2X.

Column A = 8X.

Column B = 8X and therefore the columns are equal to one another.

9.

A: The number of books that Ryan writes during 3 years

B: The number of books that Brian writes during 6 years

AI: The number of books that Ryan writes each year is by 50% larger than the number of books that Brian writes each year

The best answer is B.

Let's say that Ryan writes X books in one year \Rightarrow Brian writes 1.5X books.

Column A = 3X

Column B = 6 x 1.5X = 9X and therefore this column is greater.

10.

A: The time it would take X and Y to bake 72 cakes

B: 3 hours

AI: X can bake 6 cakes in one hour.

Y can bake 12 cakes in one hour.

The best answer is A.

Together, X and Y can bake (6+12 = 18) cakes in one hour.

72 cakes would take (72/18 = 4) hours to bake and therefore column A is greater than column B.

11.

A: The time it would take 39 monkeys to eat 63 bananas

B: 2.25 hours

AI: 13 monkeys eat 7 bananas in 45 minutes

The best answer is C.

$$Data \Rightarrow \frac{Work1}{Time1 \times Workers1} = \frac{Work2}{Time2 \times Workers2} \Leftarrow Question$$

$$Data \Rightarrow \frac{7}{45 \times 13} = \frac{63}{Time \times 39} \Leftarrow Question \Rightarrow Time = \frac{63 \cdot 45 \cdot 13}{39 \cdot 7} = 135 \text{ minutes.}$$

135 minutes = two hours and 15 minutes = 2.25 hours and therefore the columns are equal.

12.

A: The number of donuts that the officer will eat in 8 hours

B: 90

AI: An officer eats 5 donuts during half an hour

The best answer is B.

$$Data \Rightarrow \frac{Work1}{Time1 \times Worker s1} = \frac{Work2}{Time2 \times Worker s2} \Leftarrow Question$$

$$Data \Rightarrow \frac{5}{30 \times 1} = \frac{Donuts}{480 \times 1} \Leftarrow Question \Rightarrow Donuts = 480 \cdot \frac{1}{6} = 80.$$

Column B is greater.

Movement comparison Q.

13.

A: 20 meters per second

B: 72 Kilometers per hour

The best answer is C.

In one kilometer there are 1000 meters and in one hour there are 3600 seconds. One meter per second is equal to 3.6 kilometers per hour.

Column A = 20 meters per hour = (20 x 3.6 = 72 kilometers per hour) and therefore both columns are equal.

14.

A: 2500 millimeters

B: 2.5 meters

The best answer is C.

One meter is equal to 100 centimeters.

One centimeter is equal to 10 millimeters.

2.5 meters is equal to 2.5 x 1000 = 2500 millimeters and therefore the columns are equal.

15.

A: Terry's speed

B: Tania's speed

AI: Terry can walk X miles in Y/3 hours.

Tania can walk 2.5X miles in 2Y/5 hours.

The best answer is B.

Speed = Distance / Time

Column A = X / (Y/3) = 3X/Y.

Column B = 2.5X / (2Y/5) = 6.25X/Y.

Since X and Y are positive, column B is greater than column A.

16.

A: Ruth's speed

B: William's speed

AI: Ruth can swim Q pools in $P/4$ hours.
Tania can swim $1.5Q$ pools in $P/3$ hours.

The best answer is B.

Speed = Distance / Time

Column A = $Q / (P/4) = 4X/Y$.

Column B = $1.5Q / (P/3) = 4.5X/Y$.

Since Q and P are positive, column B is greater than column A.

17.

A: Phil's driving time from A to B

B: Phil's driving time from B to C

AI: Phil drives from A to B at 45 miles per hour and from B to C at 90 miles per hour.

The distance from A to B is 3 miles and from B to C is 6 miles.

The best answer is C.

Time = Distance / speed

Column A: Time = $3/45 = 1/15$.

Column B: Time = $6/90 = 1/15$ and therefore the columns are equal.

18.

A: The current's speed

B: The boat's speed

AI: A boat sails with the current of the river for half an hour and travels a

Distance of 6 Km. The boat U-turns and travels against the current for

Half an hour crossing 2 Km

The best answer is B.

Remember, compare don't calculate.

After the boat turned around, it managed to cross 2 Km, which means that her speed is faster than the currents' speed and therefore column B is greater than column A.

19.

A: The fox's speed [in miles per hour]

B: 15

AI: A fox travels during an hour and a half the same distance that he would have traveled in an hour if he's speed would be 10 miles per hour higher

The best answer is A.

Mark X as the fox's speed.

The distances are equal and so we'll compare them:

$1.5X = 1(X + 10)$ $\Rightarrow X = 20$ and therefore column B is greater.

20.

A: 155 meters per second

B: The cruise missile's velocity

AI: A cruise missile is shot from a distance of 7.5 Km and hits its target

After one minute.

The best answer is A.

Calculate the missile's speed. Speed = Distance / Time.
Speed = (7500 meters) / (60 seconds) = 125 meters per second.
Column A is greater than column B.

21.

A: The distance that flipper will travel during 5 seconds

B: 100 meters

AI: Flipper the dolphin swims at a speed of 72 kilometers per hour

The best answer is C.

Distance = Speed x Time.

Flipper traveled (5 seconds) x (72 Km per hour).

One kilometer is 1000 and one hour is 3600 seconds and therefore one meter per second is equal to 3.6 Km per hour.

72 Km per hour = 20 meters per second.

Flipper traveled (5)(20) = 100 meters and so the columns are equal.

22.

A: The time it would take the turtle to travel 2.5 Km

B: 25 hours

AI: A turtle walks at a speed of $\frac{5}{6}$ meters during 300 seconds

The best answer is A.

It takes the turtle (300/60 = 5) minutes to walk $\frac{5}{6}$ meters.

His speed is 1/6 meters per minute = 10 meters per hour.

2.5 Km = 2500 meters.

The time it would take him to walk that distance is (2500)/(10) = 250 hours.

Column A is ten times bigger than column B.

23.

A: The average (arithmetic mean) speed of the cheetah during these 8 hours

B: 75.7 miles per hour

AI: A cheetah runs for 5 hours at a speed of 70 miles per hour and three hours at an average speed of 90 miles per hour

The best answer is A.

Use the simple average formula: $\frac{5 \cdot 70 + 3 \cdot 90}{8} = \frac{620}{8} = 77.5$ miles per hour.

Kinky mixed questions

24.

A: 120 degrees

B: The measurement of the smaller angle between the clock's hands at 16:40

The best answer is A.

Draw the clock with the relevant time.

We can see that the angle is less than 120 degrees because the hour hand is not on 4, it moves a little clockwise.
Column A is greater.

25.

A: 90 degrees

B: The measurement of the smaller angle between the clock's hands at 12:15

The best answer is A.

Draw the clock with the relevant time.

We can see that the angle is less than 90 degrees because the hour hand is not on 12, it moves a little clockwise.

Column A is greater.

26.

A: 120 degrees

B: The measurement of the larger angle between the clock's hands at 12:45

The best answer is B.

Draw the clock with the relevant time.

We can see that the small angle is less than 120 degrees and more than 90 degrees because the hour hand is not on 12, it moves a little clockwise.

The largest angle completes the small angle to 360 degrees and therefore it is more than 120 degrees, thus column B is greater.

27.

A: The number of dividers on the perimeter of the circle

B: 28

AI: The perimeter of a circle was divided into 28 even arcs using dividers

The best answer is C.

Since a circle is a closed shape the number of dividers is equal to the number of spaces. Try working with three spaces, draw a circle; you can see that there are three spacers and three dividers and so is the circle with the 28 spaces.

28.

A: The number of poles

B: 20

AI: A 20 meters fence is held up with poles located every meter

The best answer is A.

Try working with a shorter fence so you can draw a sketch.

Let's try a fence 3 meters long.



As you can see, we used 4 poles for a 3 meters fence and therefore we'll need 21 poles for the 20 meters fence.

29.

A: The time it would take Rufus to drive 140 miles

B: 3 hours

AI: Rufus's driving speed is between 40 and 70 miles per hour

The best answer is D.

If Rufus drives at 40 miles per hour, it would take him 3.5 hours to travel 140 Km and if he travels at 70 miles per hour it would take him 2 hours.

Since 3 hours is in the range the answer cannot be determined and the answer is D.

30.

A: The time it would take the concord airplane to fly 1000 Kilometers

B: 2 hours

AI: The concord's airplane speed is between 200 and 400 meters per second

The best answer is B.

If it flies 200 meters per second it would take him $(1,000,000 \text{ meters}) / (200) = 5000$ seconds.

There are 3600 seconds in one hour and therefore it would take him

$(5000) / (3600) =$ approximately 1.4 hours, which is smaller than column A.

If it flies 400 meters per second it would take him even less time and so either case, it will pass 1000 Km in less than 2 hours.

31.

A: 16 minutes

B: The time it would take the gecko to get 7 meters

AI: A gecko (house-lizard) travels 2 meters every 2 hours and every third hour, it travels one meter back

The best answer is B.

Every three hours, the gecko travels 1 meter.

It would take the gecko 15 hours to travel 5 meters and so after 17 hours it will travel 7 meters for the first time.

Column B is greater ($17 > 16$).

32.

A: The time it would take Johnny to write 29 pages for the first time

B: 6 hours and 30 minutes

AI: Johnny writes 5 pages during the first 30 minutes and on the next 30 minutes he throws one page out

The best answer is C.

During one hour, Johnny writes 4 pages.

After 6 hours, he will write 24 pages. On the next 30 minutes he will write 5 more pages, reaching 29 pages. It takes him 6.5 hours to complete this mission.

33.

A: The minimum number of cards that are needed to be taken out of the box in order to get two cards with the same color

B: The minimum number of cards that are needed to be taken out of the box in order to get two cards with different colors

AI: A box of cards contains 2 blue cards and 2 red ones

The best answer is C.

If you take 2 cards out of the box, you could have two options:

Two cards in the same color or two cards in different colors but if you take one more card, you'll have three cards that 2 out of them answer the criteria's of both columns and therefore the answer is C.

34.

A: The number of Jellybeans that Tim has

B: 35

AI: Tim has between 6 and 7 boxes of Jellybeans.

Each box contains between 5 and 8 Jellybeans.

The best answer is D.

Find the range of Jellybeans that Tim has.

The minimum number of Jellybeans is 30 and the maximum is 56.

Since 35 are in the middle of the range, the answer cannot be determined properly and therefore D is the right answer.

35.

A: The number of light bulbs in the shop

B: 256

AI: There are between 12 and 18 cases of light bulbs in the shop, each case

Contains between 24 and 28 light bulbs.

The best answer is A.

Find the range of the number of light bulbs in the shop.

The minimum number of bulbs is ($12 \times 24 = 288$) and the maximum is

($18 \times 28 = 504$), both are larger than 256 and therefore column A is always greater than column B.

36.

A: The minimum number of balls that Sandra needs to pick in order to get a blue ball

B: 15

AI: In a box, there are 5 blue balls, 6 red balls, 2 green balls, 4 black balls and 3 purple ones.

The best answer is A.

Sandra, theoretically, can take 15 balls out and still not pick a blue ball since there are 15 balls in different colors. On the 16th ball she will surely pick a blue one and so column A (16) is greater than column B (15).

37.

A: The number of parts that the yard was divided to

B: 24

AI: A yard was divided into many parts by 4 lines lengthwise and 6 lines across

The best answer is A.

If a section is divided by 4 lines, there will be 5 spaces and in the same way there will be $(4 + 1)(6 + 1) = 35$ parts in the yard and not 24.

Column A is greater.

38.

A: The number of rectangles after the division

B: 64

AI: A large piece of plywood is divided into smaller rectangles using 8 lines across and 8 lines lengthwise

The best answer is A.

If a section is divided by 2 lines, there will be 3 spaces, thus three parts and in the same way there will be $(8 + 1)(8 + 1) = 81$ rectangles out of the plywood, which is greater than 64 and so column A is greater.

39.

A: The minimum number socks that are needed to be taken out of a drawer in order to get two socks of the same color

B: 8

AI: In a sock's drawer, there are 7 pairs of socks in different colors.

The best answer is C.

Take the worst case scenario, after taking 7 socks out of the drawer, the 8th sock must be in the same color as one of the other socks and therefore the columns are equal to one another.

40.

A: 5 degrees

B: The measurement of the smaller angle between the clock's hands at 14:10

The best answer is C.

Draw the clock with the relevant time.

We can see that the large hand is on 2 and the smaller hand is a little clockwise, the question is how much. Ten minutes have passed from the time the small hand was exactly on the 2 bar and therefore it moved by

$\frac{10}{60} \cdot 30$ degrees, which is 5 degrees.

The columns are equal.

41.

A: The number poles needed to support the cable

B: 67

AI: poles support a 20 Kilometers long electric cable.

The distance between the poles cannot surpass 300 meters and a pole is Required in the both edges of the cable for support.

The best answer is A.

20 Km are 20,000 meters, which are divided into 66 - 300 meters long parts and another segment of 200 meters. Let's not forget that we also need a pole in the beginning and in the end, which sums up to $(66+1+1 = 68)$ poles and therefore column A is greater.

42.

A: $X \cdot t + \left(\frac{X}{Y} + 1\right) \cdot s$

B: The time it will take to build a fence that is X meters long with a pole every Y meters

AI: Sticking a pole in the ground takes s seconds.

Installing a meter of fence takes t seconds.

The best answer is C.

The number of poles is $\frac{X}{Y} + 1$.

The time it would take to stick all of these poles is $s \cdot \left(\frac{X}{Y} + 1\right)$.

It takes $t \cdot X$ seconds to install the fence.

Sum those two to get exactly the same expression written in column A.

43.

A: The number of people in the bachelor party including Brad

B: $X(2Y + 1)$

AI: Brad invited X people to his bachelor party.

With each of the guests arrived Y more friends, and everyone of them

Also brought his date with him.

The best answer is A.

The number of people invited: X.

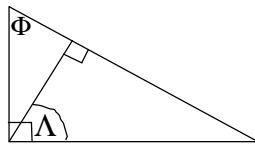
The number of friends that joined (including dates): $2YX$.

The total number of people in the party, including Brad =

$1 + X + 2XY \neq X(2Y + 1) + 1$, which is greater by 1 than column B and therefore the answer is A.

Geometry

44.



A: Λ

B: Φ

The best answer is C.

The two right triangles are similar triangles and therefore the angles Λ and Φ equal to one another.

45.

A: $(AB + BC)^2$

B: AC^2

AI: A, B and C are three corners of a right triangle where AC is the hypotenuse.

The best answer is A.

Compare the columns:

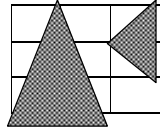
$$\begin{array}{rcl} (AB + BC)^2 & ? & AC^2 \\ AB^2 + 2AB \times BC + BC^2 & ? & AC^2 \end{array}$$

According to the Pythagoras theory, $AC^2 = AB^2 + BC^2$. Subtract there items:

$$2AB \times BC \quad ? \quad 0$$

AB and BC are positive numbers and therefore column A is greater than column B.

46.



A: Shaded region

B: White region

The best answer is B.

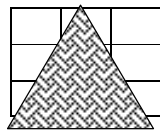
Let's say that the measurements of the white cube are X on X.

$$\text{Column A} = (2X)(3X)(0.5) + (X)(2X)(0.5) = 4X^2.$$

$$\text{Column B} = (3X)(3X) = 9X^2 - 4X^2 = 5X^2.$$

Since X must be positive, column B is greater.

47.



A: The area of the triangle divided by the area of the white region

B: $\frac{1}{2}$

AI: Each of the squared cubes has an area of 1 meter squared.

The best answer is A.

The area of the triangle is $(3)(3)(0.5) = 4.5$ meters squared.

The area of the while region is 9 minus the area of the triangle,

Thus 4.5 meters squared. Column A is greater than column B.

48.

$$\text{A: } (Z^2)/(X^2 + Y^2)$$

B: 1

AI: X, Y and Z are three sides of a right triangle

$$Z > Y$$

The best answer is D.

From the given information we cannot determine if Z or X are the hypotenuse and therefore the right answer is D.

49.

$$\text{A: } (Z^2)/(X^2 + Y^2)$$

B: 1

AI: X, Y and Z are three sides of a right triangle
 $X > Y > Z$

The best answer is B.

Let's set $X=5$, $Y=4$ and $Z=3$ as the sides of the triangle.

Column A = $(9)/(25 + 16) = 9/41 < 1$ and therefore column B is greater.

50.

A: The largest possible size of a base angle in an isosceles triangle

B: 89 degrees

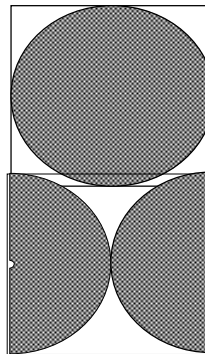
The best answer is A.

The base angles in an isosceles triangle are less than 90 degrees and therefore they can even be 89.8, which is greater than 89 degrees and therefore column A is greater.

51.

A: The area of the shaded region

B: The area of the shaded region



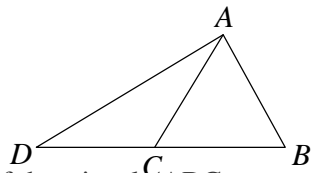
AI: The shaded region is blocked inside the square

The best answer is C.

In both shapes there is a complete circle that is blocked inside a square.

The area of the circle must be the same and therefore both columns are equal.

52.



A: The area of the triangle ABC

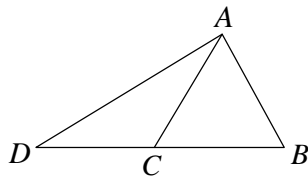
B: The area of the triangle ADC

AI: AC is the median of BD

The best answer is C.

The two triangles have the same height and the same base since AC is the median of the side BD and therefore they have the same area.

53.



A: The area of the triangle ABC

B: The area of the triangle ADC

AI: AC is the bisector of the angle DAB

The best answer is D.

The two triangles have the same height but we know nothing of their bases.

The fact that AC is the bisector of the angle DAB tells us nothing about the base and therefore the answer cannot be obtained.

54.

A: The area of a pentagon that is blocked in a circle

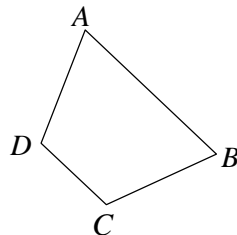
B: The area of a hexagon that is blocked in a circle

AI: The blocking circle is identical in both columns

The best answer is B.

The more sides the polygon has, the closer it is to a shape of a circle and thus its area is larger. A hexagon has 6 sides while a pentagon has only 5 and therefore the area of the hexagon will be greater.

55.



A: $AB + DC$

B: $BC + AD$

AI: ABCD is blocked inside a circle

The best answer is C.

There is a rule that implies that opposite sides of a quadrilateral that is blocked inside a circle are equal to the other opposite sides.

Therefore, $AB + DC = AD + BC$.

56.

A: The sum of the angles in a pentagon

B: 4 angles in a regular octagon

The best answer is C.

The pentagon has 5 angles, each 108 degrees, they sum up to 540 degrees in total. The octagon has 8 angles of 135 each. 4 angles of an octagon are 54 degrees and therefore the two columns are equal.

57.

A: The sum of the angles an hexagon and a square

B: The sum of the angles in three squares

The best answer is C.

A hexagon has 6 angles of 120 degrees each, which sum up to 720.

Column A = $720 + 360 = 1080$ degrees.

Column B = $360 \times 3 = 1080$ degrees.

The answer is C.

58.

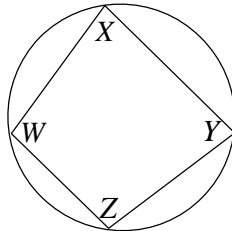
A: Four angles of a hexagon

B: Three angles of an octagon

The best answer is A.

A hexagon has 6 angles of 120 degrees each, 4 of them are exactly 480 degrees. An octagon has 8 angles of 135 each, 3 of them are 405 degrees and therefore column A is greater than B.

59.



A: Z

B: W

AI: $X < Y$

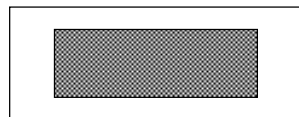
The best answer is A.

Opposite angles of a quadrilateral that is blocked in a circle are equal to 180 degrees

è $Z + X = 180$ and $W + Y = 180$.

Since $X < Y$, Z must be greater than W.

60.



A: The white region

B: The shaded region

AI: A shaded rectangle is placed inside a white rectangle.

The perimeter of the outer rectangle is twice the perimeter of the Inner rectangle.

The best answer is D.

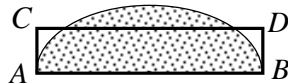
Let's name X and Y as the sides of large rectangle.

Let's name Q and P as the sides of the small rectangle.

We can write the following equation:

$2X + 2Y = 4Q + 4P$ ⇒ This equation is insufficient in order to determine the answer and therefore D is the right answer.

61.



A: The dotted area

B: The area of the rectangle ABCD

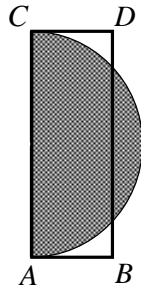
AI: $AC = R/2$, where R is the radius of the circle

The best answer is D.

Since the question didn't imply that AB is the diameter of the circle we cannot calculate the area of the rectangle or the dotted area.

More information is required in order to answer the question.

62.



A: The area of the rectangle ABCD

B: The area of the shaded region

AI: $CD = R/2$, where R is the radius of the circle

AC is the diameter of the circle

The best answer is B.

The area of the rectangle is $(2R)(R/2) = R^2$.

The area of the half circle is $\frac{\pi R^2}{2}$, which is greater than R^2 and therefore column B is greater.

63.

A: The radius of the car's wheel

B: 50 centimeters

AI: A car travels at 3000 R.P.M (rounds per minute).

The car's speed is 4000 meters per minute.

The best answer is B.

The perimeter of the wheel is $2pR$.

If we divide the distance that the car traveled in one minute by the perimeter of the wheel, we'll get the number of rounds that the wheel did during that period of time:

$$\frac{4000}{2pR} = 3000 \Rightarrow 6pR = 4 \Rightarrow R = \frac{2}{3p} \approx \frac{2}{3 \cdot 3.14} = 0.32 \text{ meters.}$$

Column B is greater than column A.

Note: Is it too much of an engineering question?

64.

A: The area of a square whose sides are $\sqrt{12}$

B: Twice the area of an equilateral whose sides are 4

The best answer is B.

Column A: The area of the triangle is $\sqrt{12} \times \sqrt{12} = 12$.

Column B: The area of the equilateral triangle is $\frac{s^2 \sqrt{3}}{4} = 4\sqrt{3}$, which is

approximately 7 and therefore twice the area is approximately 14, which is greater than column A.

65.

A: The measurement of the angle Z

B: 90

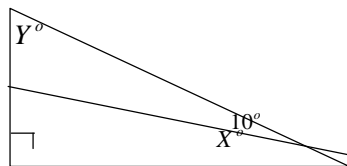
AI: X, Y and Z are three angles in a triangle.

$$Y = X + Z.$$

The best answer is B.

Since $Y = X + Z$, Z cannot be 90 degrees because then the sum of the three angles is over 180 and that's not possible.

66.



A: The measurement of the angle X

B: 20 degrees

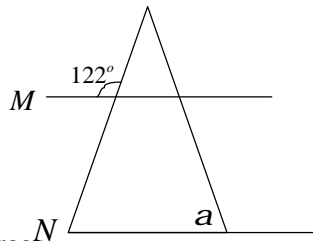
AI: $Y = 3X$

The best answer is C.

The sum of the angles in a triangle is 180 degrees.

$180 = Y + 90 + X + 10 \Rightarrow 80 = 4X \Rightarrow X = 20$ and therefore the columns are equal to one another and the answer is C.

67.



A: 58 degrees

B: a

AI: $M \parallel N$

The best answer is D.

The size of the inner left angle in the triangle is equal to 58 degrees.

Since we have no further information on the triangle, we have no correlation between this angle and a .

The right answer is D.

68.

A: 31 inches

B: The perimeter of the triangle

AI: In the triangle ABC, $AB = 6$ inches and $BC = 9$ inches

The best answer is A.

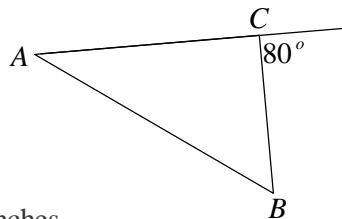
The third side (AC) has a range that it can be in:

$3 < AC < 15$ (Between the other sides difference to their sum).

Therefore the perimeter also has a range:

$18 < \text{Range} < 30$ and so 31 is out of the range and thus greater than the perimeter of the triangle.

69.



A: 14 inches

B: BC

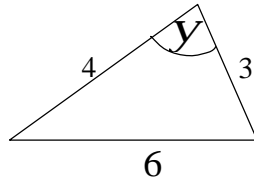
AI: $AB = 12$ inches

The best answer is A.

The angle 80 is a supplementary angle to the angle inside the triangle, which is equal to $(180 - 80 = 100)$ degrees. Since the sum of the angles in the triangle is equal to 180 degrees, the angle in front of the side BC is smaller than 100 and so $BC < AC < 12$ inches.

Column A is greater than column B.

70.



A: y

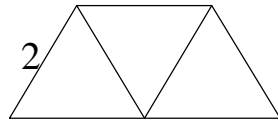
B: 90 degrees

The best answer is A.

If $y = 90$, the side in front of it would be 5 and not 6.

Since the side of the triangle in front of y is bigger than 5 then y is bigger than 90 degrees and column A is greater than column B.

71.



A: The area of the trapezoid

B: $6 \cdot \sqrt{3}$

AI: A trapezoid is made up of three equilateral triangles with a side of 2

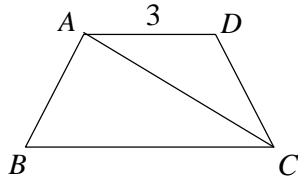
The best answer is B.

The area of the trapezoid is $(\text{Base}_1 + \text{Base}_2)(\text{Height})/2$.

The area is equal to $(2 + 4)(\sqrt{3})/2 = 3 \cdot \sqrt{3}$.

Column B is greater than column A.

72.



A: 4 inches

B: BC

AI: The area of ACD is 6 inches squared.

The area of $ABCD$ is 16 inches squared.

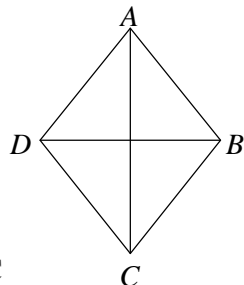
The best answer is B.

Let's name the height of the trapezoid, which is also the height of the triangle ADC .

The area of $ADC = 6 = 3H/2 \Rightarrow H = 4$ inches.

The area of the trapezoid is equal to $(AD + BC)(H)/2 = (3 + BC)(4)/2 = 16 \Rightarrow BC = 8 - 3 = 5$ inches and therefore column B is greater than column A.

73.



A: $2AC$

B: The perimeter of the rhombus

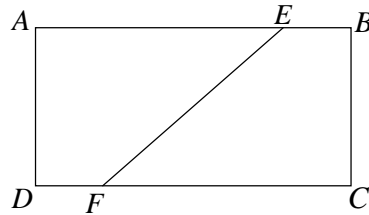
The best answer is B.

Look at ABC: $AB + BC > AC$

Look at ADC: $AD + DC > AC$

Add these two: $AB + BC + AD + DC = \text{perimeter of the rhombus} > 2AC$.

74.



A: Twice the perimeter of the trapezoid AEFD

B: The perimeter of the rectangle ABCD

AI: $DF = EB = X$

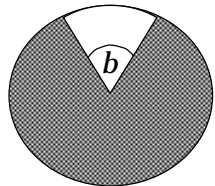
The best answer is A.

The perimeter of the rectangle is $2(BC + AB) = 2(BC + AE + X)$.

The perimeter of the trapezoid twice = $2(BC + AE + X + FE)$.

We can see that the perimeter of the trapezoid includes all the sides that the perimeter of the rectangle includes plus one more (FE) and therefore it is bigger.

75.



A: The area of the shaded region

B: $p \cdot \left(1 - \frac{b}{360}\right)$

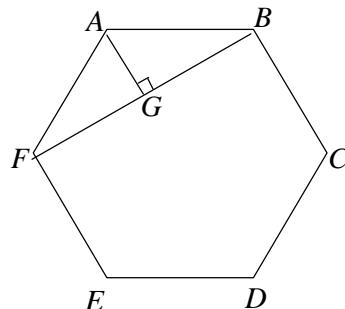
AI: The radius of the circle is 1

The best answer is C.

The angle of the shaded region is $360 - b$.

The area is therefore: $pR^2 \left(\frac{360 - b}{360}\right) = p \left(1 - \frac{b}{360}\right)$.

76.



A: FG

B: $\frac{2S}{\sqrt{3}}$

AI: The side of the regular hexagon is S

The best answer is B.

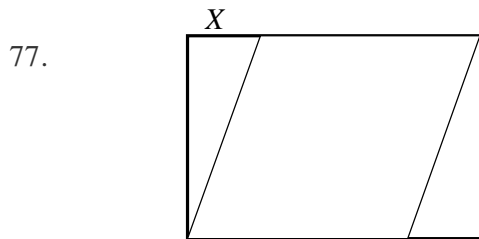
Look at the triangle AGF; the angle GAF is $(120/2)$ since the whole triangle is symmetric on the hexagon, thus AG is the median.

If GAF is 60 degrees and AGF is 90 degrees \Rightarrow AFG is 30 degrees.

Since AFG is a 30 degree angle in a right triangle, $AG = S/2$.

Use the Pythagoras principle: $S^2 = (S/2)^2 + FG^2 \Rightarrow FG = \sqrt{\frac{3S^2}{4}} = \frac{\sqrt{3} \cdot S}{2}$.

We can see that column B is greater than column A.



A: The area of the parallelogram

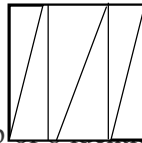
B: 45

AI: A Parallelogram is blocked inside a rectangle.

The area of the rectangle is 60 feet squared.

The best answer is B.

Draw the following guide lines:



We can see that the rectangle is made up of 6 congruent triangles and therefore 6 of those are equal to 10 \Rightarrow each = 10.

The parallelogram is made up of 4 triangles and so its area is

$4 \times 10 = 40$ feet squared.

Column B is greater.

1.

A: P

B: $\frac{1}{2}$

AI: $\sqrt{4} \cdot \sqrt{7} = 28^P$

The best answer is C.

Simplify the expression: $\sqrt{4} \cdot \sqrt{7} = 28^P \Rightarrow \sqrt{28} = 28^P \Rightarrow P = 1/2$.

The columns are equal to one another.

2.

A: X

B: 3

AI: $\sqrt[3]{361} = 19^{2X}$

The best answer is B.

Simplify the expression: $\sqrt[3]{361} = 19^{2X} \Rightarrow \sqrt[3]{19 \cdot 19} = 19^{2X} \Rightarrow (19)^{\frac{2}{3}} = 19^{2X}$.

$\frac{2}{3} = 2X \Rightarrow X = 1/3$ and therefore column B is greater.

3.

A:
$$\frac{\sqrt[5]{X^2} \cdot X^{\frac{1}{3}} \cdot X^{\frac{\sqrt{16}}{15}}}{X^{\frac{11}{\sqrt{121}}}}$$

B: 1

The best answer is C.

There is no other way, simplify the expression in column A:

$$\frac{\sqrt[5]{X^2} \cdot X^{\frac{1}{3}} \cdot X^{\frac{\sqrt{16}}{15}}}{X^{\frac{11}{\sqrt{121}}}} = \frac{X^{\frac{2}{5}} X^{\frac{1}{3}} X^{\frac{4}{15}}}{X^{\frac{11}{11}}} = \frac{X^{\frac{6+5+4}{15}}}{X} = \frac{X}{X} = 1 \text{ and therefore the}$$

columns are equal to one another and the answer is C.

4.

A: -5

B: Y

AI: $|Y + 5| = 5 - |Y|$

The best answer is D.

Y can be -5 but it can also be -2 for example and therefore there is more than one answer and the right answer is D.

5.

A: $\frac{33^6}{11^5 \cdot 3^5}$

B: 22

The best answer is A.

Simplify the expression in column A: $\frac{33^6}{11^5 \cdot 3^5} = \frac{11^6 \cdot 3^6}{11^5 \cdot 3^5} = 11 \cdot 3 = 33$ and therefore column A is greater than column B.

6.

A: $\sqrt{18} + \sqrt{5}$

B: $\sqrt{8} + \sqrt{72}$

The best answer is C.

Column A = $\sqrt{18} + \sqrt{50} = \sqrt{9 \cdot 2} + \sqrt{25 \cdot 2} = 3\sqrt{2} + 5\sqrt{2} = 8\sqrt{2}$.

Column B = $\sqrt{8} + \sqrt{72} = \sqrt{4 \cdot 2} + \sqrt{36 \cdot 2} = 2\sqrt{2} + 6\sqrt{2} = 8\sqrt{2}$.

The columns are equal.

7.

A: $\sqrt{75} + \sqrt{48}$

B: $9 \cdot \sqrt{2}$

The best answer is A.

Simplify the expression in column A:

$$\sqrt{75} + \sqrt{48} = \sqrt{25 \cdot 3} + \sqrt{16 \cdot 3} = 5\sqrt{3} + 4\sqrt{3} = 9\sqrt{3}.$$

We can see that column A is greater than column B.

8.

A: $3X - Y - Z$

B: $Y - 4$

AI: X, Y and Z are three consecutive integers ($X < Y < Z$)

The best answer is C.

Replace X with $Y - 1$ and Z with $Y + 1$:

$$3X - Y - Z = 3(Y - 1) - Y - (Y + 1) = 3Y - 3 - Y - Y - 1 = Y - 4.$$

We can see that both columns eventually are equal to $Y - 4$ and therefore the answer is C.

9.

A: $87^2 - 86^2$

B: 172

The best answer is A.

We can write column A as $(87 - 86)(87 + 86) = 1(87 + 86) = 173$.

Column A is greater than column B.

10.

A: The number of cola cans that Leroy can buy after the increase in the price

B: 10

AI: Leroy buys 12 cans of cola everyday. The price per can suddenly increased by 50%

The best answer is B.

Let's say that each can cost \$2 prior to the increase in the price.

After the price increased, each can cost $(1.5 \times 2 = \$3)$.

Leroy spends $12 \times \$2 = 24$ and now that would be enough for only 8 cans and therefore column B is greater than column A.

11.

A: The number of double digit numbers that the sum of their digit is smaller than 4

B: 5

The best answer is A.

The best way is to think of the numbers, there are 6 numbers that answer the criteria's: 10, 11, 12, 20, 21 and 30.

Column A is greater than column B.

12.

A: How much percent did Cindy add to her weight

B: 25%

AI: Cindy gained 15 Kg and now she weighs 65 Kg

The best answer is A.

Cindy's initial weight was 50 Kg. The question is how much is 15 out of

50 in percent terms: $\frac{15}{50} \times 100\% = 30\%$ and therefore column A is greater than column B.

13.

A: X

B: 15

AI: X percent of X are $X/8$

$$X \neq 0$$

The best answer is B.

Rewrite the extra data in percent terms: $X \times \frac{X}{100} = \frac{X}{8}$. Multiply both sides by 100 to get: $12.5 X = X^2 \Rightarrow X = 12.5$ and therefore column B is greater than column A.

14.

A: The total decrease in the car's value

B: 60%

AI: The value of a car decreased by 20% and then it decreased by 40% more

The best answer is B.

Let's say the car cost \$100.

At first its price decreased to \$80, then it decreased by 40%:

($0.6 \times \$80 = \48). The total decrease is ($100 - 48 = 52\%$).

The car decreased by 52% and not by 60% and so column B is greater.

15.

A: The total increase in the stock's value

B: 40%

AI: The value of a certain stock increased by 20% on January and by 20% more on February

The best answer is A.

Let's say that the value of the stock was \$100.

In January it increased to \$120.

In February it increased to ($1.2 \times 120 = \$144$).

All together, the stock's value increased by 44%, which is greater than 40%.

16.

A: By how much percent are rollerblades more expensive than ice-skates

B: 80%

AI: Rollerblades cost 40% more than skateboards and skateboards cost 40% more than ice-skates

The best answer is A.

Let's say that ice-skates cost \$100 since there are no numbers in the question. Skateboards cost 40% more, thus \$140.

Rollerblades cost 40% more than \$140, which is \$196.

And therefore rollerblades cost 96% more than ice-skates, which is greater than 80%.

17.

A: The average (arithmetic mean) of the rest of the grasshoppers

B: 5 Centimeters

AI: The average (arithmetic mean) of 15 grasshoppers is 8 centimeters.

The average of 5 of the grasshoppers is 10 Centimeters.

The best answer B.

Let's say that the average of the rest of the grasshoppers in column A is X.

Use the average formula: $\frac{10 \cdot 5 + X \cdot 3}{8} = 8 \Rightarrow 50 + 3X = 64.$

$3X = 14 \Rightarrow X = 4\frac{2}{3}$, which is a little under 5 and therefore column B is greater.

18.

A: The original number of bells that Helen had

B: 700

AI: After Helen lost 30% of her bells, she had 500 bells

The best answer is A.

500 bells are 70% of the number we are looking for.

We can write the following equation: $\frac{70}{100} = \frac{500}{?} \Rightarrow$ The original number of bells is $(50,000)/(70) =$ A little over 700 and therefore column A is greater.

19.

A: The amount of sugar (in liters) in a mix containing 3 liters of strawberry juice and 2 liters of cola

B: 1.5

AI: The concentration of sugar in strawberry juice is 20% and in cola it's 40%

The best answer is B.

Calculate the amount of sugar in the mix:

20% of 3 liters is $\frac{3}{5}$ liters plus 40% of 2 liters, which is $\frac{4}{5}$ liters.

The total is $(\frac{3}{5} + \frac{4}{5} = \frac{7}{5} = 1$ and $\frac{2}{5} = 1.4$ liters).

Column B is greater than column A.

20.

A: The probability of guessing the code the safe

B: $1/(100,000)$

AI: The code of a safe has 5 digits.

The last digit is 0.

The best answer is A.

Since we already know the last digit, we need to guess only 4 digits.

Each digit can be between 0 and 9.

The probability of guessing each digit is $1/10$ and therefore the probability of guessing the whole 4 is $(1/10)^4 = 1/(10,000)$, which is greater than the expression in column B.

21.

A: 8^2

B: 2^8

The best answer is B.

Take the expression in column B and write it as followed:

$2^8 = 16^2$, which is greater than column A.

22.

A: X

B: Y

AI: $X^2 = 25$ and $|Y| = 5$

The best answer is D.

X can be either 5 or -5, Y can either be 5 or -5 also and since there can be more than one answers to the problem, the right answer is D.

23.

A: X

B: 10

AI: $X^2 = 81$

The best answer is B.

X can either be -9 or 9.

10 is larger than both choices and therefore column B is greater than column A.

24.

A: Y

B: $0.25X$

AI: X and Y are both negative integers.

$$X/Y > 4$$

The best answer is B.

$X/Y > 4 \Rightarrow X > 4Y$ divide both sides by 4: $0.25X > Y$ and therefore column B is greater than column A.

25.

A: $X - 5$

B: $Y + 5$

AI: $-5 < -X < 5$

$$-20 < -Y < -15$$

The best answer is B.

Simplify the ranges and make them compatible with the question:

$$-5 < -X < 5 \Rightarrow 5 > X > -5 \Rightarrow 0 > X - 5 > -10$$

$$-20 < -Y < -15 \Rightarrow 20 > Y > 15 \Rightarrow 25 > Y + 5 > 20$$

We can see that the expression in column A is negative while the expression in column B is positive and therefore greater.

26.

$$A: (1/16)^{0.5} + (1/25)^{0.5}$$

$$B: (1/16 + 1/25)^{0.5}$$

The best answer is A.

$$\text{Column A} = (1/16)^{0.5} + (1/25)^{0.5} = 1/4 + 1/5 = 9/20.$$

$$\text{Column B} = (1/16 + 1/25)^{0.5} = (41/400)^{0.5} = \frac{\sqrt{41}}{20}.$$

Now, $\sqrt{41}$ is smaller than 9 and therefore column A is greater.

27.

$$A: (9/144)^{0.5} - (1/25)^{0.5}$$

$$B: (9/144 - 1/25)^{0.5}$$

The best answer is B.

$$\text{Column A} = (9/144)^{0.5} - (1/25)^{0.5} = 3/12 - 1/5 = 1/20.$$

$$\text{Column B} = (9/144 - 1/25)^{0.5} = \left[\frac{9 \cdot 25 - 144}{144 \cdot 25} \right]^{0.5} = \left[\frac{81}{3600} \right]^{0.5} = \frac{9}{60} = \frac{3}{20}.$$

We can see that column B is greater than column A.

28.

A: $7/1000$

B: $0.049/7$

The best answer is C.

$$7/1000 = 0.007.$$

$$0.049/7 = 0.007.$$

The columns are equal to one another and so the answer is C.

29.

A: 0.6^3

B: $0.6^{1/3}$

The best answer is B.

0.6 is also $3/5$.

$$\text{Column A} = (3/5)^3 = 9/125.$$

Column B = $(3/5)^{1/3}$ **è** we know that a power that is not a fraction makes a fraction smaller, its also good to remember that a power that is a fraction makes a fraction larger and therefore the expression in column B is greater than $3/5$ and obviously from $9/125$.

30.

A: The average of $(X + 9Y + 191)$ and $(9X + Y + 347)$

B: The average of $(5X + 4Y + 457)$ and $(5X + 6Y + 87)$

The best answer is B.

Find the average in both columns:

$$\text{Column A} = (X + 9Y + 191 + 9X + Y + 347)/2 = (10X + 10Y + 538)/2 = (5X + 5Y + 269).$$

$$\begin{aligned}\text{Column B} &= (5X + 4Y + 457 + 5X + 6Y + 87)/2 = (10X + 10Y + 544)/2 \\ &= (5X + 5Y + 272).\end{aligned}$$

The best answer is B.

31.

A: 3.88

B: $\sqrt{17}$

The best answer is B.

We know that $\sqrt{16} = 4$ and that $\sqrt{25} = 5$ and therefore 17, which is found between 16 and 25 will give a result between 4 and 5.

Column B is greater than column A.

32.

A: Percent increase from 63 to 65

B: Percent increase from 65 to 67

The best answer is A.

$A = 2/63$ and $B = 2/65$.

The denominator is bigger in B and therefore column A is greater.

33.

A: $X + Y$

B: $X + Z$

AI: The product of three numbers is 1000

The best answer is D.

All we know is that $XYZ = 1000$, this information is not sufficient to know whether Y is bigger than Z or not. The right answer here is D.

34.

A: 0.1

B: $\left(\frac{250}{25}\right)^{-1}$

The best answer is C.

Column B = $\left(\frac{250}{25}\right)^{-1} = \frac{25}{250} = \frac{1}{10} = 0.1$ and therefore column A and B are equal.

35.

A: 65% of 135

B: 135% of 65

The best answer is C.

Remember, don't calculate- compare.

$$A = \frac{65}{100} \cdot 135$$

$$B = \frac{135}{100} \cdot 65$$

According to the multiplication law, these expressions are equal and thus the answer is C.

36.

A: 30% of 25

B: 65% of 15

The best answer is B.

$$A = \frac{30}{100} \cdot 25 = 7.5$$

$$B = \frac{65}{100} \cdot 15 = \frac{975}{100} = 9.75$$

Column B is greater than column A.

37.

A: $|A + B|$

B: $|A| + |B|$

AI: $A > 0$

$B < 0$

The best answer is B.

If $A = -B$ for example, column A = 0 while column B = 2A or 2B.

The expression in column B is always positive as opposed to the expression in column A, which can equal zero.

38.

A: $(X + Y + Z)/3$

B: Z

AI: $X < Y < Z$

The best answer is B.

The expression in column A is actually the average (arithmetic mean), which means that its value is between X and Z, thus smaller than Z.

Since the average must be smaller than Z, column B is greater than A.

39.

A: The sum of the numbers

B: 2188

AI: The average of 12 numbers is 182

The best answer is B.

The average (arithmetic mean) of n numbers is their sum divided by n.

If the average of 12 numbers is 182, their sum will be $12 \times 182 = 2184$.

Column B is greater than column A.

40.

A: $(23)^{-1}$

B: $(24)^{-1}$

The best answer is A.

$A = 1/23$ and $B = 1/24$, in column A 1 is divide into less parts and therefore the result is greater.

41.

A: $A + B$

B: 140

AI: $A = 20 + 16 + 13 + 11 + 6 + 2$

$B = 22 + 18 + 13 + 11 + 8 + 4$

The best answer is A.

Rewrite A and B like this: $A = 20 + 16 + 13 + 11 + 6 + 2$

$$B = 4 + 8 + 11 + 13 + 18 + 22$$

Add them up: $A + B = 24 + 24 + 24 + 24 + 24 + 24$

$A + B = 24 \times 6 = 144.$

Column A is greater than column B.

42.

A: $2 \times (0.2)$

B: $(0.2)^2$

The best answer is A.

$2 \times (0.2) = 0.4.$

$(0.2)^2 = 0.04.$

Since $0.4 > 0.04$, column A is greater than B.

43.

A: Y

B: $2X + 3.5$

AI: $4Y - 8X = 14$

The best answer is C.

$4Y - 8X = 14$, divide both sides by 4: $Y - 2X = 3.5 \Rightarrow Y = 2X + 3.5.$

We can see that the columns are equal to one another.

44.

A: $1.5 - 3X$

B: Y

AI: $8Y - 24X = 12$

The best answer is D.

Take $8Y - 24X = 12$ and divide it by 8: $Y - 3X = 1.5$.

è $Y = 3X + 1.5$.

We don't know if $3X + 1.5$ are bigger or smaller than $1.5 - 3X$ since X can be positive, negative or even zero. The right answer is D.

45.

A: 11 out of 12 in percent terms

B: 91%

The best answer is A.

Column A = $\frac{11}{12} \times 100\% = \frac{1,100}{12}$. Stop here.

Go to the other column and check if 12×91 is greater than 1100:

$12 \times 91 = 1,092$ and therefore it's more than 91%.

Column A is greater than column B.

46.

A: $X - Y + Z$

B: 15

AI: $Y - X - Z > 15$

The best answer is B.

Take $Y - X - Z > 15$ and divide both sides by -1:

$X - Y + Z < -15$ (don't forget to flip the inequality)

We can see that the expression in column A is smaller than that in column B.

47.

A: $4/9 + 5/12$

B: $4/7 + 5/11$

The best answer is B.

$A = 4/9 + 5/12 = \frac{48+45}{108} = \frac{93}{108} < 1$.

$B = 4/7 + 5/11 = \frac{44+35}{77} = \frac{79}{77} > 1$ and therefore column B is greater.

48.

A: 0^7

B: 7^0

The best answer is B.

Zero raised to any positive power is zero, so Quantity A = 0.

Any number raised to 0 is unity, so Quantity B = 1.

49.

A: 1

B: X

AI: $\frac{1}{X} < -2$

The best answer is A.

Since $\frac{1}{X}$ is negative X must be negative.

If X is negative, column A is greater.

50.

A: 66

B: The average of the six numbers.

AI: The sum of 6 even consecutive numbers is 396.

The best answer is C.

The average is the sum divided by the amount of numbers.

The average of the 6 numbers is $396/6 = 66$ and therefore the columns are equal to one another.

51.

A: X^2Y^3

B: X^3Y^2

AI: $X < 0$ and $Y > 0$

The best answer is A.

Pick up numbers: For example, $X = -1$ and $Y = 2$.

Column A = $1 \times 8 = 8$.

Column B = $-1 \times 4 = -4$.

We can see that column A is positive while B is negative and so A is the right answer.

52.

A: The smallest prime number smaller than 4

B: 3

The best answer is B.

The smallest prime number smaller than 4 is 1 and not 3 and therefore column B is greater than column A.

53.

A: $1 - 4/17$

B: $27/68 + 17/34$

The best answer is B.

Column A = $1 - 4/17 = 13/17 = 52/68$.

Column B = $27/68 + 34/68 = 61/68$.

Column B is greater than column A.

54.

A: $(0.99)^3(0.99)^4$

B: $(0.99)^8$

The best answer is A.

When dealing with fractions, the smaller the power, the largest the result.

$A = (0.99)^7$ while $B = (0.99)^8$ and therefore column A is greater since the power of the fraction there is smaller.

55.

A: X

B: 7

AI: $|-7| = -X$

The best answer is B.

If $|-7| = -X$, then $-X = 7$ and so $X = -7$.

$7 > -7$ and so column B is greater than column A.

56.

A: $\sqrt{X^{2.25} + 8X^{1.5} + 16}$

B: $X^{1.5} + 4$

The best answer is C.

Take a power of two on both sides to get:

$A = X^{2.25} + 8X^{1.5} + 16$.

$B = (X^{1.5} + 4)^2 = X^{2.25} + 8X^{1.5} + 16$.

And so column A is equal to column B.

57.

A: 11^5
B: 100,000

The best answer is A.
100,000 can be written as 10^5 .
Now, $11^5 > 10^5$ and therefore column A is greater than column B.

58.
A: $\frac{|2Y|}{2}$
B: Y

The best answer is D.
For a positive Y, column A is equal to column B.
Now, for a negative Y, column A is greater than column B.
Since there is more than one answer, the right answer is D.

59.
A: X
B: 13
AI: $XY = 156$
 $Y < 11$

The best answer is A.
156 is a multiplication of 12 and 13.
Since Y is smaller than 11, X must be larger than 13 in order for the multiplication XY to be equal to 156.
Since $X > 13$, column A is greater than column B.

60.
A: $1/X - 1/Y$
B: $(X - Y)/(XY)$

The best answer is D.
Simplify column B into the following: $(X - Y)/(XY) = 1/Y - 1/X$.
Since we have no further information on X and Y, the answer cannot be obtained and the right answer is D.

61.
A: $(X - Y)/(XY)$
B: 0
AI: $Y > X > 0$

The best answer is B.

The easiest way is to plug in numbers.

Replace X with 1 and Y with 2.

Column A = $(1 - 2)/(1 \times 2) = -1/2$.

Column B = 0.

Therefore, column B is greater than column A.

62.

A: $(\sqrt{7} + \sqrt{3})^2$

B: $(\sqrt{6} + \sqrt{4})^2$

The best answer is B.

Simplify both columns.

Column A = $(\sqrt{7} + \sqrt{3})^2 = 7 + 2\sqrt{21} + 3 = 10 + 2\sqrt{21}$.

Column B = $(\sqrt{6} + \sqrt{4})^2 = 6 + 2\sqrt{24} + 4 = 10 + 2\sqrt{24}$.

We can see that the expression in column B is greater than that in column A.

63.

A: $\frac{999,999}{99}$

B: 1111

The best answer is A.

Since its hard calculating the expression in column A, do the following:

Multiply 99 with 1111, the result is far less than 999,999 and therefore column A is much bigger than column B.

64.

A: One half of 40% of 65

B: One fourth of 35% of 140

The best answer is A.

Column A = $\frac{1}{2} \left(\frac{40}{100} \times 65 \right) = \frac{1}{2} \left(\frac{260}{10} \right) = 13$.

Column B = $\frac{1}{4} \left(\frac{35}{100} \times 140 \right) = \frac{1}{4} \left(\frac{35 \times 14}{10} \right) = \frac{1}{4} \left(\frac{490}{10} \right) = \frac{49}{4} = 12.25$.

We can see that column A is greater than column B.

65.

A: One seventh of 25% of 336

B: One sixth of 20% of 360

The best answer is C.

$$\text{Column A} = \frac{1}{7} \left(\frac{25}{100} \times 336 \right) = \frac{1}{7} \left(\frac{8400}{100} \right) = \frac{84}{7} = 12.$$

$$\text{Column B} = \frac{1}{6} \left(\frac{20}{100} \times 360 \right) = \frac{1}{6} (2 \times 36) = \frac{72}{6} = 12.$$

We can see that column A = column B and so the answer is C.

66.

$$\text{A: } 5 + \frac{1 - 0.5}{10 - \left(\frac{0.5}{\sqrt{0.25}} \right) \cdot 9.5}$$

B: 6.5

The best answer is B.

Simplify the expression in column A:

$$5 + \frac{1 - 0.5}{10 - \left(\frac{0.5}{\sqrt{0.25}} \right) \cdot 9.5} = 5 + \frac{0.5}{10 - \left(\frac{0.5}{0.5} \right) \cdot 9.5} = 5 + \frac{0.5}{0.5} = 6.$$

Column B is greater than column A by 0.5 and so the answer is B.

67.

$$\text{A: } \frac{45 + 96}{0.64 + 0.36}$$

$$\text{B: } \frac{177 - 36}{0.63 + 0.36}$$

The best answer is B.

$$\text{Column A} = \frac{45 + 96}{0.64 + 0.36} = \frac{141}{1} = 141.$$

Column B = $\frac{177 - 36}{0.63 + 0.36} = \frac{141}{0.99}$, which is a little bigger than 141 and so column B is greater.

68.

$$\text{A: } (X^2 + Y^2)$$

$$\text{B: } (X + Y)^2$$

AI: $0 > X > 1 > Y$

The best answer is B.

Column A = $X^2 + Y^2$

Column B = $X^2 + Y^2 + 2XY$, subtract $X^2 + Y^2$ from both sides.

Column A = 0 while column B = $2XY$.

$2XY$ is greater than zero since X and Y are positive and therefore column B is greater than column A.

69.

A: $7/5$

B: Y/X

AI: $\frac{X-Y}{X} = \frac{2}{7}$

The best answer is A.

Take $\frac{X-Y}{X} = \frac{2}{7}$ and simplify it: $1 - Y/X = 2/7 \Rightarrow Y/X = 1 - 2/7 = 5/7$.

Column A is greater than 1 where column B is smaller than 1 and so the answer is A.

70.

A: $\frac{0.006}{0.0005}$

B: $\frac{0.0008}{0.0005}$

The best answer is A.

Move the decimals to the right, keep track of how many you moved.

Column A = $\frac{0.006}{0.0005} = \frac{6}{0.5} = 12$.

Column B = $\frac{0.0008}{0.0005} = \frac{8}{5}$, which is smaller than 12 and so column A is the greatest.

71.

A: $X + X^2 - X^3 + X^4$

B: $X^4 - X^2 + X^3 - X$

AI: $X = -3$

The best answer is B.

The best way is to replace X with -3.

Column A = $-3 + 9 - 27 + 81 = 60$.

Column B = $81 - 9 + 27 - 2 = 97$, which is greater than column A.

72.

A: $Y - X$

B: Y

AI: X and Y are positive prime numbers.

$X + Y = 8$, $Y > X$.

The best answer is B.

There are two choices: 1 and 7 or 3 and 5.

In the first option: $X=1$, $Y=7$; Column A = 6 and B = 7.

In the second option: $X=3$, $Y=5$; Column A = 2 and B = 5.

In both cases column B is greater than A and therefore B is the right answer.

73.

A: $Y - X$

B: 7

AI: X and Y are positive prime numbers.

$X + Y = 12$, $Y > X$.

The best answer is D.

There are two choices: 1 and 11 or 5 and 7.

In the first option: $X=1$, $Y=11$; Column A = 10 and B = 7.

In the second option: $X=5$, $Y=7$; Column A = 2 and B = 7.

The answer is different each time and so the right answer is D.

74.

A: $A + B$

B: 18

AI: $A \times B = 17$

The best answer is D.

A and B could be any numbers we want, for example: (1, 17) or (0.17, 100) or any other good combination. If we were told that A and B are integers, the answer would have been C but no such information was given and so the right answer is D.

75.

A: X

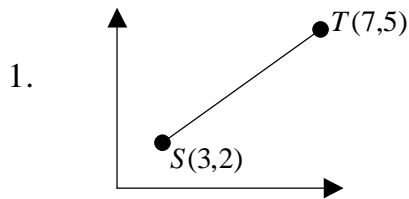
B: $9/39$

AI: $\frac{1}{X} + \frac{1}{X} + \frac{1}{X} = 13$

The best answer is C.

$$\frac{1}{X} + \frac{1}{X} + \frac{1}{X} = 13 \Rightarrow \frac{3}{X} = 13 \Rightarrow X = \frac{3}{13}.$$

Take the expression in column B: $9/39 = 3/13$ and so both columns are equal to one another.



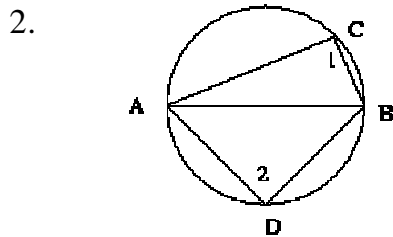
A: The length of ST

B: 4

The best answer is A.

The easiest way to answer this question is to look at ST as the hypotenuse of a triangle. The horizontal distance between S and T is $(7 - 3 = 4)$, the vertical distance is $(5 - 2 = 3)$. We can see that the third side should be 5 in order to validate the Pythagoras principle.

Column A(5) is greater than column B(4).



A: 180 degrees

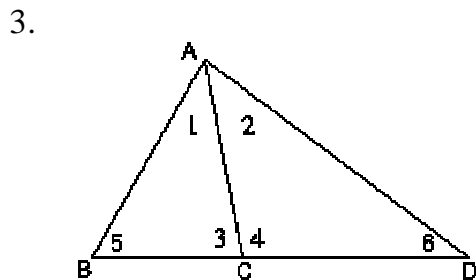
B: The measurement of angles 1 and 2

AI: AB is the diameter of the circle

The best answer is C.

Angle subtended by the diameter on the circumference = 90° .

So angle 1 = angle 2 = 90° , which means that their sum is 180 degrees.



A: The measurement of angles 2 and 6

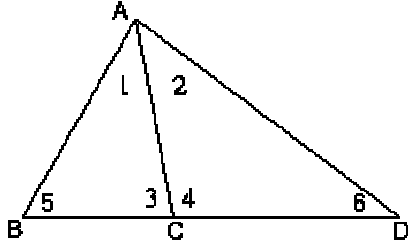
B: The measurement of angles 1 and 5

AI: The illustration is not drawn to scale

The best answer is D.

All we know about this problem is that angles 1, 2, 5 and 6 sum up to 180 degrees and that is not sufficient. Hence the relationship is indeterminate and the right answer is D.

4.



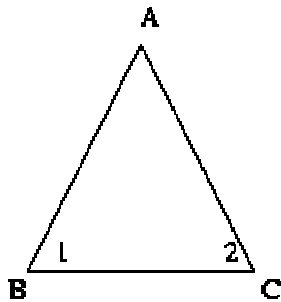
A: The measurement of angles 3 and 4

B: The measurement of angles 5 and 6

The best answer is A.

Angles 3 and 4 are supplementary angles on a straight line and therefore their sum is 180. Angles 5, 6, 1 and 2 sum up to 180 and therefore 5 and 6 by themselves are smaller than 180 degrees.

5.



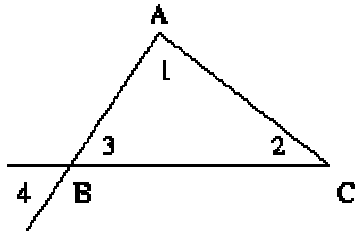
A: $2BC$

B: $AB + AC$

AI: Angles 1 and 2 are equal

The best answer is D.

The question only implies that the triangle is an isosceles and that is not enough. BC can be as small or big as we want and still the triangle can be an isosceles and therefore the right answer is D.



6.

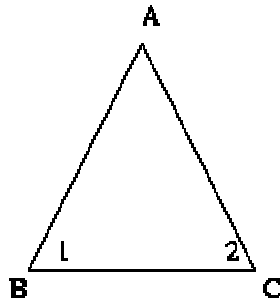
A: The measurement of angles 1 and 2

B: The measurement of angle 4

AI: The illustration is not drawn into scale

The best answer is D.

Angles 3 and 4 are vertically opposite angles and so they're equal to one another. We have no further information about the triangle and relations between the angles there. Angles 1 and 2 can be either larger or smaller than 3 and therefore the answer cannot be determined.



7.

A: The length of BC

B: The length of AC

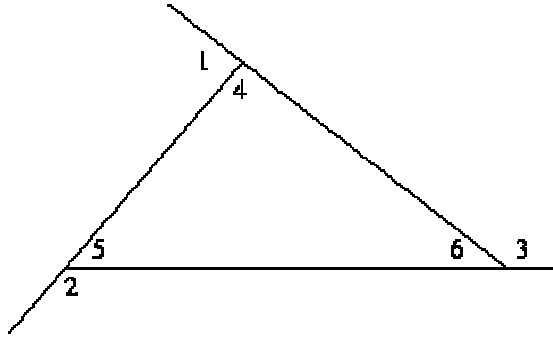
AI: Angles 1 and 2 are equal.

The measurement of angle BAC is 61 degrees.

The best answer is A.

Since the triangle is an isosceles and the top angle is 61 degrees, the two base angles are equal to 59.5 degrees.

BC is in front of 61 degrees and AC is in front of 59.5 degrees and therefore column A is greater.



8.

A: The measurement of angle 1 minus angle 3

B: The measurement of angle 6 minus angle 4

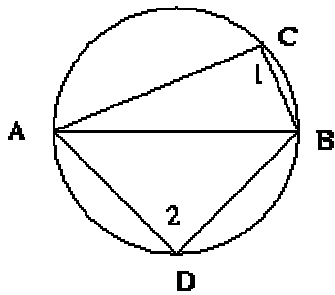
The best answer is C.

Angle 3 being an outer angle to the triangle is equal to angles $4 + 5$.

Angle 1 being an outer angle to the triangle is equal to angles $5 + 6$.

Angle 1 minus 3 is equal to angle 6 minus angle 4.

We can see that the columns are equal to one another.



9.

A: Twice the length of AB

B: The length of BD

AI: The measurement of the angle BAD is 30° .

The best answer is A.

Angle subtended by the diameter on the circumference = 90° .

So, ABD is a right triangle.

In a right triangle with an angle of 30° , the side in front of the 30 degree angle is equal to half the hypotenuse, thus AB.

In other words $AB = 2BD$.

Column A = $2AB = 4BD$.

Column B = BD and therefore the answer is A.

10.

A: Volume of a cube in which a length of a side is 7

B: Volume of a cube in which a length of a diagonal of a side is $\sqrt{72}$

The best answer is A.

Column A: The volume given the length of a side is 7^3 .

Column B: If side = X , then diagonal of a face = $(X^2 + X^2)^{1/2} = (2)^{1/2} X$.

$\sqrt{72} = \sqrt{36 \cdot 2} = 6(2)^{1/2}$ $\Rightarrow X = 6$ and so the volume is 6^3 , which is smaller than the volume in column A.

11.

A: The angle ABC

B: 55 degrees

AI: Consider an isosceles triangle, $AB = BC$.

$$AC^2 > AB^2 + BC^2$$

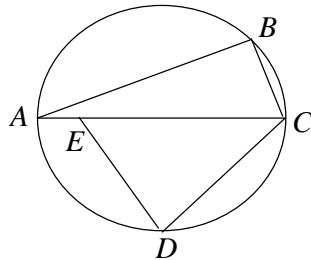
The best answer is A.

Draw a sketch of the triangle.

If the triangle was a right triangle ($\angle ABC = 90^\circ$), $AC^2 = AB^2 + BC^2$.

Since the $AC^2 > AB^2 + BC^2$, the angle at the top ($\angle ABC$) is larger than 90° degrees and column A is greater than column B.

12.



A: The measurement of the angle ABC

B: The measurement of the angle EDC

AI: AC is the diameter of the circle

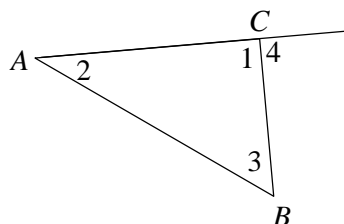
The best answer is A.

Angle subtended by the diameter on the circumference = angle $ABC = 90^\circ$.

The angle EDC lies on a line that is shorter than the diameter and therefore it is smaller than 90° .

Column A is greater than column B.

13.



A: 225°

B: The measurement of the angle 4

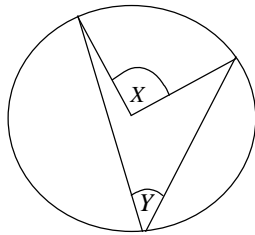
AI: The illustration is not drawn to scale

The best answer is A.

Angle 4 and angle 1 are on the same line and therefore their sum is 180° .

And therefore angle 4 must be smaller than 180 degrees, which means that column A is definitely greater than column B.

14.



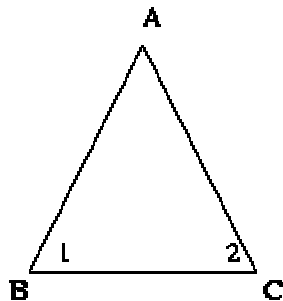
A: $2Y$

B: X

The best answer is C.

Angle subtended by an arc at the center of a circle is double the angle subtended by the same arc on the circumference, therefore $X = 2Y$.

Column A is equal to column B.



15.

A: $AB \times Z$

B: $AC \times Z$

AI: Angle 1 = angle 2

Z is a number between 0 and 50.

The best answer is C.

Since the triangle is an isosceles, $AB = BC$.

When you multiply each of the equal sides by the same number they remain equal to one another and so the two columns are equal.

16.

A: The largest angle in the triangle

B: 90°

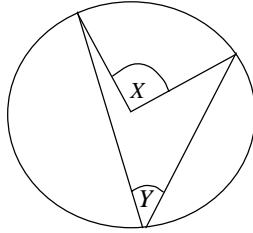
AI: consider a right triangle ABC

The best answer is C.

Since the triangle is a right triangle, there must be an angle of 90° among the angles. The other angles sum up to 90° and so the largest angle must be the right angle.

The columns are equal.

17.



A: 140°

B: The sum of angles X and Y

AI: $Y = 46\frac{2}{3}$ degrees

The best answer is C.

Angle subtended by an arc at the center of a circle is double the angle subtended by the same arc on the circumference, therefore $X = 2Y$.

If $Y = 46\frac{2}{3}$, X must be $93\frac{1}{3}$.

Column B = $X + Y = 140^\circ$ and so the columns are equal.

18.

A: The area of the square ABCD

B: The area of the circle

AI: The side of a square is $\sqrt{p \cdot R}$, where R is the radius of a circle

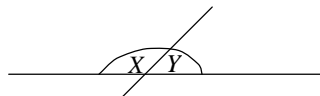
The best answer is D.

The area of the square is $\sqrt{p \cdot R} \times \sqrt{p \cdot R} = p \cdot R$.

The area of the circle is $p \cdot R^2$.

It seems like the area of the circle is greater yet the question didn't mention that R is not a fraction. If R is a fraction, for example $\frac{1}{2}$, the area of the square would be bigger. The right answer is D.

19.



A: The measurement of X

B: The measurement of Y

AI: The illustration is not drawn to scale

The best answer is D.

The only thing we know for sure is that X and Y are supplementary angles and therefore $X + Y = 180$. No further information is available and so we cannot determine the relations between X and Y and the right answer is D.

20.

A: The ratio between the diameter of circle 1 to the diameter of circle 2

B: $\sqrt{2}$

AI: The area of circle 1 is twice the area of circle 2

The best answer is C.

The area of a circle dependent on the diameter is $\frac{p \cdot d^2}{4}$.

The area of the first circle is $\frac{p \cdot d_1^2}{4}$.

The area of the second circle is $\frac{p \cdot d_2^2}{4}$.

We know that $\frac{p \cdot d_1^2}{4} = 2 \times \frac{p \cdot d_2^2}{4} \Rightarrow d_1^2 = 2 \cdot d_2^2 \Rightarrow \frac{d_1}{d_2} = \sqrt{2}$.

Column A is equal to column B.

21.

A: The sum of the angles that are equal

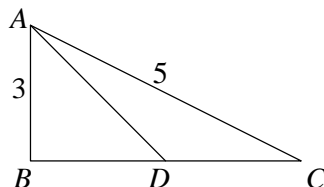
B: 130°

AI: Consider an isosceles triangle, one of the angles is 55° .

The best answer is B.

There are two possible angle arrangements in this circle: 55, 55, 70 or 55, 62.5, 62.5. In both cases, the sum of the equal angle does not sum up to 130° or greater and therefore column B is always greater than column A.

22.



A: The length of BD

B: The length of BC/2

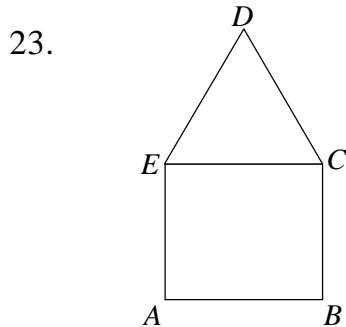
AI: ABC is a right triangle at B.
The area of ABD is 2.25.

The best answer is B.

Since ABC is a right triangle, $BC^2 + 3^2 = 5^2 \Rightarrow BC = 4$ and therefore column B = 2. The area of ABD is 2.25, write the following equation for the area:

$$(BD \times 3)/2 = 2.25 \Rightarrow BD = 1.5.$$

Column A = 1.5 while B = 2 and therefore the answer is B.



A: The area of ABCDE

B: 100

AI: The diagonal of the square is $10 \cdot \sqrt{2}$
BCD is an equilateral

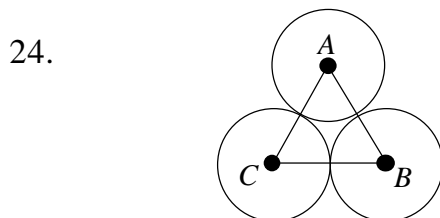
The best answer is A.

The ratio between the sides of the square to its diagonal is 1:1: $\sqrt{2}$ and therefore each side of the square and the triangle is equal to 10.

The height of the triangle is $(\sqrt{10^2 + 5^2} = \sqrt{125})$ and therefore the area of the triangle is equal to $\frac{5 \cdot \sqrt{125}}{2}$.

The area of the square is 100.

The area of both is $100 + \frac{5 \cdot \sqrt{125}}{2}$, which is surely greater than 100 and so the answer is A.



A: The circumference of one of the circles

B: The perimeter of the triangle ABC

AI: The equilateral triangle ABC is formed by connecting the centers of three identical circles. The circles are tangential to one another.

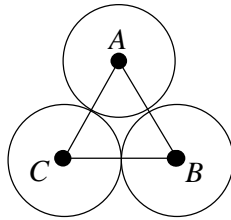
The best answer is B.

We know that the circumference of a circle is equal to $2 \cdot \pi \cdot R$, which is approximately $6.28R$.

We can see that each side of the triangle is made up of two radii and therefore the perimeter of the triangle is $(2R)(3) = 6R$.

$6.28 > 6$ and therefore column B is greater than column A.

25.



A: The area of the triangle ABC

B: The area of one of the circles

AI: The equilateral triangle ABC is formed by connecting the centers of three identical circles. The circles are tangential to one another.

The best answer is B.

The area of a circle is simply $\pi \cdot R^2$.

All we know about the equilateral triangle is that each of its sides is equal to $2R$, but this is sufficient.

The height of the ABC is $\sqrt{4R^2 - R^2} = \sqrt{3R^2} = \sqrt{3}R$.

The area of the triangle is base x height divided by two.

The area is $\frac{2R \times R\sqrt{3}}{2} = R^2 \times \sqrt{3}$.

$\pi > \sqrt{3}$ and therefore the area of the circle is larger and so column B is greater than column A.

26.

A: The volume of a cylindrical water tank that has a radius of 3 meters and a height of 5 meters

B: The volume of a cylindrical water tank that has a radius of 2 meters and a height of 10 meters

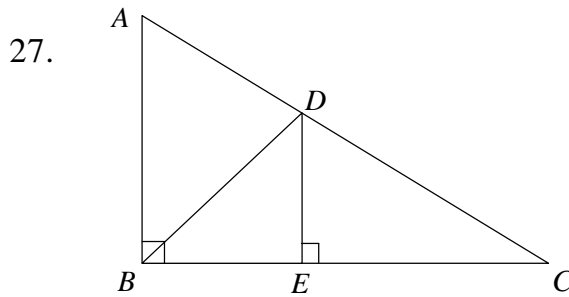
The best answer is A.

The volume of a cylinder in general is calculated according to: $\pi \cdot R^2 \cdot H$.

Column A = $\pi \cdot 3^2 \cdot 5 = 45\pi$.

Column B = $\pi \cdot 2^2 \cdot 10 = 40\pi$.

Column A is greater than column B.



A: BE

B: ED

AI: The measurement of angle ABD is 43 degrees.

The best answer is B.

$$\angle ABC = \angle ABD + \angle DBC \Rightarrow 90^\circ = 43^\circ + \angle DBC \Rightarrow \angle DBC = 47^\circ.$$

$\angle ABD$ and $\angle BDE$ are alternate interior angles and thus equal.

BE is in front of a 43° angle.

ED is in front of a 47° angle.

Therefore, ED is greater since it is located in front of a larger angle.

28.

A: The area of the circle

B: 507

AI: The circumference of a circle is $26 \cdot p$

The best answer is A.

The circumference of the circle is $26 \cdot p$, compare it with $2pR$.

$$\Rightarrow R = 13.$$

The area of the circle can be easily calculated according to $p \cdot R^2$.

$$\text{The area} = p \cdot 13^2 = p \cdot 169 \approx 3.14 \cdot 169.$$

$169 \times 3 = 507$ and therefore $3.14 \cdot 169$ is definitely greater than 507, which makes column A greater than column B.

29.

A: Perimeter of a regular octagon with a side of 4.5

B: Perimeter of an equilateral triangle with a side of 12

The best answer is C.

An octagon has 8 sides and therefore it has a perimeter of $8 \times 4.5 = 36$.

An equilateral triangle has three sides and therefore it has a perimeter of $12 \times 3 = 36$. The columns are equal.

30.

- A: Semi-circumference of a circle with a diameter of 28 inches
 B: The perimeter of a regular nonagon with a side of 5 inches

The best answer is B.

Column A: The circumference of a circle with a diameter of 28 inches is $p \times 28$, which is approximately 88 inches (3.14×28).

The semi-circumference is $88/2$, thus 44 inches (rounded up).

Column B: The perimeter of a regular nonagon (a nonagon has nine sides) is equal to $5 \times 9 = 45$ inches and therefore column B is greater than column A.

31.

- A: The perimeter of a regular octagon with a side of 10
 B: The perimeter of a regular decagon with a side of 8

The best answer is C.

An octagon has 8 sides and therefore its perimeter is $8 \times 10 = 80$.

A decagon has 10 sides and therefore its perimeter is $10 \times 8 = 80$.

32.

A: The volume of a rectangular solid with length of 4 inches, a width of 6 inches and a height of H inches.

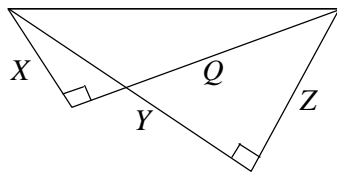
B: The volume of a rectangular solid with length of 6 inches, a width of 3 inches and a height of Q inches.

The best answer is D.

This question takes seconds if you think instead of finding the volumes right away. As you can see each of the columns is dependent on a different variable (H and Q) yet no correlation between the two is given and so the answer would be undeterminable.

The right answer in this case is D.

33.



A: $X^2 + Q^2$

B: $Y^2 + Z^2$

The best answer is C.

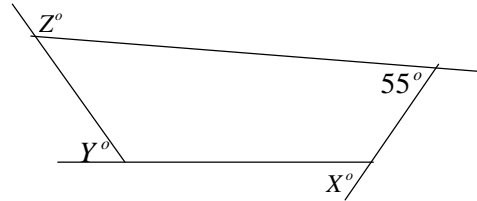
Since the two triangles are right triangles with a common base, we can use the Pythagoras principle to write the following equations:

Let's name the common base B.

$$B^2 = X^2 + Q^2 \quad \text{and} \quad B^2 = Y^2 + Z^2.$$

We can see that the columns are equal to one another.

34.



A: $X + Y + Z$

B: 230°

The best answer is A.

All the exterior angles to the quadrilateral equal to 360.

We have one exterior angle missing, which can easily be found since her supplementary angle is 55 and so the fourth exterior angle is equal to $(180 - 55 = 125^\circ)$.

$$X + Y + Z + 125 = 360^\circ \Rightarrow X + Y + Z = 360 - 125 = 235^\circ.$$

We can see that column A is greater than column B.

35.

A: X^3

B: Y^4

$$\text{AI: } 3^X = 81$$

$$4^Y = 64$$

The best answer is B.

$$3^X = 81 \Rightarrow X = 4.$$

$$4^Y = 64 \Rightarrow Y = 3.$$

$$\text{Column A} = 4^3 = 64.$$

$$\text{Column B} = 3^4 = 81.$$

Column B is greater than column A.

36.

A: A: The surface area of a cube whose volume is 343

B: 343

The best answer is B.

The volume of the cube is 343 and so each of its side is X.

$$X^3 = 343 \Rightarrow X = 7.$$

The area of each face is $X^2 = 49$ and since there are 6 faces their area together is $6 \times 49 = 294$, which is smaller than 343 and so column B is the greatest.

37.

A: The measurements of the largest angle in triangle A

B: The measurements of the largest angle in triangle B

AI: The measures of the angles in triangle A are in the ratio of 2:4:6

The measures of the angles in triangle B are in the ratio of 1:2:6

The best answer is B.

Triangle A: Divide 180 by $(2 + 4 + 6)$ to get the basic angular unit in the triangle: $180/12 = 15^\circ$. The largest angle in this triangle is 6 units, or $6 \times 15^\circ = 90^\circ$.

Triangle B: Do the same here. The unit is $180/9 = 20^\circ$ and so the largest angle in this triangle is $6 \times 20^\circ = 120^\circ$.

Column B is greater than column A.

38.

A: The median angle in the triangle

B: 60°

AI: The ratio between the angles in a triangle is 1:5:9

The best answer is C.

Divide 180 by $(1 + 5 + 9)$ to get the basic angular unit in the triangle:

$180/15 = 12^\circ$. The median angle in this triangle is 5 units, or $5 \times 12^\circ = 60^\circ$.

We can see that column A = column B.

1.

A: The number of bullets hitting the penny

B: 40

AI: The chances of a striking a penny with a gun bullet from 300 yards is 0.04%. A gun man fires 10,000 bullets.

The best answer is B.

$0.04\% \text{ of } 10000 = (0.04/100) \times 10000 = 4.$

Therefore Quantity B is greater.

2.

A: The number of anticipated winners in the raffle

B: 80

AI: The chances of winning the raffle are 0.08%. 10,000 people are participation in the raffle.

The best answer is B.

$0.08\% \text{ of } 10000 = (0.08/100) \times 10000 = 8$ and therefore column B is greater than column A.

3.

A: The time it would take Sean to bike 100 miles

B: The time it would take Connell to bike 60 miles

AI: Sean bikes at 30 mph and Connell bikes at 15 mph.

The best answer is B.

Time = Distance / Speed

Time it takes Sean = $100/30 = 3$ hour and a $1/3$.

Time taken by Connell = $60/15 = 4$ hours.

So Column B is greater.

4.

A: The energetic value of one liter of Kerosene

B: The energetic value of one liter of HTPB

AI: The energetic value of 4 liters of kerosene with 3 liters of HTPB is equal to the energetic value of 2 liters of Kerosene with 7 liters of HTPB.

The best answer is A.

Let K represent Kerosene and H represent HTPB.

We can write the following equation: $4K + 3H = 2K + 7H$

Simplify it $\Rightarrow 2K = 4H \Rightarrow K = 2H$ and therefore the value of one liter of Kerosene is twice the value of HTPB and so column A is greater.

5.

A: The value of an American dollar

B: The value of an Australian dollar

AI: The money value of 3 American dollars and 5 Australian dollars is equal to the value of 2 American dollars and 8 Australian dollars

The best answer is A.

Let X be the number of American dollars and Y the number of Australian dollars. We can write the following equation: $3X + 5Y = 2X + 8Y$.
Simplify $\Rightarrow X = 3Y$ and therefore the value of an American dollar is greater than the value of an Australian dollar.

6.

A: The value of the largest among the three

B: 104

AI: The sum of three consecutive numbers is 312

The best answer is A.

Let $x-1$, x and $x+1$ be the three consecutive numbers.

We know that $x-1 + x + x+1 = 312 \Rightarrow 3x = 312 \Rightarrow x = 104$.

The largest among the three is equal to 105 and therefore column A is greater.

7.

A: The average (arithmetic mean) of the first and the last among those numbers

B: 54

The best answer is B.

AI: The sum of 4 consecutive numbers is 214.

Let x , $x+1$, $x+2$ and $x+3$ be the four numbers.

We can write the equation: $x + x + 1 + x + 2 + x + 3 = 220$.

$\Rightarrow 4x + 6 = 220 \Rightarrow x = 52$.

The average arithmetic mean of the first and the second is

$(52 + 55)/2 = 53.5$, which is smaller than 54 and so column B is greater.

8.

A: The time it takes to run 3 Km at a rate of 150 meters per 10 seconds

B: The time it takes to run 2 Km at a rate of 80 meters per 12 seconds

The best answer is B.

Time = Distance / rate

Time_A = $3000 / 150 = 20 \times 10 = 200$ seconds.

Time_B = $2000 / 80 = 25 \times 12 = 300$ seconds and therefore column B is greater than column A.

9.

A: 25 minutes

B: Y

AI: X cakes are baked by Z woman in 25 minutes.

X cakes are baked by Z + 3 woman in Y minutes.

The best answer is A.

The same number of cakes is baked by more women in less time and therefore Y minutes are less than 25 minutes.

Column B is the greatest.

10.

A: 3 hours and a half

B: X

AI: Z delivery boys deliver W pizzas in 3 hours and a half.

Z delivery boys deliver $(W + 3)$ pizzas in X hours.

The best answer is B.

This is a simple reasoning problem, more pizzas delivered by the same number of delivery boys would take more time to deliver and therefore X has to be bigger than 3.5.

11.

A: The time in minutes it would take Sandra to walk 10 miles

B: The time in hours it would take Christopher to walk 5 miles

AI: Sandra walks at a rate of 5 miles per hour while Christopher walks 2.5 miles per one hour.

The best answer is A.

Read the columns carefully.

Column A is the time in minutes and column B is in hours.

Column A = 2 hours = 120 minutes.

Column B = 2 hours.

$120 > 2$ and therefore column A is greater than column B.

Note: people are gonna curse me for that question.

12.

A: Time elapsed from 14:12 to 19:03

B: 3 hours and 51 minutes

The best answer is A.

Column A: from 14:12 to 15:00 its 48 minutes, from 15:00 to 19:00 its 4 hours and 3 more minutes to 19:03. Altogether, it's 4 hours and 51 minutes.

Column A is greater by one hour exactly from column B.

13.

A: The probability of getting an even number in a throw of a dice

B: The probability of getting a number greater than 2 in a throw of a dice

The best answer is B.

There are 6 options altogether; 3 of them are even numbers: 2, 4 and 6 and therefore the probability is $3/6 = 1/2$.

There are 4 numbers greater than 2: 3, 4, 5 and 6 and therefore the probability here is $4/6 = 2/3$, which is greater than $1/2$ and so column B is greater than A.

14.

A: Timothy's height

B: Avery's height

AI: David is 3 inches taller than Timothy and 4 inches taller than Avery

The best answer is A.

Let X be the height of David.

Timothy is $X - 3$ and Avery is $X - 4$, which means that Timothy is taller than Avery and column A is greater than column B.

15.

A: The distance that Martha traveled in kilometers

B: The distance that Bertha traveled in miles

AI: Martha traveled 6 miles and Bertha traveled 9.6 kilometers

Assume that 1 mile is 1.6 kilometers.

The best answer is A.

Martha traveled 6 miles, which is $(6 \times 1.6 = 9.6)$ kilometers.

Bertha traveled 9.6 kilometers, which is 6 miles.

$9.6 > 6$ and therefore column A is greater.

16.

A: The number of minutes that the machine was operational

B: 1440N

AI: A food processing machine was operating for N Days

The best answer is C.

1 day has 24 hours, which is $(24 \times 60 = 1440)$ minutes.

The total number of minutes is 1440N.

The columns are equal and the right answer is C.

17.

A: Frank's income

B: Susan's new income

AI: Before Susan quit her old job, her income was 35% more than Frank's income.

After Susan changed jobs, her new income is 35% less than her old income.

The best answer is A.

Since no numbers were given, plug in \$100 as Frank's income.

Susan old income was 35% more than \$100, thus \$135.

Susan's new income is 35% less than \$135, which is $\frac{65}{100} \cdot \$135 = \frac{8775}{100} = \87.75 .

We can see that her new income is less than Frank's income and so column A is greater than column B.

18.

A: The cost of Z erasers

B: ZX/Y

AI: Y erasers cost X dollars

The best answer is C.

If Y erasers cost X dollars, each single eraser costs X/Y dollars.

We want to know how much do Z erasers cost, multiply Z by the cost of one unit. Z erasers cost ZX/Y and so column A = column B.

19.

A: Matt's speed from work back home

B: Matt's speed from home to work

AI: Matt goes from home to work in 5 minutes and returns home from work in 25 minutes.

The best answer is D.

The question lacks an important detail- we have no way of knowing if Matt goes through the same path from home to work and from work home or if he has a ride in one direction.

It is indeterminable and so the right answer is D.

20.

A: Number of feet in 999 yards.

B: Number of minutes in two days

The best answer is A.

Column A: There are 3 feet in every yard and therefore there are $999 \times 3 = 2997$ feet.

Column B: There are $24 \times 60 = 1440$ minutes in one day and therefore there are 2880 minutes in two days.

Column A is greater than column B.

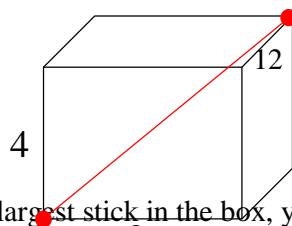
21.

A: The length of the longest stick that can fit inside a box whose internal dimensions are 12 cm by 4 cm by 3 cm

B: 12 Cm

The best answer is A.

This is a hard question to figure out with out a drawing so draw a small sketch of a box:



If you try to put the largest stick in the box, you'll put it from corner to corner and thus you form two right triangles: one with sides of 3, 4, 5 and the second is a one with 5, 12 and X. Where X is the size of the stick.

Using the Pythagoras principle, $X = \sqrt{5^2 + 12^2} = 13$ Cm.

Column A is greater than column B.

Another way to solve this question is by intuition, if one of the sides is 12, you can always put the stick diagonally and therefore a larger stick can be placed in the box.

22.

A: Betty's average speed, in miles per hour

B: 40

AI: Betty drove 210 miles from 8:00 A.M. to 13:15 P.M.

The best answer is C.

Betty drove from 8:00 to 13:15, which are exactly 5 hours and a quarter.

Speed = Distance / Time
 Speed = $210 / 5.25 = 40$ miles per hour.
 Column A = column B = 40 miles per hour.

23.

A: The smallest number greater than 300 in the sequence

B: 330

AI: The first term of a sequence is one. Starting with the second term, each term is two less than 4 times the previous term.

The best answer is A.

Follow the sequence carefully:

The first is 1, the second is $4(1) - 2 = 2$.

The third term is $4(2) - 2 = 6$.

The fourth term is $4(6) - 2 = 22$.

The fifth term is $4(22) - 2 = 86$.

The fifth term is $4(86) - 2 = 342$. Stop here since we passed 300.

Since 342 is greater than 330, column A is greater than B.

24.

A: The cost of M guitars in dollars

B: $\frac{(100QM - PM)}{100}$

AI: At Jim's guitar centre, a guitar costs Q dollars and P cents

The best answer is A.

One guitar costs Q dollars + P/100 dollars.

M guitars cost $M\left(Q + \frac{P}{100}\right) = \left(\frac{100QM + PM}{100}\right)$.

We can see that the expression in column B has $-PM$ instead of PM and therefore it is smaller than the expression in column A.

25.

A: The ratio between the number of people who jump rope to the number of people who *only* ran

B: $1/2$

AI: At the city sports day, 600 people jumped rope, 400 ran and 200 did both

The best answer is A.

$(600 + 200 = 800)$ people jumped rope.

400 people only ran.

The ratio between the two groups is $800/400 = 2$.

$2 > 1/2$ and so column A is greater than column B.

26.

A: The units' digit of 11^5

B: The units' digit of 5^{11}

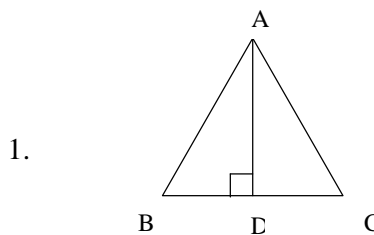
The best answer is B.

Column A: 11 by any power is always a number where the units' digit is 1. Try some numbers: $11^1 = 11$, $11^2 = 121$ and so on.

Column B: 5 by any power is always a number where the units' digit is 5.

Try some numbers: $5^2 = 25$, $5^3 = 125$ and so on.

Column A = 1 and column B = 5, B is the answer.



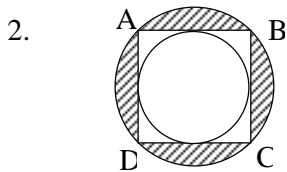
A: The area of ABC.

B: 10.

AI (additional Information): $AB = AC$, $AD = 8$.

The best answer is D.

In order to know if the area of the triangle is bigger or smaller than 10, you need to know the length of the base, which is not given and therefore the relationship cannot be determined.



A: The area of the inner circle.

B: The area of the shaded region.

AI: the Square ABCD is inscribed in the large circle.

The small circle is inscribed in the square ABCD.

The best answer is A.

Let's define X as the length of the radius of the large circle.

According to the Pythagoras principle, the ratio between the sides of the square to the diagonal is $1:1:\sqrt{2}$. If the diagonal is equal to $2R$ then the area of the square is equal to $2R^2$. The area of the shaded region is equal to $pR^2 - 2R^2 = R^2(p - 2)$.

The area of the smaller circle is equal to $p(R\sqrt{2})^2 = R^2(2p)$.

Since $2p < p - 2$, the answer is B.

3. AI: Line Q goes through (1, 2) and (9, 8).

Line W is perpendicular to Q.

A: The slope of line Q.

B: The slope of line W.

The best answer is A.

Without drawing the lines, we know that line Q has a positive slope and since line W is perpendicular to Q, it has a negative slope. And therefore the answer is A.

If drawing a quick sketch helps, do so, but always remember that time is running.

4.

A: $234 + 675 + 898$.

B: $324 + 756 + 989$.

The best answer is B.

This question can be solved quickly by adding the numbers, but a quicker way is to think.

You can see that each of the numbers in column B is bigger than those in column A and therefore B is greater.

5.

A: $100Z$

B: $100/Z$

AI: $Z > 0$.

The best answer is D.

Take $Z = 2$, $A = 200$ and $B = 50$.

Take $Z = \frac{1}{2}$, $A = 50$ and $B = 200$.

And therefore you cannot determine which column is greater.

6.

A: $(X + Y)^2$

B: $X^2 + Y^2$

AI: XY is a positive integer.

The best answer is A.

$A = X^2 + 2XY + Y^2$ and $B = X^2 + Y^2$. Subtract similar variables from each side and the question comes to: is $XY > 0$, if so then A is the answer. Since the additional information stated that XY is positive, the answer is A.

7.

A: $A^2 + B^2$

B: $(A - B)^2$

AI: $A < 0$, $0 < B < 1$.

The best answer is B.

$A = A^2 + B^2$ and $B = A^2 + B^2 - 2AB$. If AB is positive then the answer is A, else the answer is B. According to the additional information, A is negative and B is positive and therefore AB is negative. The answer is B.

8.

A: $(X + Y)^2$

B: $(X - Y)^2$

AI: $A, B \geq 0$

The best answer is D.

The difference between the two columns is the presence of the variable XY . If it's positive then A is greater and if it's negative B is greater but if it's equal to zero the columns are equal. Since the additional information is not distinct (A can be also zero), the answer cannot be determined.

9.

A: $3X$

B: 3^X

AI: $X < 0$

The best answer is B.

Since X is negative, $3X$ is negative, whereas 3^X is positive. Try out a number: $X = -2$.
 $A = -6$ and $B = 3^{-2} = 1/9$ and therefore B is greater.

10.

A: $4XY$

B: $(XY)^4$

AI: X and Y are integers

The best answer is D.

Pick up numbers: $X = 2$, $Y = 2$. $A = 16$ and $B = 256$.

Take $X = 1$, $Y = 1$: $A = 4$ and $B = 1$. Since picking up different numbers that fit the data resolves in a different answer, the answer cannot be determined.

11.

A: X

B: 5

AI: $X + Y = 20$, $Y - X = 10$.

The best answer is C.

Take the given equations and add them, the result is $Y = 15$. Now find $X = 5$.

The columns are equal.

12.

A: X

B: Y

AI: $14X - 16Y = 27$, $81 - 42X = -48$.

The best answer is D.

In order to determine which column is greater we need two equations.

If you multiply the first equation by 3 and you play with it a little, you'll get the second equation and therefore we lack an equation to determine the answer.

13.

A: $\left(\frac{24}{25}\right)^2$

B: $\left(\frac{25}{24}\right)^{-3}$

The best answer is A.

Column B can be written as $\left(\frac{24}{25}\right)^3$. Since both A and B are fractions, the power of the fraction will determine the answer. The higher the fraction ~~is~~ the smallest the number and therefore A is larger.

14.

A: $\left(\frac{6}{7}\right)^3$

B: $\left(\frac{7}{8}\right)^2$

The best answer is B.

$$A = \left(\frac{6}{7}\right)^3 = \frac{6^3}{7^3} = \frac{216}{343}.$$

$$B = \left(\frac{7}{8}\right)^2 = \frac{49}{64}.$$

Since the numbers are not easy to work with, let's be rough.

A is close to 220/340, which is 11/17 and B is close to 50/65, which is 10/13.

10 divided into 13 parts is a lot bigger than 11 divided into 17 parts and therefore B is greater. Remember, you don't need to solve the numbers, just to compare.

15.

A: $\left(\frac{6}{7}\right)^6$

B: $\left(\frac{6}{7}\right)^7$

The best answer is A.

Don't open the parenthesis, just compare.

Both A and B are fractions, the one in A is powered by a smaller number and thus the result is bigger. The rule in fractions is so, the greater the power, the smaller the number.

16.

A: $9P$

B: P^2

AI: $2 < P < 4$

The best answer is A.

Find the highest and the lowest values of A and B.

A is between 18 and 36 while B is between 4 and 16.

We can see that for every P, the value of column A is greater than that of B.

17.

A: P

B: 27

AI: $Q + P = 27$, $Q - P = 27$.

The best answer is B.

Adding the equations will give: $Q = 27$ and therefore $P = 0$.

18.

A: Z

B: M

AI: $\frac{3^{Z+2M}}{3^{3M-Z}} = 27$

The best answer is D.

Rewrite the expression: $\frac{3^{Z+2M}}{3^{3M-Z}} = 27 \Rightarrow 3^{Z+2M-3M+Z} = 3^{2Z-M} = 3^3 \Rightarrow 2Z - M = 3$.

$M = 2Z - 3$. Now pick up numbers, take $Z = 1 \Rightarrow M = -1$.

Now take, $Z = 3 \Rightarrow M = 3$. Since the answer is not distinct the answer is D.

19.

A: X

B: Y

AI: $\frac{4^{3X-Y}}{2^{5X+2-Y}} = 256$

The best answer is A.

Rewrite the expression: $\frac{4^{3X-Y}}{2^{5X+2-Y}} = \frac{2^{6X-2Y}}{2^{5X+2-Y}} = 2^{6X-2Y-5X-2+Y} = 2^{X-Y-2} = 2^8 \Rightarrow X-Y-2 = 8$.

And therefore $X = Y + 10$, thus X is greater than Y.

20.

A: Y

B: 2

AI: $8Y^3 = 128Y$

The best answer is D.

If $8Y^3 = 128Y$ then $Y^2 = 16 \Rightarrow Y = 4$ or $Y = -4$. Since 2 is bigger than -4 and smaller than 4 the answer is D.

21.

A: Z

B: 7

AI: $7Z^3 = 175Z$

The best answer is B.

If $7Z^3 = 175Z$ then $Z^2 = 25$ and so $Z = 5$ or $Z = -5$. Since 7 is bigger than both, column B is greater.

22.

A: The distance between X and Y.

B: The distance between Y and Z.

AI: $X + Y = 4 + 2Y$, $Z = X + 10$.

The best answer is D.

This question has a little trick, no one said that the points are on a straight line.

From the data we know that the distance between X and Y is 4 and that the distance between X and Z is 10. We cannot conclude that the distance between Y and Z is 6 because we were not told that X, Y and Z are on a straight line.

1.

A: 3.

B: The average (arithmetic mean) of X, Y and Z.

AI: $X + Y = 6$

$$Y = 8 - Z$$

$$Z = 4 - X$$

The best answer is C.

If you add all three equations, you'll get $2X + 2Y + 2Z = 18$, divide both sides by 6 to get: $(X + Y + Z)/3 = 3$, which is exactly the average.

2.

A: X

B: Y

AI: $2X = 8 + 3Y$

$$Y = 2X$$

The best answer is A.

Substitute $2X$ for Y in the first equation to get: $2X = 8 + 6X \Rightarrow X = -2$, $Y = -4$ and therefore X is greater than Y .

3.

A: X

B: -1

AI: $2X = 10 - 3Y$

$$Y = -4X$$

The best answer is C.

Substitute $-4X$ for Y in the first equation to get: $2X = 10 + 12X \Rightarrow X = -1$ and therefore the answer is C.

4.

A: X

B: 6

AI: $5X + 3 < 4X + 10$

The best answer is D.

$5X + 3 < 4X + 10$ can be written as $X < 7$ and therefore X can be equal to 6 or even smaller than 6 and therefore the answer cannot be determined and the answer is D.

5.

A: 13

B: Z

AI: $27 - 13Z > 40 - 14Z$

The best answer is B.

The additional information can also be written as $Z > 13$ and therefore Z can be 14 and up, thus column B is greater.

6.

A: X

B: Y

$$\text{AI: } \frac{X}{2} - \frac{Y}{2} < \frac{65}{13}$$

The best answer is D.

The expression can be simplified: $\frac{X}{2} - \frac{Y}{2} < \frac{65}{13} \Rightarrow X - Y < 10 \Rightarrow X < Y + 10$.

Now, we can see that the answer cannot be determined because of the 10 supplement in the right wing of the inequality. X is only smaller if you add 10 to Y and therefore the answer is not clear from the data given.

7.

A: 49/14

B: The average (arithmetic mean) of G and H.

$$\text{AI: } G + 2H = 15$$

$$H - 2G = 10$$

The best answer is C.

Multiply the first equation by two and add the second equation to get: $5H = 30 + 10 \Rightarrow H = 8$ and $X = -1$. The average of X and Y is 3.5, which is equal to 49/14 or 7/2.

8.

A: The average (arithmetic mean) of a, b, c, d and e.

B: c.

AI: a, b, c, d and e are 5 consecutive numbers.

The best answer is C.

By definition, the average of an odd amount of numbers is the median one and therefore c, which is the median among the 5, is the average of all the numbers.

9.

A: 25.

B: The average (arithmetic mean) of 5, 12, 14, 24 and 65.

The best answer is A.

Find the average of the 5 given numbers. $\text{Average} = (5+12+14+24+65)/5 = 120/5 = 24$.

Column A is greater and therefore the answer is A.

10.

A: X

B: Y

$$\text{AI: } \frac{1}{X} - 2 = \frac{1}{Y}$$

X and Y are negative integers.

The best answer is B.

Multiply both sides by XY to get: $Y - 2XY = X \Rightarrow Y - X = 2XY$, which is a positive number. We see that the difference between Y and X is a positive number and therefore Y is greater than X.

Word problems

11.

A: Mike's age in two years

B: John's age two years ago

AI: Mike is twice as old as he was 14 years ago

John is one third as old as he will be in 12 years

The best answer is A.

Put the words into variables. Let M be the age of Mike today and J as the age of John today. We can write two equations: $M = 2(M - 14) \Rightarrow M = 28$.

$$J = (J + 12)/3 \Rightarrow J = 6.$$

A = 30 and B = 4 and therefore Column A is greater.

12.

A: Kevin's age today.

B: Val's age today.

AI: Kevin is three times older than he was 16 years ago.

Val is half as old as he will be 10 years from now.

The best answer is A.

Replace the words with variables. Let K be Kevin's age today and let V be Val's age. We can write two equations: $K = 3(K - 16) \Rightarrow K = 24$.

$$2V = V + 10 \Rightarrow V = 10.$$

A = 24 and B = 10 and therefore the answer is A.

13.

A: The amount that Rachael saves every month.

B: The amount that Rachael spends every month.

AI: Rachael spends one fifth of her monthly allowance on new cloths and one third of the rest on driving lessons. The rest, Rachael saves in a savings account.

The best answer is B.

Rachael spends $1/5 + (1/3)(4/5)$, which is $(1/5 + 4/15 = 7/15)$ of her allowance each month. The rest, which is $(1 - 1/5 - 8/15 = 4/15)$ she saves up. $7/15 > 4/15$ and therefore the answer is B.

14.

A: Money Travis spends on his Children's education.

B: Money Travis spends on basic necessities.

AI: Travis deposits 40% of his salary in a trust fund and 20% of the rest he spends on basic necessities. The rest of the money goes to his children's education.

The best answer is A.

Travis deposits $\frac{2}{5}$ of his salary and $(\frac{1}{5})(\frac{3}{5})$, which is $\frac{3}{25}$, goes to basic necessities.

The rest of the money, which is $(1 - \frac{2}{5} - \frac{3}{25} = \frac{12}{25})$, goes to his children's education.

$A = \frac{12}{25}$ and $B = \frac{3}{25}$ and therefore the answer is A.

15.

A: 50

B: The number of years until Laura will be 5 times as old as she is now.

AI: In 10 years, Laura will be twice as old as she is now.

The best answer is A.

Define L as the age of Laura today. Write the equation: $2L = L + 10 \Rightarrow L = 10$.

If today she is 10, in **40** years she will be 50, which is 5 times as old as she is now.

$40 < 50$ and therefore the answer is A.

16.

A: 22

B: The number of years until George will be twice as old as he is now

AI: In 8 years from now, George will be one and a half as old as he was two years ago

The best answer is C.

Let G be the age of George now. Write the equation: $G + 8 = 1.5(G - 2) \Rightarrow 0.5G = 11 \Rightarrow G = 22$. In 22 years, George will be twice as old as he is now. $A=22$ and $B=22$ and therefore the answer is C.

17.

A: The number of 4\$ coins that Owen used.

B: The number of 7\$ coins that Owen used.

AI: Owen is playing a board game where there are only 4 and 7 dollar coins.

Owen paid the cashier \$100 with \$4 and \$7 coins only.

The best answer is D.

Let X represent the number of \$4 coins that he used and Y as the number of \$7 coins.

We can write the equation: $4X + 7Y = 100$.

There are only two solutions to this equation which are integers, $X = 18$, $Y = 4$ and $X = 4$, $Y = 12$. A distinct answer cannot be determined and therefore the answer is D.

18.

A: The number of milk cartons that Erika used.

B: The number of loafs of bread that Erika used.

AI: In Weerky, people still trade goods. Two milk cartons are worth one fifth of a sheep and three loafs of bread are worth one eighth of a sheep. Erika traded milk cartons for half the value of the sheep and the other half with loafs of bread.

The answer is B.

The question is quite easy although there is much data.

One milk carton is worth $1/10$ of a sheep.

One loaf of bread is worth $1/24$ of a sheep.

Half a sheep was bought with milk, thus 5 milk cartons.

The other half was bought with bread, thus 12 loaf of bread and therefore B is the answer.

19.

A: The number of 3 eggs cartons that Alf used.

B: The number of 4 eggs cartons that Alf used.

AI: Alf made a cake with 14 eggs using 3 and 4 eggs cartons only.

The best answer is

We need to find a combination of 4 and 3 that will resolve in 14.

The only combination will be $3+3+4+4 = 14$ and therefore the answer is C.