#1 –Sec. 2

If $3x = 0$, then $x = 0$. Since $x = 0$, $1 + x + x^5 = 1 + (0) + (0)^5 = 1.$

Answer B

#2 –Sec. 2

The ratio of the diameters of the circles is $3:1$. The radius is half of the diameter, so the radii will be in a ratio of $\frac{3}{2}:\frac{1}{2}$. This is the same as a $3:1$ ratio.

Answer E

#3 –Sec. 2

The arithmetic mean of a set of numbers is 3 . This means the sum of the numbers in the set divided by the number of elements in the set is 3 . If we double each number in the set, the sum of the elements doubles as well. Since the amount of elements remains the same, $3 \times 2 = 6$ is the arithmetic mean of the new set.

Answer D

#4 –Sec. 2

If we multiply a number by 10 , the decimal place moves to the right one digit. If we multiply a number by 10^2, the decimal place moves to the right two digits. This process can be repeated indefinitely. The same goes for if we divide a number by 10 , 10^2, or 10^3. When we divide by 10 we move the decimal place one digit to the left. For the three digit number PRT , when we divide this by 10^2 we move the decimal place to places to the left and get $P.RT$.

Answer C

#5 –Sec. 2

If $k + n < k$, then $(k + n) - k < (k) - k$. This simplifies to $n < 0$.

Answer E

#6 –Sec. 2

The slope of the ramp is $\frac{7}{16}$. This means that $\frac{rise}{run} = \frac{y}{x} = \frac{7}{16}$. Since $y = 3.5$, we can cross multiply and simplify to arrive at $x = 8$.

Answer A

#7 –Sec. 2

If we compare $y = ax^2 + 2$ and $y = \frac{a}{3}x^2 + 2$, we can first see that they have the same y -intercept (2). Comparing the coefficients on x^2, a and $\frac{a}{3}$, we can see that the second equation increases at $\frac{1}{3}$ the rate. This causes a widening effect on the graph of the equation $y = \frac{a}{3}x^2 + 2$.

Answer B

#8 –Sec. 2

We can solve this problem using a case-by-case scenario. Ask your self these question: If I have a red hat, how many combinations can I have? If I have a blue hat, how many combinations can I have? If I have a white hat, how many combinations can I have? From here we can see that the combinations (hat, sweater, jeans) are (red, white, blue), (red, blue, white), (white, red, blue), (white, blue, red), (blue, red, white), and (blue, white, red). There are 6 different combinations.

Answer B

#9 –Sec. 2

When twice a certain number p is increased by 5, the result is 14. This means $2p + 5 = 14$. When simplified, $p = 4.5$.

Answer 4.5

#10 –Sec. 2

Line K intersects parallel lines L and M. When a line intersects parallel lines, adjacent interior angles are supplementary. This means $y + x = 180°$. We know that $y = 3x$, and, therefore, $x = \frac{y}{3}$. This implies $y + x = y + \left(\frac{y}{3}\right) = 180°$. This simplifies to $y = 135°$.

Answer 135

#11 –Sec. 2

The dimensions of the box is 4 inches $\times 4$ inches $\times 8$ inches, and the dimensions of the CD case are 4 inches $\times 4$ inches $\times \frac{1}{4}$ inch. This means the CD case will fit flush with in the dimensions of the box.

The amount of CD cases that could fit in one box is $\frac{4 \times 4 \times 8}{4 \times 4 \times \frac{1}{4}} = 32$ CD cases.

Answer 32

#12 –Sec. 2

First let us notice that $\frac{3x+y}{y} = \frac{3x}{y} + 1 = \frac{6}{5}$. This means that $\frac{3x}{y} = \frac{1}{5}$. From here we can divide everything by 3 to get $\frac{x}{y} = \frac{1}{15}$.

Answer $\frac{1}{15}$

#13 –Sec. 2

To get the average increase in profit per store, we can either average each individual profit for each store or we can get the total increase in profit and divide it by the three stores. Since we have the totals for each year, the average increase in profit is $\frac{\$26,250 - \$21,000}{3} = \$1,750$.

Answer 1750

#14 –Sec. 2

We can use a guess-and-check method on this problem. If we want a value for a where $f(a) < a$, then it would be best to find a small value for $f(a)$. Let us start off by letting $f(a) = |3a - 17| = 0$. By simplifying we get $a = 5\frac{2}{3}$.

Answer $4.25 < x < 6.5$

#15 –Sec. 2

Let x be the number of red pieces that Ari takes form the jar. This means there are $13 - x$ green pieces. For Ari to have a total of more red pieces than green pieces, we set up the equation

$3 + (x) > 4 + (13 - x)$. This simplifies down to $x > 7$. Thus, the least number of red candies he must grab is 8 .

Answer 8

#16 –Sec. 2

We can count the consecutive integers' products. First, $1 \times 2 \times 3 = 6$. Second, $2 \times 3 \times 4 = 24$. Third, $3 \times 4 \times 5 = 60$. Fourth, $4 \times 5 \times 6 = 120$. Fifth, $5 \times 6 \times 7 = 210$. This goes on all the way through to $9 \times 10 \times 11 = 990$, but then stops at $10 \times 11 \times 12 = 1320$. That means there are nine sets.

Answer 9

#17 –Sec. 2

We set up the equation to se the costs equal $\$1 + \$.07(t - 20) = \$.06t$. This simplifies to $t = 40$.

Answer 40

#18 –Sec. 2

The perimeter of the arrangement is $16k$. The area of the arrangement is $10k^2$ square inches. Since we know that $p = a$, $p = 16k$, and $a = 10k^2$, we can see that $16k = 10k^2$. This simplifies to $k = 1.6$.

Answer 1.6

#1 –Sec. 6

If each term is 2 more than twice the previous term, then $t = 2 + 2(10) = 22$.

Answer D

#2 –Sec. 2

If a machine fills x cartons in 5 minutes at a rate of 24 cartons an hour, then we can set up the equation $\frac{x \text{ cartons}}{5 \text{ minutes}} = \frac{24 \text{ cartons}}{60 \text{ minutes}}$. We can simplify to get $x = 2$ cartons.

Answer A

#3 –Sec. 6

The combined amount of cars Cathy sold in February is $20 + 18 = 38$. In the month of May she sold 48 cars, so the difference is $48 - 38 = 10$ cars.

Answer A

#4 –Sec. 6

The proportion of the central angle to $360°$ is equal to the area of the sector compared to the whole circle. Since April is $\frac{30}{20+18+22+30+48+42} = \frac{1}{6}$ of the total circle. Thus, $\frac{\text{central angle}}{360°} = \frac{1}{6}$. This means the central angle is $60°$.

Answer C

#5 –Sec. 6

This is a problem that no equation can help with. This can be an easy problem as long as you make sure to follow all instructions in the question. Mistakes include not paying attention to clockwise or counter-clockwise directions, not paying attention to the degree of the term, and so on.

Answer D

#6 –Sec. 6

If 3 more than twice a certain number n is equal to 10 , then $3 + 2n = 10$. This means $2n = 7$. From here we can double both sides of the equation to get $4n = 14$.

Answer D

#7 –Sec. 6

The term a will be the greatest because for any negative a , $8a < 4a < 2a < a$.

Answer A

#8 –Sec. 6

We can see that the height of jut on the left side is the difference of the far right side and the left main side $6-4=2$. We can determine the area by using side lengths to determine areas of rectangles. Thus, the complete area is $2\times2+6\times4=28$.

Answer B

#9 –Sec. 6

If $(x-2)^2=25$, then $\sqrt{(x-2)^2}=\sqrt{25}=x-2=\pm5$. This implies $x=7$ or $x=-3$.

Answer D

#10 –Sec. 6

From simple observations that the angles are equal for triangles PTQ and triangle PSR, we see that PTQ and PSR are similar triangles. This means respective sides have equal proportions. This implies $\frac{QT}{RS}=\frac{PT}{PS}=\frac{8}{10}=\frac{4}{5}$.

Answer E

#11 –Sec. 6

We set up a function of L with respect to W. The graph has a L-intercept at $L=0$. To find the slope we take 2 points. The slope is $\frac{(30)-(10)}{(3)-(1)}=10$. Thus the function is $L=10W+0=10W$.

Answer D

#12 –Sec. 6

The answer is 6 . If 6 were a possible candidate, then the mode would be shared between 5 and 6 which would contradict the original statement that the mode is 5 .

Answer A

#13 –Sec. 6

We must count the number of elements in the region $(Y \text{ and } Z)$. The number is $3+7=10$.

Answer C

#14 –Sec. 6

If $m = t^3$ and $w = m^2 + m$, then $w = (t^3)^2 + (t^3) = t^{3\times 2} + t^3 = t^6 + t^3$.

Answer E

#15 –Sec. 6

We know that $6\Delta = (6+1)(6-1) = 35$ and $5\Delta = (5+1)(5-1) = 24$. Thus, $6\Delta - 5\Delta = 35 - 24 = 11.$ Now let us test some of the answer. $3\Delta + 2\Delta = (2+1)(2-1) + (3+1)(3-1) = 3 + 2 \times 4 = 11$. This is a correct guess.

Answer B

#16 –Sec. 6

Let us check some of the possible solutions. $\frac{1^2}{1} = 1$ is an integer, and $\frac{1}{1} = 1$ is an integer so this is incorrect. $\frac{3^2}{2} = 4.5$, so this is incorrect. $\frac{4^2}{2} = 8$ is an integer, and $\frac{4}{2} = 2$ is an integer, so this is incorrect. $\frac{6^2}{4} = 9$ is an integer, but $\frac{6}{2} = 3$ is not an integer, so this is correct.

Answer D

#17 –Sec. 6

Let us plug in some possible solutions. Let $y = 0$. This will be the point $(3,0)$. Let $x = 0$. This will be the point $(0,6)$. The only possible graph that contains these 2 points is B.

Answer B

#18 –Sec. 6

The smallest rectangular box that could contain the cylinder would have bases where the cylinders circular bases are at. This means the rectangular base must completely fit the circle with the smallest dimensions. A square that fit the circle completely would provide appropriate dimensions. Since the diameter of the circle would be d , one side length of the square base would be d . This implies the dimensions for the box would be d^2h .

Answer B

#19 –Sec. 6

Could not read complete problem.

#20 –Sec. 6

If line L and line Q are perpendicular, then there slopes would be negative reciprocals. The slope of line L is $\frac{(0)-(1)}{(0)-(2)} = \frac{1}{2}$ and the slope of line Q is $\frac{(1)-(t)}{(2)-(0)} = \frac{1-t}{2}$. If there slopes are negative reciprocals, then $\frac{-2}{1} = \frac{1-t}{2}$. This simplifies to show that $t = 5$.

Answer E

#1 –Sec. 9

This can be shown through a simple ratio. $\frac{15\ minutes}{90\ minutes} = \frac{1}{6}$.

Answer B

#2 –Sec. 9

JK is the greatest side because there are two right triangles inside triangle JHK, and JK is the hypotenuse for the bigger of the two triangles. We know that JK is the bigger of the two right triangles' hypotenuses because the triangle takes up more area and shares a leg with the other right triangle.

Answer D

#3 –Sec. 9

For a linear function, values can be found directly through setting up an equation. The slope for the line is $\frac{(13)-(7)}{(2)-(1)} = 6$. This mean the equation is $f(n) - (7) = 6(n-1)$. This means $f(n) = 6n + 1$. We know $p = f(4)$, so $p = 6(4) + 1 = 25$.

Answer C

#4 –Sec. 9

If k is the number of houses Charlie has built, then $k + 5 = 2n$. This means $k = 2n - 5$.

Answer C

#5 –Sec. 9

Angle APB and angle BPD are supplementary, so angle BPD $= 180° - 80° = 100°$. PC bisects angle BPD, so angle CPD $= 50°$.

Answer B

#6 –Sec. 9

The odd integers are …-3,-2,-1,0,1,2,3… Odd integers occur once every two units. Thus, the next odd integer greater than x would be $x + 2$.

Answer C

#7 –Sec. 9

The distance d measured is measure by setting up the coordinates like a right triangle and then finding the hypotenuse. Since we know that point T is on the negative x-values, we see that P is an equal distance from the origin as T if the x-value of T is made a negative. Thus, point T is (-a,b) .

Answer A

#8 –Sec. 9

The probability of getting a red glass bead is three times higher than getting a blue glass bead. Since there are 12 red glass beads, there must be $\frac{12}{3} = 4$ blue glass beads. That means there are a total of $12 + 4 = 16$ glass beads. Since there are four times as many glass beads than wood beads, the amount of wood beads is $\frac{16}{4} = 4$. The total number of beads is $16 + 4 = 20$.

Answer A

#9 –Sec. 9

If we wish to produce a reflection over the x-axis, we must flip everything to the exact opposite side of the x-axis while keeping the same distance from x-axis. We see that the only graph that remotely represents the original graph is graph A.

Answer A

#10 –Sec. 9

If $(x + y)^2 = 100$ and $(x - y)^2 = 16$, then $x + y = 10$ and $x - y = 4$. If we add the two equations together and solve, we find that $x = 7$ and $y = 3$. This means $xy = 21$.

Answer C

#11–Sec. 9

Since $-1 \leq 4x - 5$, through simplifying we can see that $x \geq 1$. Greater than or equal to something means there would be a closed dot on the number line. We can see that answer A is correct because it holds true for all $x \geq 1$.

Answer A

#12 –Sec. 9

Without any reference to the perimeter of an inscribed rectangle in a circle, if an object can be inscribed in a circle in some way, there are infinitely many ways to inscribe the object in that same circle.

Answer E

#13 –Sec. 9

We know that $2^n + 2^{n+1} = 2^n + 2(2^n) = 3(2^n) = k$. This means $2^n = \frac{k}{3}$. Thus, $2^{n+2} = \frac{4k}{3}$.

Answer B

#14 –Sec. 9

If side $AB > AC$, then the opposite angles fit the same inequality respectively. Thus, $z > y$. This means that $y = z$ is FALSE.

Answer E

#15 –Sec. 9

The hotel room cost Tom 20% of his $\$240$. This means the hotel cost $.2 \times \$240 = \$48$. If Tom split the hotel equally between four people, then the total cost of the hotel room is $\$48 \times 4 = \$192$.

Answer D

#16–Sec. 9

A game board of n rows with n squares a piece can be shown to have $4(n-1)$ squares along its boundary. Plugging in simple values for n gives $4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, 56, 60 \dots$ A possible value for k would be 52 .

Answer E