

ACT 0556A - MATH TEST SECTION 2 Answers

Problem #1

The only answer that is true statement is A – Maria has car insurance, because Maria is a licensed driver who lives in Ohio and it is stated clearly that all drivers who live in Ohio have car insurance.

Answer B is not true (the given fact in the box is that Antonio does not live in Ohio and that does not mean that Antonio does not have car insurance)

Answer C is also not true (the given fact in the box is Catherine has car insurance and this does not mean that Catherine lives in Ohio)

Answer D is not true (the given fact in the box is Tai has car insurance and this does not mean that Catherine lives in Ohio)

Answer E is not true (the given fact in the box is Jorge lives in Maine and from that you can't conclude that Jorge does not have a driver's license)

ANSWER - A

Problem #2

If $x = -3$, what is the value of $(x^2 - 1) / (x + 1)$?

There is couple of ways to do the problem –

1 - the easy way will be to recognize that $(x^2 - 1)$ is same as $(x^2 - 1^2)$ and can be written as $(x + 1)(x - 1)$ and therefore $(x^2 - 1) / (x + 1)$ can be $(x + 1)(x - 1) / (x + 1)$, and $(x + 1)$ cancels out each other and results in $(x - 1)$.

Substituting x with -3 , results in $-3 - 1 = -4 \Rightarrow$ ANSWER F

2 way is to substitute for x with -3 in $(x^2 - 1) / (x + 1) \Rightarrow [(-3)^2 - 1] / (-3 + 1) \Rightarrow [9 - 1] / -2$
Or $8 / -2 = -4$

ANSWER - F

Problem #3

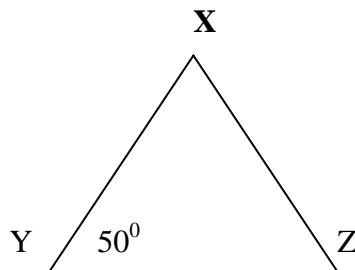
The problem is to take off 18% for taxes etc., from \$320. Couple of ways to do this problem.

#1 is to find what 18% of \$ 320 is and then subtract that from \$320. 18% is same as 18/100 or 0.18
 $\$320 \times 0.18 = \$57.60 \Rightarrow \$320 - \$57.60 = \$262.40 \Rightarrow$ ANSWER B

2 is easier way is to 82% of \$ 320 is what the take home pay will be or $\$320 \times 0.82 = \262.40
(the one step way of solving saves some time)

ANSWER - B

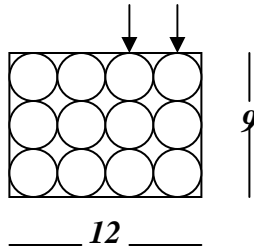
Problem #4



Since $XY = XZ$, the measure of angle $\angle Y = \angle Z = 50^\circ$, therefore $\angle X = 180 - 100 = 80^\circ$

ANSWER - J

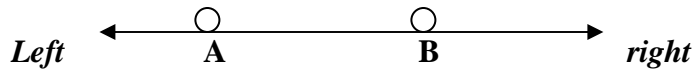
Problem #5



Since each circle is 3 inches in diameter, you can place 2 more circles in each row, shown by the arrows or a total of 12 circles in the 9 x 12 paper. To get 50 circles, then you will need at least five 9 x 12 papers, because 4 papers will get you $4 \times 12 = 48$ circles and to get 2 more circles to make 50, you will need one more paper.

ANSWER – E

Problem #6



Given that B is positive, the value of A is $< B$ or less than B. This is the only information you can conclude. Answer H

There is not enough information given to determine if A is negative or positive or between 0 and B. You know for sure A is not greater than B. Therefore answers F, G, J and K are incorrect.

ANSWER – H

Problem #7

If $2(x - 5) = -11$, then $x = ?$ Open the $2(x - 5)$ parenthesis $\implies 2x - 10 = -11$

Or $2x = -11 + 10$ or $2x = -1$ or $x = -\frac{1}{2}$ or Answer E

ANSWER – E

Problem #8

The problem is to find a factor of the polynomial $(x^2 - x - 20)$

One of the ways to find the factors is to find factors of -20 that will give a result of -1 when they are added. The -1 is because that is the coefficient of the middle term $-x$.

For example $-20 = -10 \times 2$, but when added $-10 + 2 = -8$, so this is not the factors.

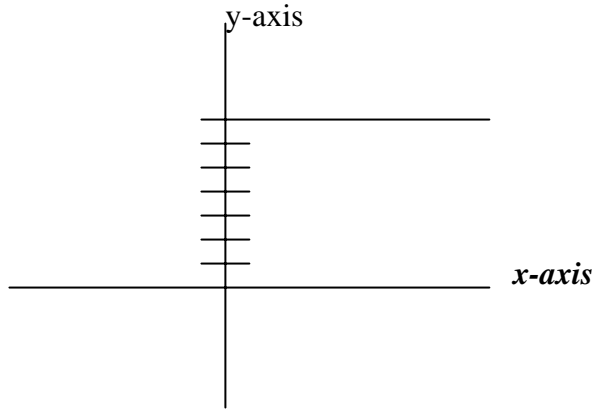
$-20 = -5 \times 4$, now when they are added $-5 + 4 = -1$ and therefore the factors we are looking for are -5 and $+4$

This means that the factors for polynomial $(x^2 - x - 20)$ are $(x - 5)$ and $(x + 4)$. Looking at the answers, only F is what we are looking for.

ANSWER – F

Problem #9

A line in the (x, y) coordinate plane is parallel to the x-axis and 7 units above it. Which of the answers is an equation of this line?



The line is parallel to x-axis, so the slope ‘m’ is zero in the standard equation for line $y = mx + c$. If m is 0 then the equation becomes $y = c$, where c is the y-intercept, which is given as 7. Therefore the equation that fits this line is $y = 7$ or Answer A

ANSWER – A

Problem #10

$3p/5 + 3q/2$ \Rightarrow common denominator is 10. Multiply each by 10 & divide by common denominator 10

$\Rightarrow (6p + 15q) / 10 \Rightarrow$ Answer G

ANSWER – G

Problem #11

The airplane was 27 feet in length and 41 feet in wingspan length. For a 1/20 scale model, the length of the wingspan will be $(1/20) \times 41$ feet = $41/20 \Rightarrow 2 \frac{1}{20}$ or Answer C

ANSWER – C

Problem #12

Ann ate 4 slices of pizza, Bill ate 3, and Carl ate 2 and half of the pizza plus 1 slice is left over. How many pieces in total were there?

You can set up an equation in terms of x, which is the total number of slices from this information.

$4 + 3 + 2 + (1 + \frac{1}{2} x) = x$, where the term in the parenthesis is what is left over and the 4, 3, and 2 are the number of slices eaten.

Or $10 + \frac{1}{2} x = x$ or (subtracting $\frac{1}{2} x$ from both sides) will give $10 = \frac{1}{2} x$ or (multiply both sides by 2) will result in $20 = x$ or there were a total of 20 slices to start with. You can check the answer by taking $4 + 3 + 2$ or 9 slices that were eaten to get 11 slices left over which is equal to $\frac{1}{2}$ of the total number of 20 plus 1.

ANSWER – K

Problem #13

The cost to ship is \$80 and the cost increased by 60% when the company moved to a new location. What is the new cost to ship?

There is couple of ways to do this (in one step or couple of steps depending on the level of understanding of the student – again fewer the steps, better is your time management.)

#1 – one step method is to multiply \$80 by 1.60 (because 60% is 0.60 in fraction or 60/100 and you are adding to 1 (because \$80 is 100% to start with or 100/100 = 1) to get 1.60

$\$80 \times 1.60 = \128 or Answer G

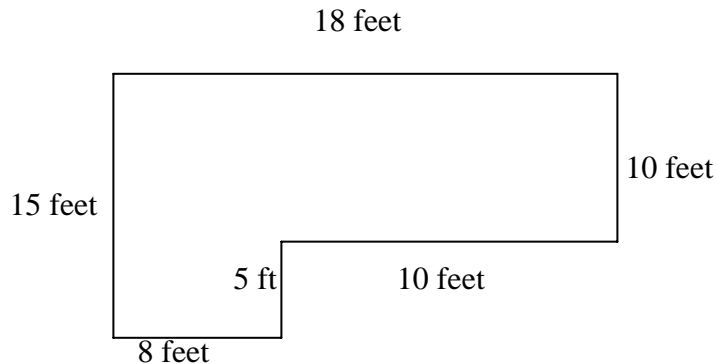
#2 – two step method – first find what 60% of \$80 is and then add that to \$80 to get the new cost.

$\$80 \times 0.60 = \48 .

New cost = $\$80 + \$48 = \$128$ or Answer D

ANSWER – D

Problem #14



There couple of ways to get the area of the figure:

#1 is by imagining the 15 x 18 feet rectangle and subtracting the 5 x 10 piece cut out or subtracted.

Or $15 \text{ ft} \times 18 \text{ ft} = 270$ square ft and subtracting $5 \text{ ft} \times 10 \text{ ft}$ or 50 square ft = $270 - 50 = 220$ sq ft

2 method is to imagine 2 rectangles from the drawing, one with 15 ft X 8 ft and adding the second rectangle area 10 ft X 10 ft = $120 + 100 = 220$ square ft

Either way to get the number of paint quart can for this, **you will need a minimum of 3 quarts**, because each quart can will be used for each 100 square ft area. You actually need 2 full quarts plus 1/5 th of the third can.

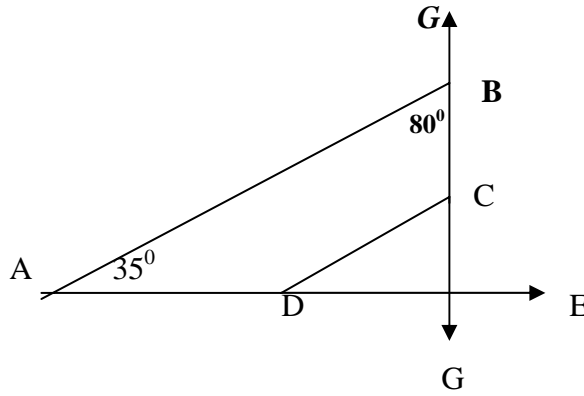
ANSWER – H

Problem #15

If $x = -4$, then the value of $3x^2 - 15x = 3(-4)^2 - 15(-4) = 3 \times 16 + 60 = 48 + 60 = 108$

ANSWER – E

Problem #16



Problem is to find value of angle BCD or angle C

Line AB is parallel to line DC. Use the parallel line intersects basics, drawn by the line with arrows

Since Angle ABC = 80°, then angle ABG = 180 – 80 = 100°

Angle ABG = Angle BCD, because of the intersecting parallel lines = 100°

ANSWER – G

(This is the fewer steps way to solve.)

Problem #17

$$(6a^3 - 5ac^2 + 14c) - (8c - 3a^3 - 2ac^2)$$

Open the parenthesis and group the similar terms to add or subtract.

$$6a^3 - 5ac^2 + 14c - 8c + 3a^3 + 2ac^2 = 9a^3 - 3ac^2 + 6c \text{ or Answer D}$$

ANSWER – D

Problem #18

If $f(x) = 3x^2 + 5x - 5$, then $f(-2) = ?$

Substitute x with -2

$$3(-2)^2 + 5(-2) - 5 = 3(4) - 10 - 5 = 12 - 10 - 5 = -3 \text{ or Answer J}$$

ANSWER – J

Problem #19

3 tires at the regular price and then the 4th tire is free. What is the % discount off the regular price.

There are couple of ways to do this. # 1 is the easy way, by assuming the cost of the original tire prices is \$100 each. So when you spend \$300 for 3 tires, you get a free tire or \$300 for 4 tires. The cost of each tire will be $\$300/4 = \75 . So a \$ 100 tire, you are buying for \$ 75 or a \$25 discount on a \$100 original price or a 25% discount. Answer C

#2 method – Assume the original cost of each tire is x, then 4 tires would have costed 4x, but you are only paying 3x or you are getting 1x discount on 4x. To calculate the % discount is to find what 1x to 4x is equivalent to ?% to 100.

$$\text{Or } \frac{1x}{4x} = \frac{?}{100} \text{ or } \frac{1 \cancel{x} (100)}{4 \cancel{x}} = ? \text{ or } ? = 25$$

ANSWER – C

Problem #20

You tossed a head/tail coin 10 times recording H for heads and T for tails. You recorded for the 10 tosses T H H H H T H H H H. What is the probability that the head side will land up on the next or 11th toss?

This is a trick probability problem. For a coin each toss, no matter how many times you have tossed, the probability of a Head or tail is always 1 out of 2 chances or 1/2 or 50%. So the Answer is J.

ANSWER – J

Problem #21

This is a another trick problem in permutaions and combinations. There are 26 letters, but the first letter cannot be O. The 2 letters (25 letters are possible without letter O for the first letter and 26 letters for the 2nd letter), is followed by 2 digits from 0 to 9 (or 10 possible digits for the 3rd and 4th numbers), and the letters amd digits can be repeated. The combinations are product of all possible numbers of letters or digits or 25 X 26 X 10 X 10 or Answer C

ANSWER – C

Problem #22

The length of the rectangle is 6 inches longer than its width and the perimeter is 48 inches. What is the width in inches?

This type of problem is easy to solve using x for the width. This means the length is x + 6 inches. The perimeter of a rectangle is 2 x length + 2 width.

Or $2x + 2(x+6) = 48$ or $2x + 2x + 12 = 48$ or $4x + 12 = 48$. Subtract 12 from both sides or take 12 to the other and solve for x.

$4x = 36$ or $x = 36/4 = 9$.

ANSWER – J

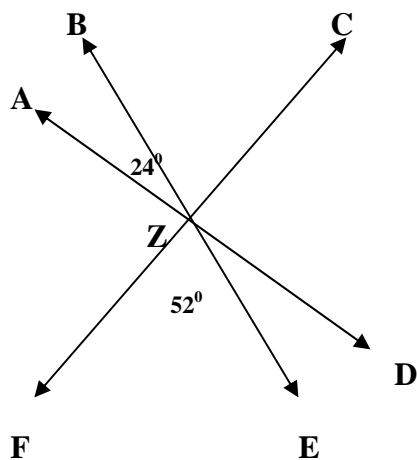
Problem #23

The slope of the line PQ is rise over run or $(y_2 - y_1) / (x_2 - x_1)$, where x and y are coordinates of any 2 selected points on the graph for line PQ. Each grid line is 1/2. For example point P coordinates are (0, 2) and point Q is (3/2, 3).

Slope = $(3 - 2) / ((3/2) - 0) = 1 / (3/2) = 2/3$

ANSWER – A

Problem #24 Find $\angle CZE = ?$

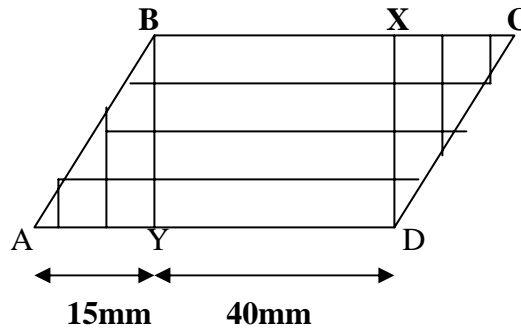


Since the lines intersect at point Z, the opposite angles are equal. For example $\angle FZE = \angle BZC = 52^\circ$
 $\angle AZB = \angle EZD = 24^\circ$

Since CF is a straight line, $\angle CZD = 180 - \angle EZD - \angle FZE = 180 - 24 - 52 = 104$.

$\angle CZE = \angle CZD + \angle EZD = 104 + 24 = 128^\circ$ or Answer K

Problem #25



Easy way solve this is to look at the triangles AYB and DXC, both are equal in size and that leaves the rectangle BYDX. The area of the triangle is $\frac{1}{2}$ base X height and the area of the rectangle is length X width.

(Keep in mind that each grid division is 5 mm (millimeters). For example $AY = 3 \times 5 = 15$ mm, $YB = 4 \times 5 = 20$ mm, $YD = 8 \times 5 = 40$ mm.

Area of triangle AYB = $\frac{1}{2} (AY) (YB) = \frac{1}{2} (15) (20) = 150$ square mm

Area of triangle DXC is the same as triangle AYB = 150 square mm

Area of rectangle BYDX = Length YD X Width YB= $40 \times 20 = 800$ square mm

Therefore the area of the \square ABCD = area of \triangle AYB + Area of \triangle DXC + area of \square BYDX

Therefore the area of the \square ABCD = $150 + 150 + 800 = 1100$ square mm

ANSWER - C

Problem #26

Another tricky problem. Given $d = -5t^2 + 18t + 8$, where d is the distance from the above the ground and t is the time of flight in seconds. The distance $d = 0$ in this equation because the projectile has hit the ground.

Therefore $0 = -5t^2 + 18t + 8$ or multiplying both sides by -1 will give

$5t^2 - 18t - 8 = 0$. t is the common factor. So you can write this as

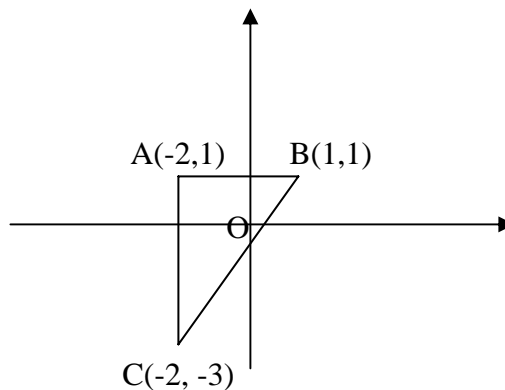
$t(5t - 18) - 8 = 0$ or taking 8 to the other side or adding 8 to both sides, you get

$t(5t - 18) = 8$. You can guess what 't' has to be on the left side to get 8 on the right side of the

equation. For t equal to 1, 2, or 3 won't work. Try $t = 4$, it will work. $4(5 \times 4 - 18) = 4(20 - 18) = 8$

ANSWER - H

Problem #27



One of the method is to find the distance AB (base of the \triangle ABC) and distance AC (height of the \triangle ABC).

Then use the area formula for the \triangle ABC = $\frac{1}{2}$ (base) (height)

Distance AB = $(x_2 - x_1) = 1 - (-2) = 3$ and distance AC = $(y_2 - y_1) = 1 - (-3) = 4$.

Therefore area of \triangle ABC = $\frac{1}{2} (3) (4) = 6$

ANSWER - B

Problem #28

$- (-3a^3)^2 = ?$ First solve what is in the parenthesis $= (-3a^3)(-3a^3) = 9a^6$
or $- (-3a^3)^2 = - (9a^6)$

ANSWER - F

Problem #29

120 is $\frac{5}{12}$ th of what number? Let the number be N.

$$\frac{5}{12} N = 120 \text{ or } N = 120 \times \frac{12}{5} = 288 \text{ or Answer E}$$

(If you are used to seeing this as multiplying both sides by $\frac{12}{5}$, you will get the same result for N)

ANSWER - E

Problem #30

What is the simplified version of $\frac{b+3}{(b^2-9)} \div \frac{1}{b-3}$

Recognize that $(b^2 - 9)$ is same as $(b^2 - 3^2)$ or is the same as $(b+3)(b-3)$

$$\frac{\cancel{(b+3)}}{(b+3)(b-3)} \div \frac{1}{(b-3)} = \frac{(b-3)}{(b-3)} = 1$$

ANSWER - F

Problem #31

All numbers are negative numbers. Therefore the negative number that is the smallest will be the greater one than the rest. Intuitively you can see that the larger the denominator, with a small numerator will be the smallest negative number. Without using a calculator, you may be able see right away that Answer E is the one

ANSWER - E

Problem #32

If $\frac{4}{3} x > -1$, what is the set of possible values of x ?

cross multiply or multiply both sides by $\frac{3}{4}$, to get x = ?

$$\text{You get } x > - \frac{3}{4}$$

ANSWER - F

Problem #33

The owner wants to double the area of a rectangular dance floor that is 8 ft x 10 ft. The owner increases the 8 ft width by 2 ft. What must be the length to get double the area?

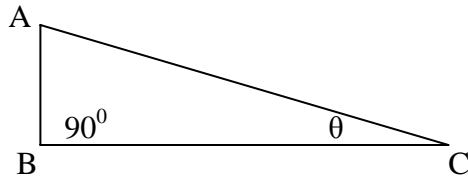
The original area = length x width = 10 ft x 8 ft = 80 square ft

Double the area will be 160 square ft. Let L be the new length we are trying to find

Or $L(8 + 2) = 160$ or $10L = 160$ or $L = 16$ ft or the length must be increased from 10 ft to 16 ft or by 6 ft

ANSWER - C

Problem #34



Given $\tan \theta = 2 / \sqrt{77}$, then $\sin \theta = ?$

$\tan \theta = \text{opposite side} / \text{adjacent side} = AB/BC$ or $AB = 2$ and $BC = \sqrt{77}$

Since triangle ABC is a right triangle, hypotenuse $AC = \sqrt{(\sqrt{77})^2 + 2^2} = \sqrt{77 + 4} = \sqrt{81} = 9$

$\sin \theta = \text{opp side} / \text{hyp} = AB / AC = 2 / 9$

ANSWER - F

Problem #35

What is the slope of the line parallel to $x + 2y = 6$ or $2y = -x + 6$ or $y = -\frac{1}{2}x + 3$ (the equation is rewritten in the standard equation for a straight line $y = mx + c$, where m is the slope and c is the y-intercept)

Therefore for $y = -\frac{1}{2}x + 3$, the slope = $-\frac{1}{2}$ and any line parallel to this line will also have the same slope.

ANSWER - B

Problem #36

Given that $A = P(1 + rt)$, find $r = ?$

Divide both sides by P or crossmultiply to take P to the left side

$$A / P = 1 + rt$$

Subtract 1 from both sides or take 1 to the left side

$$(A/P) - 1 = rt$$

To get $r = ?$, divide both sides by t crossmultiply to take 't' to the left side

$$r = [(A/P) - 1] / t = \frac{A}{Pt} - \frac{1}{t} = \frac{A - P}{Pt}$$

(Taking Pt as the common denominator looking at the answer G matches)

ANSWER - G

Problem #37

Charles paid $\frac{1}{2}$ as much as Tanya for the gift that cost \$ 24. How much was Tanya’s contribution. Assume Tanya paid x and so Charles paid $\frac{1}{2} x$ and $x + \frac{1}{2} x = 24$ or

$$\frac{3}{2} x = 24 \text{ or } x = 16$$

ANSWER – D

Problem #38

$$|x - 1| > 5$$

this means $x - 1 > 5$ and $-(x - 1) > 5$
Or for $x - 1 > 5$, adding 1 to both sides $x > 6$

And for $-(x - 1) > 5 = -x + 1 > 5$ or adding -1 to both sides, $-x > 4$ or $x < -4$ (by switching sides)

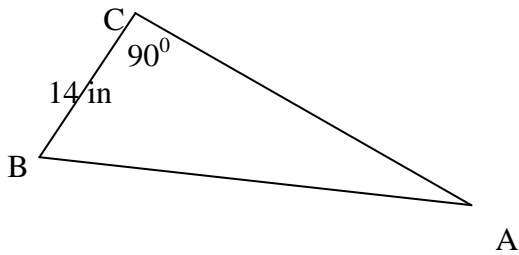
ANSWER – F

Problem #39

Given that $4 < \sqrt{x} < 9$
Square each number to get $16 < x < 81$

ANSWER – E

Problem #40



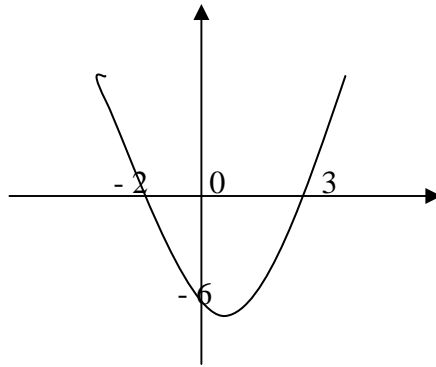
$\sin A = \frac{3}{7} = \text{opposite side} / \text{hypotenuse} = BC / AB$ and the problem is to find what distance AB is
 $\frac{3}{7} = \frac{14}{AB}$ or $AB = 14 \left(\frac{7}{3} \right) = \frac{98}{3}$ or Answer J

(you can cross multiply or multiply both sides by $(7/3)$ and AB to solve this depending on how you are used to solving problems. Cross multiplication is usually the simplest way to solve problems like this in fewer steps and avoid errors. When you cross multiply the numbers or factors is moved to the opposite side cross – moving a numerator from one side to the other side goes to the denominator, moving a denominator from one side to the other side it goes to the numerator – this is the same thing as multiplying and dividing both sides, but cross multiplication or division is done in single step.

For example in this problem take 7 from left side denominator to numerator on the right side, take 3 to the denominator on the right side, AB is taken cross to the numerator on the left side)

ANSWER – J

Problem #41



One way to solve the problem is to look at the graph points for x and y values and plug them in the equations to pick the answer. At first glance answers D and E can be eliminated because for $x = 0$, it gives $y = +6$ and y has to be -6 for $x = 0$. Answers A, B, and C can give the value of -6 for $x = 0$. Let us try to find which will give $y = 0$ when $x = 3$ and $y = 0$ when $x = -2$.

When $x = 3$, only A can give a value of $y = 0$. So B and C are not the correct ones. Verify the answer A with $x = -2$, and A gives $y = 0$.

ANSWER – A

Problem #42

The average of 5 integers is 4 \implies this should tell you that the total for 5 integers is $5 \times 4 = 20$. Now if one of the integers is 3, then what is the average of the remaining 4 integers? Subtract 3 from 20 to get 17 as the total for the remaining 4 integers. Therefore the average of the 4 integers is $17 / 4 = 4 \frac{1}{4}$

ANSWER – J

Problem #43

If one of the solution to $x^2 - kx - 8 = 0$ is $x = -k$, then what are the possible values of k?

Substitute x with $-k \implies (-k)^2 - k(-k) - 8 = 0$ or $k^2 + k^2 - 8 = 0$ or $2k^2 - 8 = 0$
Or $2k^2 = 8$ or $k^2 = 8/2 = 4$ or $k = \sqrt{4}$ or $k = +2$ or $k = -2$

ANSWER – B

Problem #44

Triangle T1 is congruent to triangle T2
Triangle T1 is similar to triangle T3 \implies This does not mean T1 is congruent to T3, can mean that T1 may be congruent to T3 if additional information is provided. Because T1 is similar to T3, you can infer that T3 is similar to T2. So Answer J is the best choice.

ANSWER – J

Problem #45

The piece is $1\frac{1}{2}$ in X $1\frac{1}{2}$ in X 6 ft in length. The 6 foot length side is the one he is cutting $1\frac{1}{2}$ piece to make the cubic block to get $1\frac{1}{2}$ x $1\frac{1}{2}$ x $1\frac{1}{2}$ in block and he loses $\frac{1}{8}$ th inch for each cut, except for the first and last cut at the end.

First convert 6 ft length to inches or $6 \times 12 = 96$ inches

You can look at it that each cut has to be $(1\frac{1}{2} + \frac{1}{8})$ or $\frac{3}{2} + \frac{1}{8} = \frac{13}{8}$ in cut in length

(Taking 8 as the common denominator and adding what is in the parenthesis, is how it ended up as $\frac{13}{8}$ in for each cut.)

Now calculate how many $\frac{13}{8}$ in cut can be done in 96 in length or $96 / (\frac{13}{8})$

Or = $(96 \times 8) / 13 = 43$ and $9/13$ or 44 when looking at the answer choices and taking into account that the first and the last cut does not lose $\frac{1}{8}$ th inch.

ANSWER – B

Problem #46

What is the value of k for which the lines $y = kx + 1$ and $y = x - 2$ intersect at the point (4,2) in the standard (x, y) coordinate plane?

For the point (4, 2), substitute $x = 4$ and $y = 2$ in equation $y = kx + 1$, to find k, the slope

$$2 = k(4) + 1 \text{ or } k = \frac{1}{4}$$

(Now you can verify that it meets the 2nd equation $y = x - 2$ by substituting for $x = 4$ and $y = 2$ and it does.)

ANSWER – G

Problem #47

For a rectangle in a (x,y) coordinate the equation for the line one side is $y = \frac{3}{4}x - 2$, which of the equations in the answers will represent the adjacent side of this rectangle.

The adjacent side will be perpendicular to the above line and should have a slope of reciprocal of the above line and a negative (opposite to the positive slope of the given line) or a slope of $-\frac{4}{3}$. The only answer that has this is E

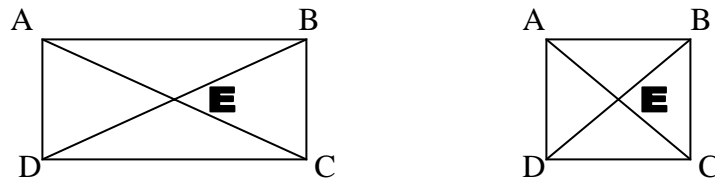
ANSWER – E

Problem #48

Positive integers of factors of 30 are 1, 2, 3, 5, 6, 10, 15, and 30 or 8 positive integers are factors of 30.

ANSWER – J

Problem #49



A little tricky problem, but easy if you recognize what the question is. ABCD is a rectangle and the question is about it being a square (should imagine it as shown on the right side square). In the square all triangles has to be congruent. So the answer is that triangle ABE must be congruent to triangle ADE for ABCD to be a square. Answer B fits this criterion. **ANSWER – B**

Problem #50

2 pencils and one pen costs \$0.55 or 55 cents

1 pencil and 2 pens costs \$0.95 or 95 cents. (It will be easier to solve as cents rather than decimal \$s)

Let x be the cost of a pencil and y be the cost of a pen and you can set up 2 equations from the above information and then solve the simultaneous equations to get the value of x and y.

From the first info, you can write an equation as $2x + y = 55$ (Equation # 1)

From the second info, you can write an equation $x + 2y = 95$ (Equation # 2)

Multiply the first equation by 2 on both sides $\implies 4x + 2y = 110$

Now subtract equation #2 from this $x + 2y = 95$

(To subtract multiply equation# 2 by -1 on both sides and then add the 2 equations. The term $2y$ will cancel out each other) to get $3x = 110 - 95 = 15$ or $x = 15/3 = 5$ cents. So the pencil cost 5 cents each.

Now that you know what x is (5), take any one of the equations and substitute for x to get y

Equation # 2 for example, $x + 2y = 95$ or $5 + 2y = 95$ or $2y = 95 - 5 = 90$ or $y = 90 / 2$ or $y = 45$ cents
So the pen costs 45 cents each and the pencil cost 5 cents each.

Now the question is what is the cost of one pencil and one pen or $= 5 + 45 = 50$ cents or \$0.50

ANSWER - H

Problem #51

The imaginary number i is defined as $i^2 = -1$. What is $i + i^2 + i^3 + \dots + i^{49}$ equal to

Another tricky problem, but it is easy once you see how to break it down to solving it. Since we know that $i^2 = -1$, we can rewrite this as

$i + (-1) + i(i^2) + (i^2)(i^2) + \dots + i(i^{48})$ Now you can see that the even terms alternate in values of -1 and $+1$ or cancel each other. The odd terms except the first term alternate in values as $-i$ and $+i$ and also cancel each other. This leaves only the first term i and the answer is A

ANSWER - A

Problem #52

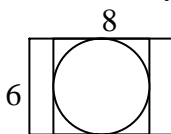
For $0 < x < \pi / 2$, then if $\sin x > 0$ and $\cos x < 0$, what are the possible values of x ?

$\sin x$ is > 0 and at the same time $\cos x < 0$ when $x > \pi / 2$ and $x < \pi$

ANSWER - G

Problem #53

What is the largest circle to fit a rectangle of 6 cm by 8 cm? It is easy to see that the maximum diameter of the circle can only be 6 cm or a radius of 3 cm. So the area $= \pi (3)^2 = 9\pi$



The circle has to be within a square inside the rectangle and 6 cm is the smallest possible side, within the rectangle of 6 cm by 8 cm.

ANSWER - C

Problem #54

The circle is of radius 6 inches. So, the perimeter of this circle is $2 \pi r = 12 \pi$
Now the piece is an arc of $1 / 12$ th or $= 12 \pi / 12 = \pi$

ANSWER – H

Problem #55

Answers A, B, D, and E fits the criteria to have the same terminal side as angle AOC. The only one that does not have the same terminal side is 680 or Answer C.
(-320 is one, 400 is $360 + 40$, 760 is $360 + 360 + 40$, 1120 is $360 + 360 + 360 + 40$ and are terminal to angle AOC)

ANSWER – C

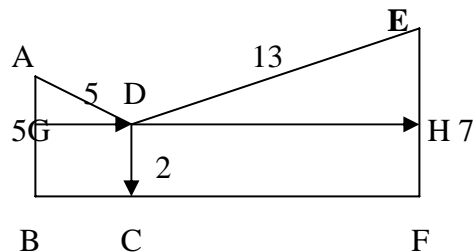
Problem #56

The plane travels 8 hours at a speed of x mph and for 7 hours at 325 mph, to find the average speed for both trips is to find the total distance traveled and divide by the total number of hours.

$8x + 7(325)$ is the total miles and 15 hours is the total time. This has to equal to $15(350)$ as it is given that the average speed for the entire trip is 350 mph
or $8x + 7(325) = 15(350)$ or Answer K

ANSWER – K

Problem #57



The area of the quadrilateral ABCD = area of the rectangle BCDG + the area of the triangle AGD

The area of the quadrilateral DCFE = area of the rectangle DCFH + the area of the triangle DHE

$AG = AB - DC = 5 - 2 = 3$, using right triangle AGD, then $GD = \sqrt{5^2 - 3^2} = \sqrt{25 - 9} = \sqrt{16} = 4$

$EH = EF - FH = 7 - 2 = 5$, using the right triangle DEH, $DH = \sqrt{13^2 - 5^2} = \sqrt{169 - 25} = \sqrt{144} = 12$

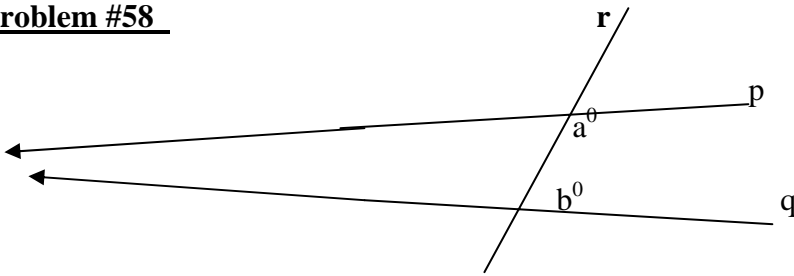
The area of the quadrilateral ABCD = area of the rectangle BCDG + the area of the triangle AGD
 $= GD \times DC + \frac{1}{2} (GD)(AG) = 4 \times 2 + \frac{1}{2} (4)(3) = 14$

The area of the quadrilateral DCFE = area of the rectangle DCFH + the area of the triangle DHE
 $= DC \times DH + \frac{1}{2} (DH)(EH) = 2 \times 12 + \frac{1}{2} (12)(5) = 54$

Therefore the ratio of area of the quadrilateral ABCD to area of the quadrilateral DCFE = 14: 54 or 7:27

ANSWER – D

Problem #58



Given that line p and q cross somewhere on the left of line r (as shown by the line with arrows. This means that line p and q are not parallel and the angles a and b must be $> 90^{\circ}$, which means that $a + b > 180$ or Answer K

ANSWER – K

Problem #59

For what value of 'a' will a circle centered at (2, - 3) pass through points (1, a) and (a, 3)

a = 3 will satisfy the info given

ANSWER – E

Problem #60

If a and b are real numbers such that $a^2 \neq b^2$

Then for what values of x, if any, is the equation $|ax + b| = |bx + a|$ true?

Since $a^2 \neq b^2$, taking square root on both sides,

$$\pm a \neq \pm b$$

for $|ax + b| = |bx + a|$, then x has to be ± 1

ANSWER – G