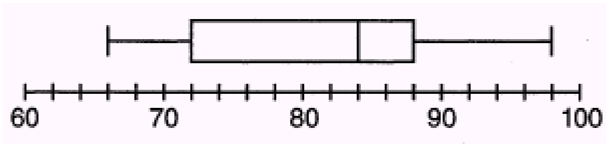
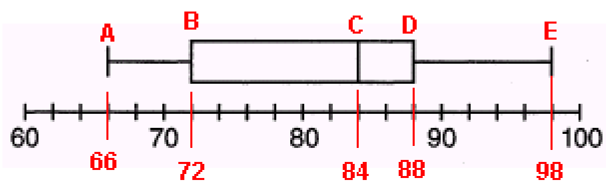
PART 1

1) ***The box-and-whisker plot below represents the math test scores of 20 students.***



What percentage of the test scores are less than 72?
(1) 25 (2) 50 (3) 75 (4) 100

Below is the box-and-whisker plot again with an explanation of what the vertical lines indicate:



Point A indicates a lowest test score of 66.

Point B indicates that 72 is the first quartile. This means that 25% of the scores were below 72. (This is the answer to the question.)

Point C indicates 84 as the second quartile or median. 50% of the scores were below 84.

Point D indicates the third quartile. 75% of the scores were below 88.

Point E indicates the highest test score as 98. **ANSWER: (1)**

2) ***A bag contains eight green marbles, five white marbles, and two red marbles. What is the probability of drawing a red marble from the bag?***

(1) $\frac{1}{15}$ (3) $\frac{2}{13}$

(2) $\frac{2}{15}$ (4) $\frac{13}{15}$

There are a total of 15 marbles (8+5+2). Two are red. The probability of drawing a red marble from the bag is therefore 2/15. **ANSWER: (2)**

3) ***Julia went to the movies and bought one jumbo popcorn and two chocolate chip cookies for $5.00. Marvin went to the same movie and bought one jumbo popcorn and four chocolate chip cookies for $6.00. How much does one chocolate chip cookie cost?***

(1) \$0.50 (3) \$1.00

(2) \$0.75 (4) \$2.00

You can set up two equations and solve them, but here is a different way. Both bought one jumbo popcorn. The only difference is that Julia bought 2 cookies while Marvin bought 4 cookies--two cookies more than Julia. Marvin's items cost $6.00, while Julia's cost $5.00. This means that Marvin's two cookies upped his price by $1. You now know that 2 cookies cost $1, putting the price of one cookie at 50 cents. **ANSWER: (1)**

4) ***Given:***
Q = {0, 2, 4, 6}
W= {0,1,2,3}
Z = {1, 2, 3, 4}
What is the intersection of sets Q, W, and Z?

(1) {2} (3) {1, 2, 3}
(2) {0, 2} (4) {0, 1, 2, 3, 4, 6}

You are being asked for the intersection of the sets. This means you are trying to determine which element or elements are common to all three sets.
Let's do some elimination. 0 is missing from set Z. 1 is missing from set Q. **2 is in all sets.** 3 is missing from set Q. 4 is missing from set W. 6 is only in set Q.
2 is the only element common to all three sets. **ANSWER: (1)**

5) ***Roger is having a picnic for 78 guests. He plans to serve each guest at least one hot dog. If each package, p, contains eight hot dogs, which inequality could be used to determine how many packages of hot dogs Roger will need to buy?***

(1) $p \geq 78$ (3) $8 + p \geq 78$
(2) $8p \geq 78$ (4) $78 - p \geq 8$

If each package contains 8 hot dogs, then p packages will contain 8p hot dogs.
He needs enough hot dogs for 78 guests. This means that the **8p** will have to equal at least 78 (could be more, but not less). In other words, it could be **greater than or equal** to 78. **ANSWER: (2)**

6) ***In a science fiction novel, the main character found a mysterious rock that decreased in size each day. The table below shows the part of the rock that remained at noon on successive days.***

Day	Fractional Part of the Rock Remaining
1	1
2	$\frac{1}{2}$
3	$\frac{1}{4}$
4	$\frac{1}{8}$

Which fractional part of the rock will remain at noon on day 7?

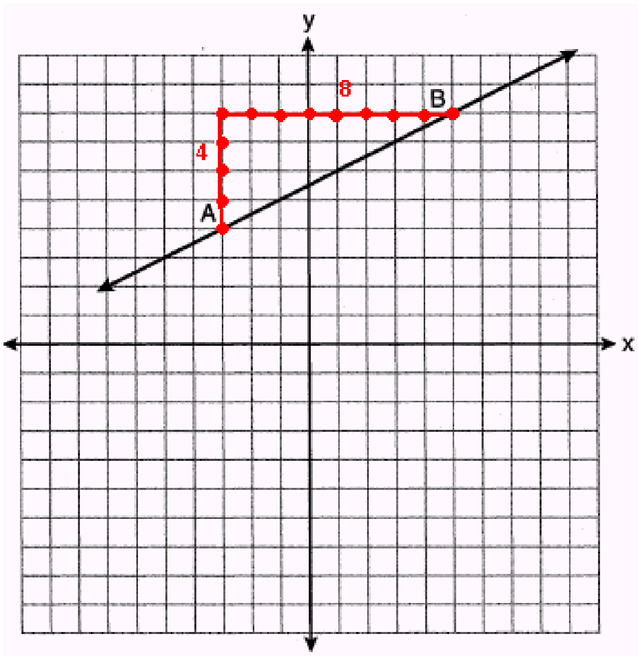
(1) $\frac{1}{128}$ (3) $\frac{1}{14}$
(2) $\frac{1}{64}$ (4) $\frac{1}{12}$

You see that each day's remains is one-half of the previous day's.
The size for day 5 will be one-half of 1/8, or 1/16.
The size for day 6 will be one-half of 1/16, or 1/32
The size for day 7 will be one-half of 1/32, or 1/64.

Alternate method:
The numerators will always remain1. The denominator is always a power of 2.
The denominator for day 2 is 2^1, for day 3 it is 2^2, for day 4 it is 2^3…
for day 7 it will be 2^6, or 64.

ANSWER: (2)

7) ***In the diagram below, what is the slope of the line passing through points A and B ?***



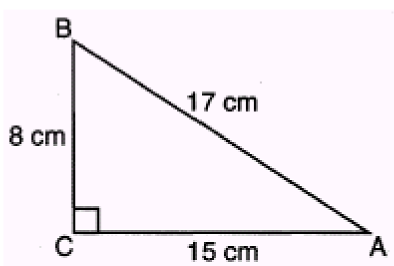
(1) -2 (3) $-\frac{1}{2}$

(2) 2 (4) $\frac{1}{2}$

Slope is defined as the change in y over the change in x. To get from point A to B, we move 4 units up (+) in the y direction, followed by 8 units to the right (+) in the x direction. This results in a slope of 4/8, or 1/2.

ANSWER: (4)

8) ***Which equation shows a correct trigonometric ratio for angle A in the right triangle below?***



(1) $\sin A = \frac{15}{17}$ (3) $\cos A = \frac{15}{17}$

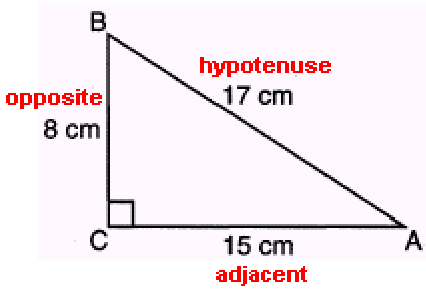
(2) $\tan A = \frac{8}{17}$ (4) $\tan A = \frac{15}{8}$

Sine, cosine, and tangent are ratios involving the sides of a right triangle.

$\sin = \frac{\text{opposite}}{\text{hypotenuse}}$ $\cos = \frac{\text{adjacent}}{\text{hypotenuse}}$ $\tan = \frac{\text{opposite}}{\text{adjacent}}$

The hypotenuse always remains the same. It is the side opposite the right angle. However, the opposite and adjacent sides change depending on the angle being used.

On the next page is the diagram and choices again.



(1) $\sin A = \frac{15}{17}$ (3) $\cos A = \frac{15}{17}$

(2) $\tan A = \frac{8}{17}$ (4) $\tan A = \frac{15}{8}$

Choice 3 is the only correct ratio. The cosine ratio is adjacent over hypotenuse, which in this case will be 15/17. **ANSWER: (3)**

9) ***Debbie solved the linear equation 3(x + 4) - 2 = 16 as follows:***

[Line 1]	$3(x + 4) - 2 = 16$
[Line 2]	$3(x + 4) = 18$
[Line 3]	$3x + 4 = 18$
[Line 4]	$3x = 14$
[Line 5]	$x = 4\frac{2}{3}$

She made an error between lines

(1) 1 and 2 (3) 3 and 4

(2) 2 and 3 (4) 4 and 5

She made her error between lines 2 and 3. To get from line 2 to 3, she should be using the distributive property.
3(x + 4) = 18
3x + 12 = 18 (She has 3x + 4 = 18)
She multiplied the x by 3 but forgot to multiply the 4 by 3.
ANSWER: (2)

10) ***The value of the expression - |a - b| when a = 7 and b = -3 is***
(1) -10 (2) 10 (3) -4 (4) 4

The two vertical bars in the above expression indicate absolute value.
Some examples:
The absolute value of -x = x and the absolute value of x = x. |-3| = 3 and |3| = 3

- |a - b| Substitute given values.
- |7 -(-3)| Continue simplifying.
- |7 + 3|
- |10|
-10 **ANSWER: (1)**

11) Which expression represents $\frac{12x^3 - 6x^2 + 2x}{2x}$ in simplest form?

(1) $6x^2 - 3x$ (3) $6x^2 - 3x + 1$

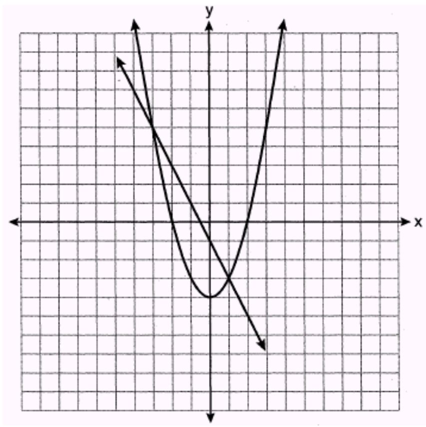
(2) $10x^2 - 4x$ (4) $10x^2 - 4x + 1$

To simplify the above expression, divide each term in the numerator by the denominator.

$\frac{12x^3}{2x} = \mathbf{6x^2}$ $\frac{-6x^2}{2x} = \mathbf{-3x}$ $\frac{2x}{2x} = \mathbf{1}$

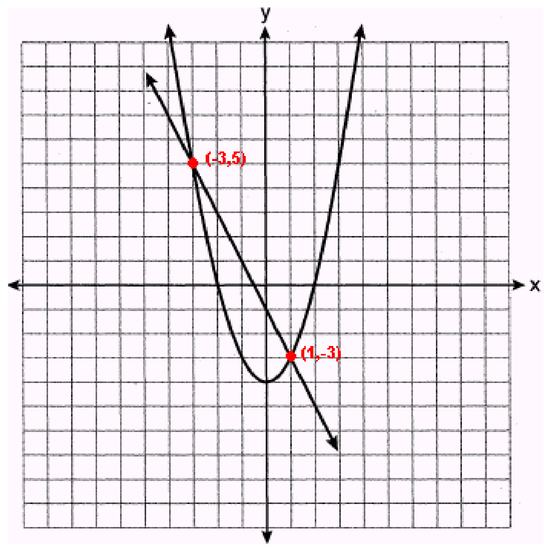
Final answer = $\mathbf{6x^2 - 3x + 1}$ **ANSWER: (3)**

12) ***Which ordered pair is a solution of the system of equations shown in the graph below?***



(1) (−3,1) (3) (0,−1)

(2) (−3,5) (4) (0,−4)



The solution set to the system of equations shown in the graph is the intersection of the graphs. To the right I've inserted in red the coordinates of the points of intersection. They are (-3,5) and (1,-3).

ANSWER: (2)

13) ***Which equation represents the line that passes through the points (-3,7) and (3,3)?***

(1) $y = \frac{2}{3}x + 1$ (3) $y = -\frac{2}{3}x + 5$

(2) $y = \frac{2}{3}x + 9$ (4) $y = -\frac{2}{3}x + 9$

First find the slope of the line. The slope is the change in y (subtract the y-coordinates) over the change in x (subtract the x-coordinates).

slope = $\frac{7 - 3}{-3 - 3} = \frac{4}{-6} = -\frac{2}{3}$ Slope of line is $\mathbf{-\frac{2}{3}}$.

Now use the slope intercept form of a line to find the y-intercept.
The slope intercept form of a line is y= mx + b, where m represents the slope and b represents the y-intercept.
Use the above equation. Substitute what is known and solve for b.
Let's use (3,3), one of the given points for x and y. Remember that m is -2/3.

$y = mx + b$ Substitute.

$3 = -\frac{2}{3}(3) + b$ Simplify.

$3 = -2 + b$ Add 2 to both sides.

5 = b

Your equation is $\mathbf{y = -\frac{2}{3}x + 5}$ **ANSWER: (3)**

14) ***Which data table represents univariate data?***

Side Length of a Square	Area of Square
2	4
3	9
4	16
5	25

(1)

Hours Worked	Pay
20	$160
25	$200
30	$240
35	$280

(2)

Age Group	Frequency
20–29	9
30–39	7
40–49	10
50–59	4

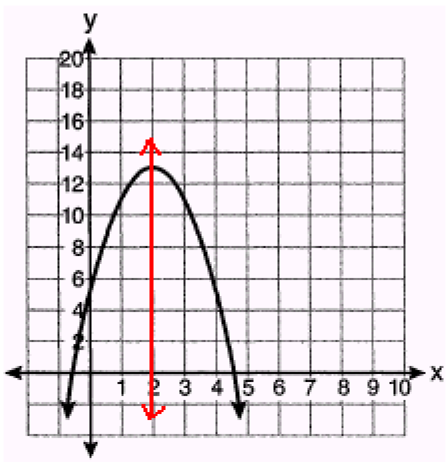
(3)

People	Number of Fingers
2	20
3	30
4	40
5	50

(4)

Table 3 consists of only one variable, age group, and describes its frequency. Univariate data deals with one variable and is descriptive. Bivariate data deals with the causal relationship between two variables. **ANSWER: (3)**

15) ***What is the equation of the axis of symmetry of the parabola shown in the diagram below?***



(1) $x = -0.5$ (3) $x = 4.5$

(2) $x = 2$ (4) $x = 13$

The axis of symmetry is indicated by the points that would divide the parabola into two congruent halves. I indicated those points using the red vertical line.
Its equation is x=2.

ANSWER: (2)

16) ***The members of the senior class are planning a dance. They use the equation r = pn to determine the total receipts. What is n expressed in terms of r and p ?***

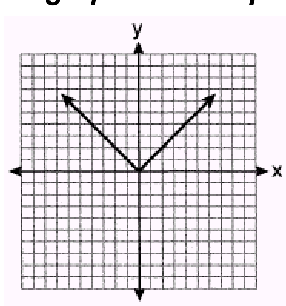
(1) $n = r + p$ (3) $n = \frac{p}{r}$

(2) $n = r - p$ (4) $n = \frac{r}{p}$

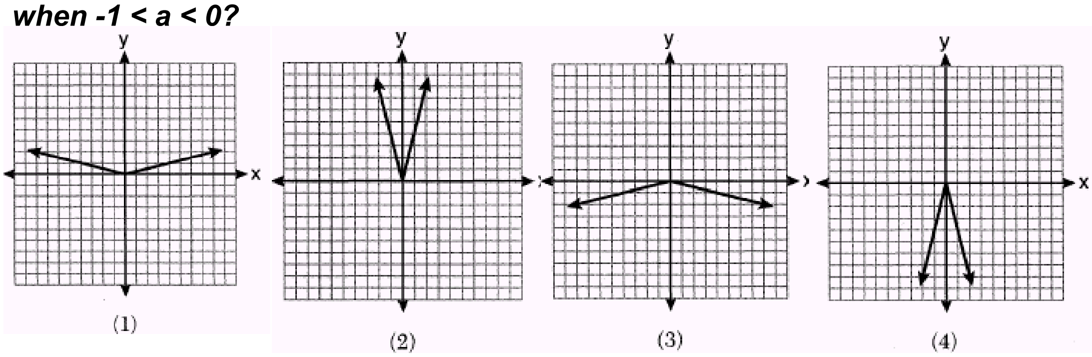
r = pn Divide each side by p.

$\frac{r}{p} = n$ **ANSWER: (4)**

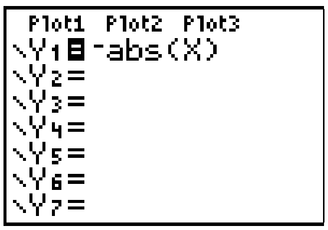
17) ***The graph of the equation y = |x| is shown in the diagram below.***

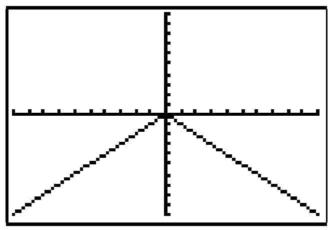


***Which diagram could represent a graph of the equation* y=a |(x)|**
when -1 < a < 0?

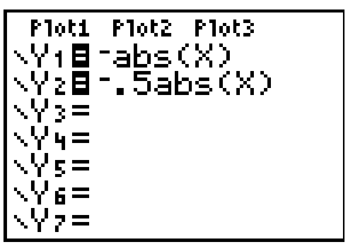


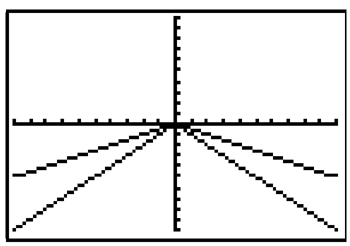
The graph of **y=a |(x)|** where a is negative will look like the original graph but will open to the bottom.





As "a" will approaches 0, the graph will spread out and eventually become the x-axis where y = 0.
Pick a value for "a" between 0 and -1. Here is what happens with -.5





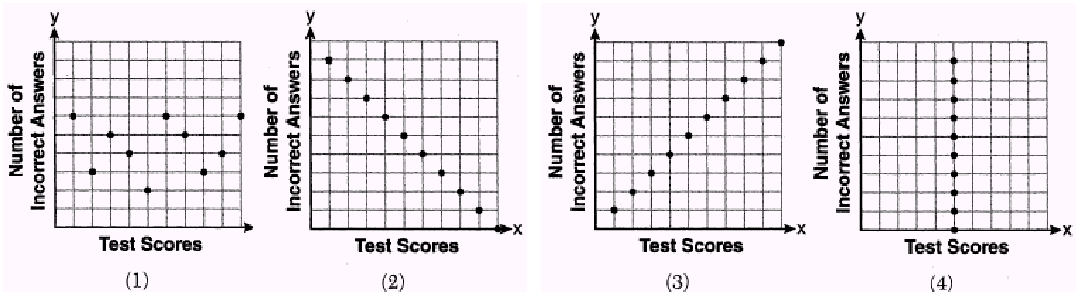
ANSWER: (3)

18) ***Which relation represents a function?***
(1) {(0,3), (2,4), (0,6)}
(2) {(-7,5), (-7,1), (-10,3), (-4,3)}
(3) {(2,0), (6,2), (6,-2)}
(4) {(-6,5), (-3,2), (1,2), (6,5)}

For a relation to represent a function, an x-value can only be paired with one unique y-value.

Choice 1 is disqualified….(0,3) (0.6)
Choice 2 is disqualified….(-7,5) (-7,1)
Choice 3 is disqualified….(6,2) (6,-2)
Choice 4 is your answer. Note that two different x-values can be paired with the same y-value….(-3,2) (1,2) and (-6,5) (6,5). **ANSWER: (4)**

19) ***Which scatter plot shows the relationship between x and y if x represents a student score on a test and y represents the number of incorrect answers a student received on the same test?***



Choice 2 is your answer. It shows that as the number of incorrect answers decrease, the test scores increase. (As you move to the right along the x-axis, the scores increase). **ANSWER: (2)**

20) ***Which expression is equivalent to $3^3 * 3^4$?***

(1) 9^{12} (3) 3^{12}
(2) 9^7 (4) 3^7

Here's the rule for multiplying expressions with powers: $x^3 \bullet x^4 = x^{3+4} = x^7$
Using that rule, $3^3 \bullet 3^4 = 3^7$ **ANSWER: (4)**

21) ***Which point is on the line 4y - 2x = 0?***

(1) (−2,−1) (3) (−1,−2)
(2) (−2,1) (4) (1,2)

You can substitute the coordinates of each choice into the equation to determine whether they are a solution set.

Let's try choice 1: x = -2 y = -1

4y - 2x = 0	Substitute
4(-1) - 2(-2) = 0	Multiply
-4 + 4 = 0	Add
0 = 0	Choice 1 is your answer.

Alternate Method:

4y - 2x = 0	Add 2x to each side.
4y = 2x	Divide each side by 4.

$y = \frac{2}{4}x$ or $y = \frac{1}{2}x$

Choice 1 is the only case where the y-coordinate equals half the x-coordinate. (This method would have saved you some time if the correct point would have been placed as the last choice.) **ANSWER: (1)**

22) ***If Ann correctly factors an expression that is the difference of two perfect squares, her factors could be***

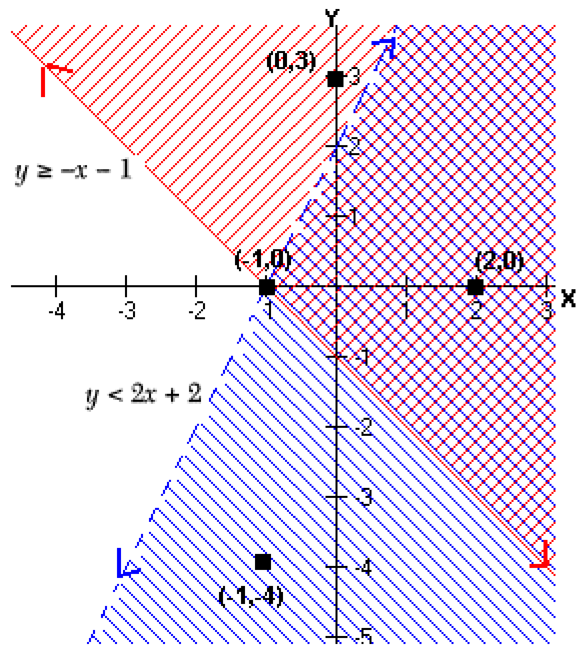
(1) (2x + y)(x - 2y) ***(3) (x - 4)(x - 4)***
(2) (2x + 3y)(2x - 3y) ***(4) (2y - 5)(y - 5)***

The factors of the difference of two perfect squares will always be the product of the sum and difference of two terms. Choice 2 shows the product fo the sum and difference of two terms, 2x and 3y. **ANSWER: (2)**

23) ***Which ordered pair is in the solution set of the following system of linear inequalities?***

$y < 2x + 2$
$y \geq - x - 1$

(1) (0,3) ***(2) (2,0)*** ***(3) (-1,0)*** ***(4) (-1,-4)***



To the right you see the graphs of the given system of inequalities. The ordered pair that lies in the solution set is the point (2,0).
The solution set for a system of inequalities when graphed, will always be within the the checkered area. That will be the area that contains points that satisfy both inequalities. By the way, the point (-1,0) satisfies the second inequality (graphed in red) because its graph is a solid line and contains (-1,0), but it is not contained on the graph of the first inequality (graphed in blue) as its graph is a broken line.
If you wish you can skip the graphing and simply substitute each set of points into the given inequalities until you find the point that satisfies both.

ANSWER: (2)

24) The expression $6\sqrt{50} + 6\sqrt{2}$ written in simplest radical form is

(1) $6\sqrt{52}$ (3) $17\sqrt{2}$
(2) $12\sqrt{52}$ (4) $36\sqrt{2}$

You have to have common radicals so that you can add the terms.

$6\sqrt{50}$ can be simplified as follows. First factor the radicand using the highest perfect
$6\sqrt{50}$ square it can be divided by evenly.
$6\sqrt{25}\sqrt{2}$
$6 \bullet 5\sqrt{2}$
$30\sqrt{2}$

Now that you have like radicals you can add them by combining the numerical coefficients.
$30\sqrt{2} + 6\sqrt{2} = 36\sqrt{2}$ **ANSWER: (4)**

25) What is the sum of $\frac{3x^2}{x-2}$ and $\frac{x^2}{x-2}$?

(1) $\frac{3x^4}{(x-2)^2}$ (3) $\frac{4x^2}{(x-2)^2}$

(2) $\frac{3x^4}{x-2}$ (4) $\frac{4x^2}{x-2}$

The rule for adding fractions with like denominators is simply to add the numerators and retain the denominator.

In the above example, therefore, add the numerators:
$3x^2 + x^2 = 4x^2$, and keep the denominator of x-2. **ANSWER: (4)**

26) ***Which equation represents a line parallel to the graph of 2x - 4y = 16?***

(1) $y = \frac{1}{2}x - 5$ (3) $y = -2x + 6$

(2) $y = -\frac{1}{2}x + 4$ (4) $y = 2x + 8$

The slopes of parallel lines are equal. Let's determine the slope of the line represented by 2x - 4y = 16. Transform it into y=mx + b, the slope-intercept form of a line, where m represents the slope.

2x - 4y = 16 Subtract 2x from each side.

-4y = -2x +16 Divide each side by -4

$y = \frac{1}{2}x - 4$ 1/2 is in the m position making the slope of the line 1/2.

You now know that a line with the a slope of 1/2 will be parallel to the given line. Choice 1 shows the equation whose line has a slope of 1/2 and would therefore be parallel to the given line. **ANSWER: (1)**

27) ***An example of an algebraic expression is***

(1) $\frac{2x+3}{7} = \frac{13}{x}$ (3) $4x - 1 = 4$

(2) $(2x + 1)(x - 7)$ (4) $x = 2$

Choices 1, 3, and 4 are examples of equations. Choice 2 is that of an algebraic expression. **ANSWER: (2)**

28) What is the solution set of $\frac{x+2}{x-2} = \frac{-3}{x}$?

(1) {−2, 3} (3) {−1, 6}

(2) {−3, −2} (4) {−6, 1}

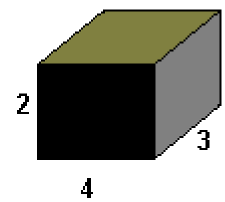
Whenever you have two fractions equal to each other, the product of the extremes and means will be equal. In other words:

$x(x+2) = -3(x - 2)$ Use the distributive law.
$x^2 + 2x = -3x + 6$ Add 3x to both sides.
$x^2 + 5x = 6$ Subtract 6 from each side.
$x^2 + 5x - 6 = 0$ Factor the quadratic equation.
$(x + 6)(x - 1) = 0$ Set each factor equal to 0 and solve for x.

$x + 6 = 0$ Subtract 6 from each side. $x - 1 = 0$ Add 1 to each side.
$x = -6$ **$x = 1$** **ANSWER: (4)**

29) ***How many square inches of wrapping paper are needed to entirely cover a box that is 2 inches by 3 inches by 4 inches?***
(1) 18 (2) 24 (3) 26 (4) 52

To the right, not drawn to scale is the box. The front of the box is 2 x 4. The back of the box, a side not visible is 2 x 4 as well. Actually the box which has six sides, but opposite sides will be equal in measure.
You will have 2 sides 2x4 accounting for 16 square inches.
You will have 2 sides 4x3 accounting for 24 square inches.
You will have 2 sides 3x2 accounting for 12 square inches.
Total surface area will be 16 + 24 + 12, or 52 square inches.



ANSWER: (4)

30) ***Which situation describes a correlation that is not a causal relationship?***
(1) the length of the edge of a cube and the volume of the cube
(2) the distance traveled and the time spent driving
(3) the age of a child and the number of siblings the child has
(4) the number of classes taught in a school and the number of teachers employed
The age of a child does not determine, is not a cause of, the number of siblings the child has. In choice 1, the volume of a cube is determined by the length of the cube. In choices 2 and 4, as well, each situation describes a causal relationship. **ANSWER: (3)**

PART II

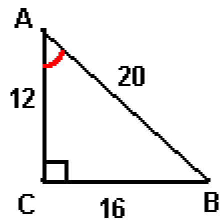
31) ***Angela wants to purchase carpeting for her living room. The dimensions of her living room are 12 feet by 12 feet. If carpeting is sold by the square yard, determine how many square yards of carpeting she must purchase.***

3 feet = 1 yard
9 square feet = 1 square yard

Her living room is 12 by12 feet.
3 feet is one yard, so 12 feet is 12/3, or 4 yards.
Her living room in terms of yards is therefore
4x4 yards, which is a total of 16 square yards..
ANSWER: 16 square yards.

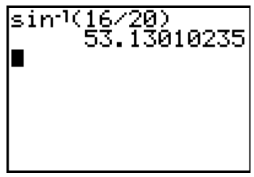
32) ***In right triangle ABC, AB = 20, AC= 12, BC = 16, and m∠C = 90. Find, to the nearest degree, the measure of ∠A.***

Below is a diagram of the given triangle (not drawn to scale).



You are asked for the measure of ∠A. Since the measures of all the sides are known, you can use any one of the three trigonometric ratios to determine the measure of ∠A.
Let's use the sine ratio.

$$\text{sine A} = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{16}{20}$$ Use your calculator.



Remember to hit **2nd SIN** to access the **$\sin^{-1}$** key.

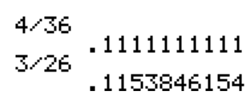
ANSWER: The measure of angle A to the nearest degree is 53.

33) ***Jon is buying tickets for himself for two concerts. For the jazz concert, 4 tickets are available in the front row, and 32 tickets are available in the other rows. For the orchestra concert, 3 tickets are available in the front row, and 23 tickets are available in the other rows. Jon is randomly assigned one ticket for each concert. Determine the concert for which he is more likely to get a front-row ticket. Justify your answer.***

The **jazz concert** has a total of 36 tickets available (4+32).
4 of those tickets are front row. The probability of getting a front row ticket is **4/36**.

The **orchestra concert** has a total of 26 tickets available (3+23).
3 of those tickets are front row. The probability of getting a front row ticket is **3/26**.

All that remains now is to determine which fraction is greater. That will be the one with the higher probability. Use your calculator:



.115 is greater than .111.
3/26 is therefore greater than 4/36,

ANSWER: He is more likely to get a front row ticket for the orchestra concert, because the probability of obtaining a front row ticket there is greater.

PART III

34) ***Find the roots of the equation $x^2 - x = 6$ algebraically.***

$x^2 - x = 6$ Subtract 6 from each side.
$x^2 - x - 6 = 0$ Factor.
$(x - 3)(x + 2)=0$ Set each factor equal to 0 and solve for x.

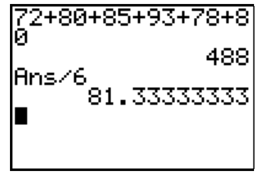
$x - 3 = 0$ Add 3 to each side. $x + 2 = 0$ Subtract 2 from each side.
$x = 3$ **$x = -2$**

ANSWER: The roots of the equation are 3 and -2.

35) Ms. Mosher recorded the math test scores of six students in the table below.

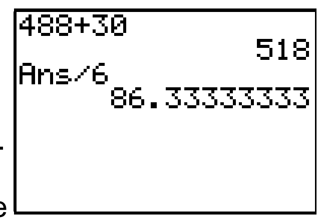
Student	Student Score
Andrew	72
John	80
George	85
Amber	93
Betty	78
Roberto	80

Determine the mean of the student scores, to the nearest tenth,
Add the six scores and divide by 6.
ANSWER: The mean to the nearest tenth is 81.3.



Determine the median of the student scores.
The median will be the middle score. First put the scores in order.
72, 78, 80, 80, 85, 93. There are 6 scores. The median will be the average of the 3^{rd} and 4^{th} score. The 3^{rd} and 4^{th} scores are both 80, so the median is 80.
ANSWER: The median is 80.

Describe the effect on the mean and the median if Ms. Mosher adds 5 bonus points to each of the six students' scores.
If 5 points will be added to each of the six scores, then the total of the scores will increase by 30 (6x5). Instead of 488 being the total, the new total will be 518.
Divided by 6, the new average is 86.3 - an increase of 5.
Regarding the median, the 3^{rd} and 4^{th} scores will now be 85 rather than 80, so the median will be 85 -- an increase of 5 as well.



ANSWER: The mean and median will both increase by 5 points.

36) ***Using his ruler, Howell measured the sides of a rectangular prism to be 5 cm by 8 cm by 4 cm. The actual measurements are 5.3 cm by 8.2 cm by 4.1 cm. Find Howell's relative error in calculating the volume of the prism, to the nearest thousandth.***
The relative error will be the difference between the two volumes (the actual volume and Howell's volume) divided by the actual volume.
Volume equals length x width x height.

Howell's volume = 5 x 8 x 4 = 160 cubic centimeters.
Actual volume = 5.3 x 8.2 x 4.1 = 178.186 cubic centimeters.
Difference = 178.186 - 160 = **18.186**

Relative Error = Difference/Actual = 18.186 ÷178.186 =.1020618904
To nearest ten-thousandth = **.102**

ANSWER: His relative error is .102.

PART IV

37) ***A password consists of three digits, 0 through 9, followed by three letters from an alphabet having 26 letters.***

If repetition of digits is allowed, but repetition of letters is not allowed, determine the number of different passwords that can be made.
The password consists of six characters. Repetition of digits is allowed. This means that in each of the first three spots you will have a choice of 10 digits. Repetition of letters is not allowed. This means that in the fourth spot you will have a choice of 26 letters, but in the fifth spot a choice of only 25 letters, followed by a choice of 24 letters in the last position.

$\underline{10}$ $\underline{10}$ $\underline{10}$ $\underline{26}$ $\underline{25}$ $\underline{24}$ Using the counting principle you can now determine the number of possible passwords meeting the requirements.
10 x 10 x 10 x 26 x 25 x 24 = **15,600,000**

ANSWER: 15,600,000 passwords are possible when repetition of digits is allowed.

If repetition is not allowed for digits or letters, determine how many fewer different passwords can be made.

$\underline{10}$ $\underline{9}$ $\underline{8}$ $\underline{26}$ $\underline{25}$ $\underline{24}$ Since the digits can not be repeated, the possibilities for the first three positions are now 10, 9, and 8. The number of possible passwords are now:
10 x 9 x 8 x 26 x 25 x 24 = **11,232,000**

15,600,000 - 11,232,000 = **4,368,000**

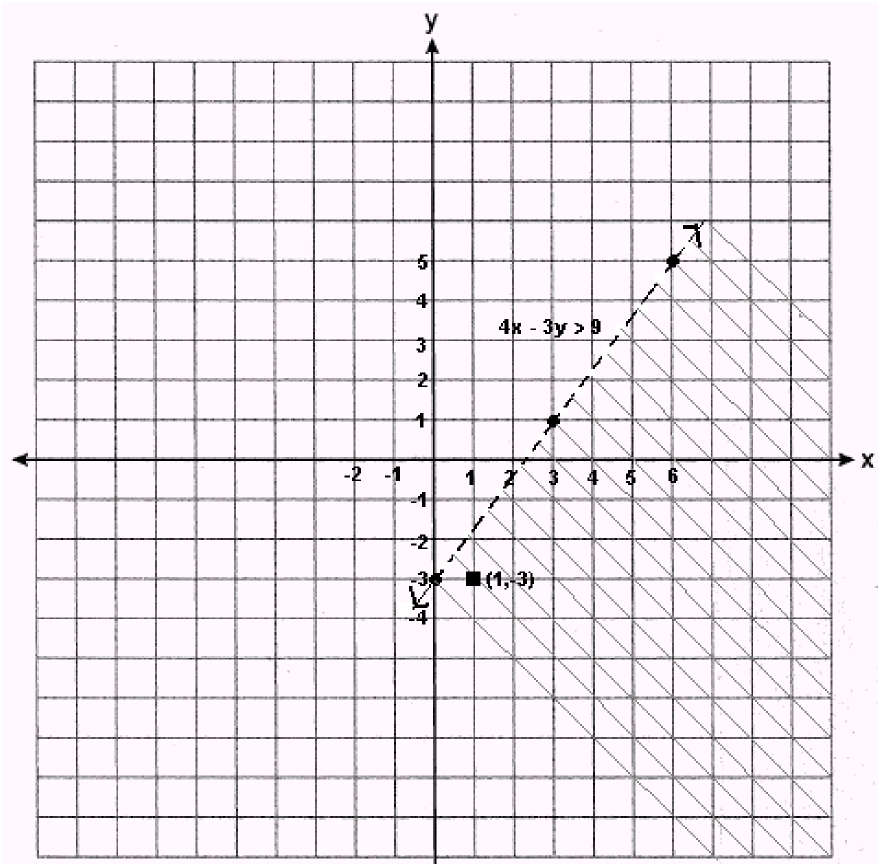
**ANSWER: If neither repetition of digits or letters is allowed,
4,368,000 fewer passwords are possible.**

38) ***Graph the solution set for the inequality 4x - 3y > 9 on the set of axes below. Determine if the point (l,-3) is in the solution set. Justify your answer.***
To make the graphing easier transform the inequality into the slope intercept form of a line.

$4x - 3y > 9$ Subtract 4x from each side.
$-3y > -4x + 9$ Divide each side by -3. (inequality symbol switches).
$\mathbf{y < \frac{4}{3}x - 3}$ The 4/3 is positive because we divided a negative by a negative.

Now on the coordinate plane appearing on the next page, graph this inequality in same manner as you would graph an equation. Remember at the end, though, to connect the points with a broken line as it is really an inequality. Also remember to shade appropriately.

Based on the above, were the inequality an equation, its y-intercept would be -3.
Its slope is 4/3.



As noted on the previous page, the y-intercept is -3. From that point (0,-3), move up 4 and then 3 to the right. That is the next point you see, (3,1). Move again 4 up and 3 to the right to get to the next point, (6,5). You kept moving 4 up and 3 to the right because the slope of the line is 4/3.
Now recall that once you transformed the inequality into the slope intercept form, the direction of the inequality sign switched to less then. That is why the inequality is shaded in a downward direction.

The solution set is contained in the shaded area of the coordinate plane.
ANSWER: The point (1,-3) is in the solution set because it lies in the shaded area which contains all the points in the solution set of the given inequality.

Number 39 begins on the next page…

39) ***Find three consecutive positive even integers such that the product of the second and third integers is twenty more than ten times the first integer. [Only an algebraic solution can receive full credit.]***

Consecutive even integers are two apart. So define your variables.

x = first integer
x + 2 = second integer
x + 4 = third integer

The product of the second and third is **(x+2)(x+4).**
Ten times the first integer is 10x.
Twenty more than ten times the first is **10x+20**.

Read the problem again and set up your equation.

(x+2)(x+4) = 10x+20 Multiply.
$x^2 + 6x + 8 = 10x + 20$ Subtract 10x from each side.
$x^2 - 4x + 8 = 20$ Subtract 20 from each side.
$x^2 - 4x - 12 = 0$ Factor.
(x - 6)(x + 2) = 0 Set factors equal to 0 and solve for x.
x - 6 = 0 Add 6 to each side. x + 2 = 0 Subtract 2 from each side.
x = 6 x = -2 Reject (problem states positive integers).

ANSWER:
First integer = 6
Second int. = 8
Third integer =10