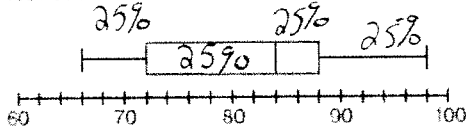


0110ia

- 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

- 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) $\frac{1}{15}$
 - 2) $\frac{2}{15}$
 - 3) $\frac{2}{13}$
 - 4) $\frac{13}{15}$
- Handwritten work for question 2:
 $GGGGGGGG \leftarrow 8$
 $WWWWW \leftarrow 5$
 $RR \leftarrow 2$
 Total: 15 marbles
 2 red / 15 marbles

- 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
- 2) \$0.75
- 3) \$1.00
- 4) \$2.00

Handwritten work for question 3:
 $P = \text{popcorn}$
 $C = \text{cookies}$
 general form $Ax + By = C$
 $1P + 2C = 5.00$
 $1P + 4C = 6.00$
 $A=1 \quad B=2$
 $A=1 \quad B=4$
 $1P + 2C = 5.00$
 $(-1P - 4C = -6.00)$
 \hline
 $-2C = -1.00$
 $\frac{-2C}{-2} = \frac{-1.00}{-2}$
 $C(\text{cookie}) = .50$

- 4 Given:
 $Q = \{0, 2, 4, 6\}$
 $W = \{0, 1, 2, 3\}$
 $Z = \{1, 2, 3, 4\}$

common to all sets Q, W, Z

What is the intersection of sets Q, W, and Z?

- 1) $\{2\}$
- 2) $\{0, 2\}$
- 3) $\{1, 2, 3\}$
- 4) $\{0, 1, 2, 3, 4, 6\}$

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

at least $\rightarrow \geq$
 at most $\rightarrow \leq$
 $8p \geq 78$

- 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?

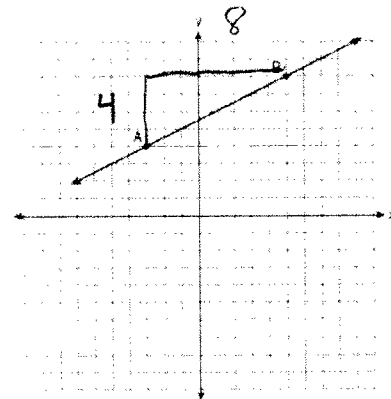
- 1) $\frac{1}{128}$
~~2) $\frac{1}{64}$~~
 3) $\frac{1}{14}$
 4) $\frac{1}{12}$

Continue pattern

Day	
5	$\frac{1}{16}$
6	$\frac{1}{32}$
7	$\frac{1}{64}$

from back page

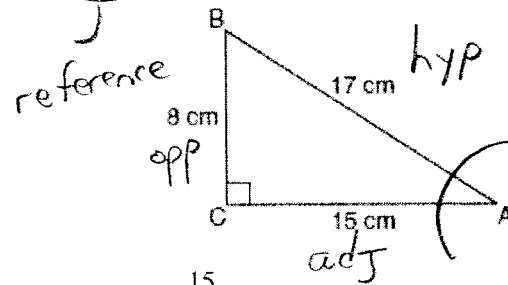
- 7 In the diagram below, what is the slope of the line passing through points A and B?



- 1) -2
 2) 2
 3) $\frac{1}{2}$
~~4) $\frac{1}{2}$~~

rise / run = $\frac{4}{8} = \frac{1}{2}$

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



- 1) $\sin A = \frac{15}{17}$
 2) $\tan A = \frac{8}{17}$
~~3) $\cos A = \frac{15}{17}$~~
 4) $\tan A = \frac{5}{8}$

$\sin A = \frac{\text{opp}}{\text{hyp}}$

$\cos A = \frac{\text{adj}}{\text{hyp}}$

$\tan A = \frac{\text{opp}}{\text{adj}}$

2

- 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
~~2) 2 and 3~~ → did not distribute the 3
 3) 3 and 4 to the 4 in ()
 4) 4 and 5

- 10 The value of the expression $-|a-b|$ when $a=7$ and $b=-3$ is

- ~~1) -10~~
 2) 10
 3) -4
 4) 4

$-|(7) - (-3)|$
 calculator

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

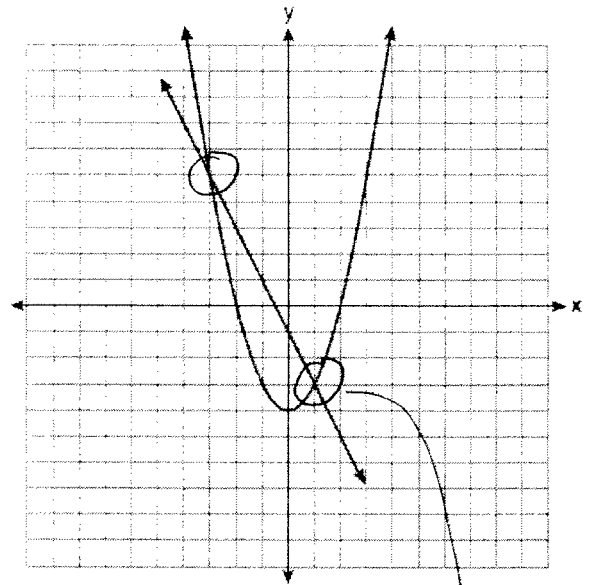
- 1) $6x^2 - 3x$
 2) $10x^2 - 4x$
~~3) $6x^2 - 3x + 1$~~
 4) $10x^2 - 4x + 1$

$\frac{12xxx - 6xx + 2x}{2x \quad 2x \quad 2x}$

$6x^2 - 3x + 1$

or in calc:
 use "sto" to find match

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



- 1) $(-3, 1)$
~~2) $(-3, 5)$~~
 3) $(0, -1)$
 4) $(0, -4)$

not listed

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

- 1) $y = \frac{2}{3}x + 1$
 2) $y = \frac{2}{3}x + 9$
~~3) $y = -\frac{2}{3}x + 5$~~
 4) $y = -\frac{2}{3}x + 9$

find m:

$m = \frac{y_2 - y_1}{x_2 - x_1}$

$m = \frac{(3) - (7)}{(3) - (-3)} = \frac{-2}{3}$

$y = -\frac{2}{3}x + b$ find b:

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

$3 = -2 + b$

$+2 \quad +2$
 $5 = b \rightarrow y = -\frac{2}{3}x + 5$

bivariate data \rightarrow 2 data fields

one data field

14 Which data table represents univariate data?

1)

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

bivariate

2)

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

bivariate

3)

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

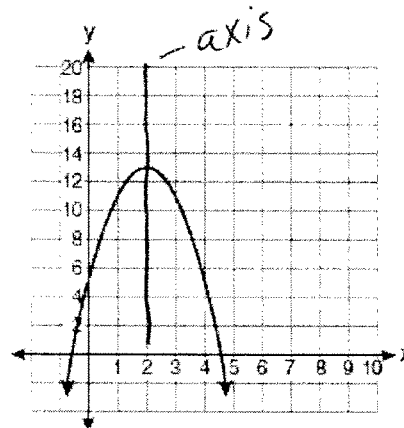
univariate
frequency is not
a data field

4)

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

bivariate

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



- 1) $x = -0.5$
- 2) $x = 2$
- 3) $x = 4.5$
- 4) $x = 13$

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

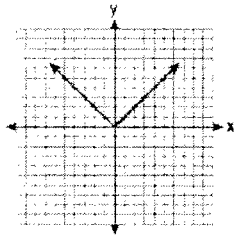
↑
solve for n

$$\frac{r}{p} = \frac{pn}{p}$$

$$\frac{r}{p} = n$$

x's can't repeat (x,y)

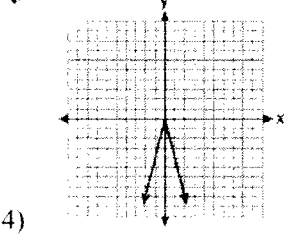
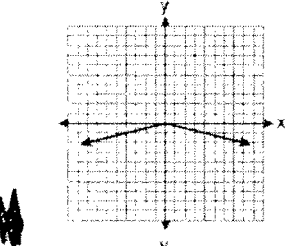
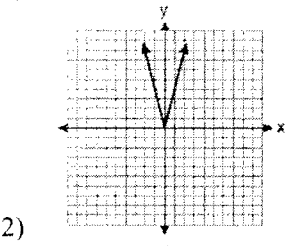
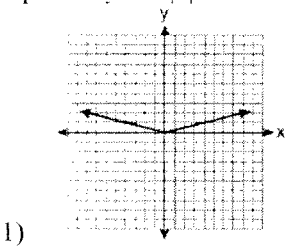
- 17 The graph of the equation $y = |x|$ is shown in the diagram below.



- 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) $\{(-6,5), (-3,2), (1,2), (6,5)\}$~~

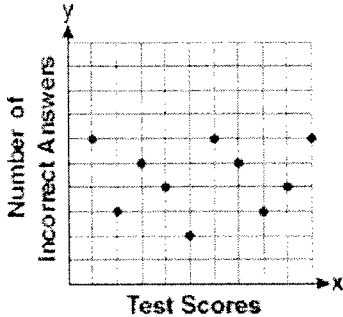
Which diagram could represent a graph of the equation $y = a|x|$ when $-1 < a < 0$?



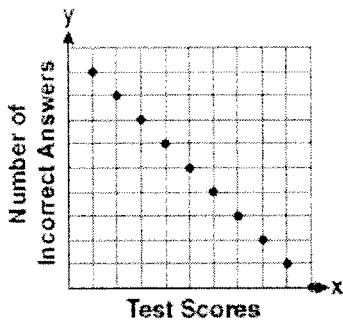
a must be greater than -1, and less than 0

so $\rightarrow y = -\frac{1}{2}|x|$
negative, so flip

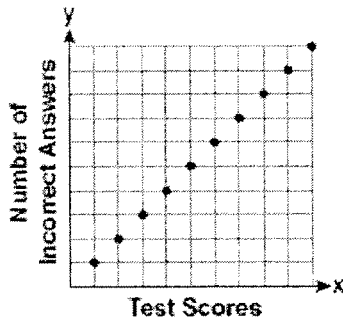
- 19 Which scatter plot shows the relationship between x and y if x represents a student score on a test and y represents the number of incorrect answers a student received on the same test?



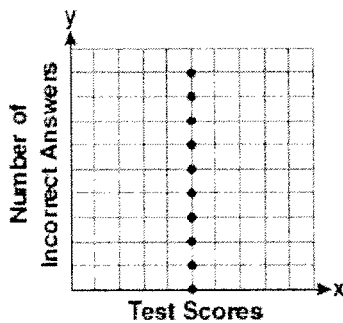
1)



2)



3)



4)

higher score
lower incorrect
negative

- 20 Which expression is equivalent to $3^3 \cdot 3^4$?

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

$3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 = 3^8$

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

- 1) $(-2, -1)$ True
- 2) $(-2, 1)$ False
- 3) $(-1, -2)$ False
- 4) $(1, 2)$ False

$4(-1) - 2(-2) = 0$ True

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

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

- 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) $(-1, -4)$

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

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

$6\sqrt{50}$
 $6 \cdot \sqrt{25} \cdot \sqrt{2}$
 $6 \cdot 5\sqrt{2} = 30\sqrt{2}$
 $30\sqrt{2} + 6\sqrt{2} = 36\sqrt{2}$

Surface area formula on back reference page

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

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

add

$$\frac{3x^2 + 1x^2}{x-2} = \frac{4x^2}{x-2}$$

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

- 1) $y = \frac{1}{2}x - 5$
- 2) $y = -\frac{1}{2}x + 4$
- 3) $y = -2x + 6$
- 4) $y = 2x + 8$

lines have same slope

$$\begin{array}{r} 2x - 4y = 16 \\ -2x = -2x \\ \hline -4y = -2x + 16 \\ y = x - 4 \end{array}$$

27 An example of an algebraic expression is

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

no equal sign or $>, <, \geq, \leq$

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
- $l=2$
 $w=3$
 $h=4$

Surface area formula

$$SA = 2lw + 2hw + 2lh$$

$$SA = 2(2)(3) + 2(4)(3) + 2(2)(4) = 52$$

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 - age does not cause
- 4) the number of classes taught in a school and the number of teachers employed

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.

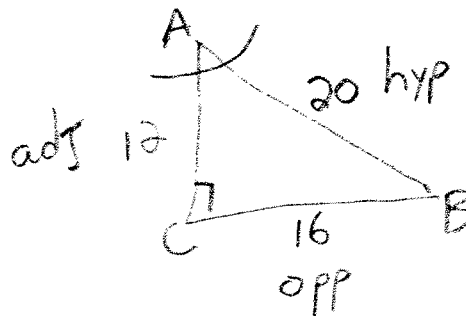
3 feet = 1 yard
 9 square feet = 1 square yard

$$\frac{144 \text{ sq ft}}{9 \text{ sq ft}} = 16 \text{ sq yd}$$

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

- 1) $\{-2, 3\}$
- 2) $\{-3, -2\}$
- 3) $\{-1, 6\}$
- 4) $\{-6, 1\}$

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



$\sin A = \frac{\text{opp}}{\text{hyp}}$

$\cos A = \frac{\text{adj}}{\text{hyp}}$

$\tan A = \frac{\text{opp}}{\text{adj}}$

pick any ratio in this case

$\tan^{-1} A = \frac{16}{12}$

$= 53.13$
 $= 53^\circ$

Inverse function because you need to find the angle.

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.

last page

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

last page

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 ✓

mean → average
add scores & then divide by 6
 $\frac{488}{6} = 81.3$
mean

median order first
72 78 (80 80) 85 93
middle scores are 80

Determine the mean of the student scores, to the nearest tenth. Determine the median of the student scores. Describe the effect on the mean and the median if Ms. Mosher adds 5 bonus points to each of the six students' scores.

mean + median will both increase.

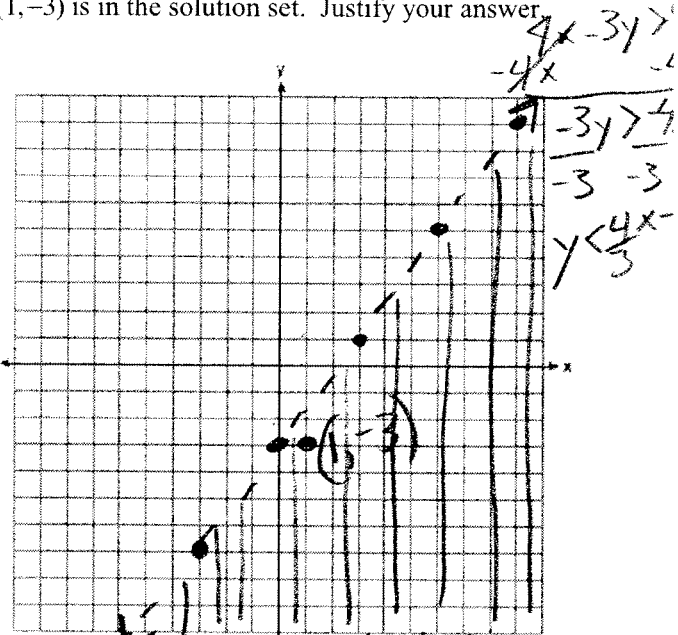
36 Using his ruler, Howell measured the sides of a rectangular prism to be 5 cm by 8 cm by 4 cm. The actual measurements are 5.3 cm by 8.2 cm by 4.1 cm. Find Howell's relative error in calculating the volume of the prism, to the nearest thousandth.

measured $5 \times 8 \times 4 = 160$
actual $5.3 \times 8.2 \times 4.1 = 178.186$
R. Error $\frac{178.186 - 160}{178.186} = .1020$
R.E. = $\frac{\text{difference}}{\text{actual}}$

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

last page

38 Graph the solution set for the inequality $4x - 3y > 9$ on the set of axes below. Determine if the point $(1, -3)$ is in the solution set. Justify your answer.



dotted line, shade below
 $(1, -3)$ is in the shaded region

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.]

33 Jazz concert $\frac{4}{36}$ front row .1111

Orchestra concert $\frac{3}{26}$ front row .11538

How likely to get a front row orchestra ticket

.11538 > .11111

34
$$\begin{array}{r} -6x^2 - x = 6 \\ \underline{-6} \end{array}$$

$$x^2 - x - 6 = 0$$

$$\begin{array}{l} a = 1 \\ b = -1 \\ c = -6 \end{array}$$

$$-1 + 6 = 5$$

$$+2 + -3 = -1$$

$$(x+2)(x-3) = 0$$

$$x+2=0$$

$$x-3=0$$

$$x = -2$$

$$x = 3$$