Albert Einstein High School
Summer Task Cover Sheet

NAME: _____ PERIOD: ____

60

AP Statistics Summer Review Packet

Teacher(s): Ryan Oben

Teacher(s) Contact Information:
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Course:

- ✓ **Purpose of the Summer Assignment:**
  In general, AP Statistics includes applied concepts rather than pure mathematics in much of the course. That being said, a basic level of algebraic proficiency is expected. This summer packet will test your knowledge of some of the expected mathematical skills and help you identify your strengths and weaknesses. While most students will find the majority of this summer packet relatively easy, do not be lulled into a false sense of security by the simplicity of this packet. AP Statistics is challenging. ☺

- ✓ **Relationship between Summer Task and 1st Quarter Objectives:**
  Many of these topics will not be directly assessed, but are instead requisite skills to navigate this course.

- ✓ **Description of the Task:**
  A range of topics from Algebra 1, Geometry, and Algebra 2 are included within this packet.

- ✓ **Supportive Resources:**
  Go to http://www.montgomeryschoolsmd.org/ for review materials and formula sheets for Algebra 1, Geometry, and Algebra 2 course work.

Grading:

- ✓ **DUE DATE:** First day of school (Tuesday, September 4th, 2018).

- ✓ **DEADLINE:** Friday, September 7th, 2018

- ✓ **Grading Category:** This will be left to teacher discretion.

- ✓ **Points:** 60 points

- ✓ **Extent to which the summer task counts towards the marking period grade:**
  This will be left to teacher discretion and directly depends on the number of points earned throughout the quarter within the corresponding category.

- ✓ **Grading Criteria and Rubric:** These problems will be checked for accuracy. Students will be asked to transcribe their answers onto a scantron sheet in order to be scored.

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INSTRUCTIONS:

Complete all sections of this packet and bring it in with you to turn in on the first day of school.

You must complete this summer packet without assistance from any outside source and **without a calculator**. You may use any spare space in this packet for work but be sure that your answers are all clearly marked (upon your return to school you will be asked to copy your answers onto a scantron). After this summer packet has been scored, the answers will be made available to you.

HONESTY CLAUSE: Read the integrity agreement below, then sign and date.

"I promise on my honor I have not given or received any assistance on this assignment and that the work presented herein is entirely my own. I understand that violation of this agreement will result in no credit on this assignment."

SIGNATURE: _____ DATE: _____

Albert Einstein High School

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PART I: PERCENT, DECIMAL, PROPORTION:

(A) Let's see if you can convert between decimals and percents…

1) The percentage 3% is equivalent to what decimal:
(A) 30 (B) 3 (C) 0.3 (D) 0.03 (E) 0.003

2) The decimal 0.5 is equivalent to what percentage:
(A) 50% (B) 5% (C) 0.5% (D) 0.05% (E) 0.005%

3) 16% is equivalent to which of the following:
(A) 0.16% (B) 0.016% (C) 0.16 (D) 0.016 (E) 0.0016

(B) Let's see if you can convert between proportions and percents…

4) Statistics students sometimes reason as follows: "Since $\frac{1}{10}$ is 10%, it must be true that $\frac{1}{4}$ is 4%." Is this reasoning correct?

(A) No, because $\frac{1}{10}$ is not 10%.

(B) No, because, although $\frac{1}{10}$ is 10%, this only works with the number 10.

(C) Yes, this works with 4, although there may be other numbers it won't work with.

(D) Yes, and this will work with any number.

(E) None of the above are completely accurate.

(C) Let's see if you can compare decimals.

5) Choose the correct words (A: Less than, B: Equal to, C: Greater than) to complete each sentence:

0.04 is _____ 0.01
(A) Less than (B) Equal to (C) Greater than

6) Choose the correct words to complete the following sentence:

0.008 is _____ 0.05
(A) Less than (B) Equal to (C) Greater than

7) Choose the correct words to complete the following sentence:

0 is _____ 0.01
(A) Less than (B) Equal to (C) Greater than

(D) Let's see if you can interpret "proportion" terminology:

Suppose there are 50 people in the room, of which 13 are male. Suppose 7 males in the room are wearing a baseball hat.

8) The proportion of males in the room is:
(A) $\frac{1}{13}$ (B) $\frac{13}{50}$ (C) $\frac{50}{13}$ (D) $\frac{13}{100}$ (E) $\frac{6}{50}$

9) The proportion of males that are wearing a baseball hat is:
(A) $\frac{1}{7}$ (B) $\frac{13}{7}$ (C) $\frac{7}{13}$ (D) $\frac{7}{50}$ (E) $\frac{7}{100}$

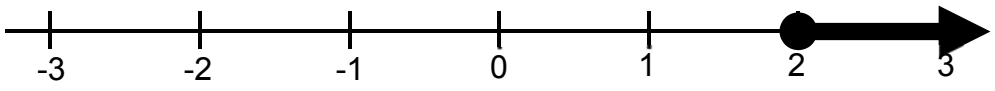
10) Out of the whole room, the proportion of baseball-hat-wearing males is:
(A) $\frac{1}{7}$ (B) $\frac{13}{7}$ (C) $\frac{7}{13}$ (D) $\frac{7}{50}$ (E) $\frac{7}{100}$

PART II: ALGEBRAIC NOTATION

(A) Let's see if you can read inequality notation:

11) The expression "X $\leq$ 4" means is read as "X is less than or equal to 4" but can also be read as…
(A) X is greater than 4.
(B) X is at least 4.
(C) X is less than 4.
(D) X is no more than 4.
(E) X is equal to 4.

12) The set of X values represented by the darkened portion of the number line shown below is symbolized by what expression:



(A) X < 2
(B) X $\leq$ 2
(C) X > 2
(D) X $\geq$ 2
(E) X = 3

13) The expression "0 < X < 1" means:
(A) X must be greater than 1.
(B) X must be negative.
(C) X can be greater than 1, or negative.
(D) X must be between 0 and 1.
(E) X is either 0 or 1.

(B) Let's see if you can read functional notation:

14) If P(x) is a function, then the expression "P(x) = y" is properly interpreted to mean:
(A) X represents the input and y represents the output.
(B) X represents the output and y represents the input.
(C) X is multiplied by P to get y.
(D) Both x and y are the output.
(E) None of the above are true.

15) If P(x) is a function, then the expression "P(3) = 0.01" is shorthand for:
(A) When the input is 3, the output is 0.01.
(B) When the input is 0.01, the output is 3.
(C) x can equal 3 or 0.01.
(D) P(x) can equal 3 or 0.01.
(E) None of the above are true.

(C) Let's see if you can interpret summation notation:

16) The expression $\sum_{i=1}^{5}(\frac{i}{9})$ is shorthand for:

(A) The following sum of two terms: $\frac{1}{9}+\frac{5}{9}$

(B) The following sum of three terms: $\frac{1}{9}+\frac{2}{9}+\frac{5}{9}$

(C) The following sum of five terms: $\frac{1}{9}+\frac{1}{9}+\frac{1}{9}+\frac{1}{9}+\frac{1}{9}$

(D) The following sum of five terms: $\frac{1}{9}+\frac{2}{9}+\frac{3}{9}+\frac{4}{9}+\frac{5}{9}$

(E) The following sum of five terms: $\frac{5}{9}+\frac{5}{9}+\frac{5}{9}+\frac{5}{9}+\frac{5}{9}$

17) Supposing that: x_1 stands for 6,
x_2 stands for 8,
x_3 stands for 15,
x_4 stands for 7,

then the expression $\sum_{i=1}^{4}(x_i - 9)$ is shorthand for:

(A) The following quantity: (1 + 2 + 3 + 4) - 9
(B) The following quantity: (6 + 8 + 15 + 7) - 9
(C) The following quantity: (1 – 9) + (2 – 9) + (3 – 9) + (4 – 9)
(D) The following quantity: (6 – 9) + (8 – 9) + (15 – 9) + (7 – 9)
(E) The following quantity: (x – 9) + (x – 9) + (x – 9) + (x – 9)

(C) Let's see if you can interpret summation notation: (continued…)

18) Supposing that: x_1 stands for 6,
x_2 stands for 8,
x_3 stands for 15,
x_4 stands for 7,

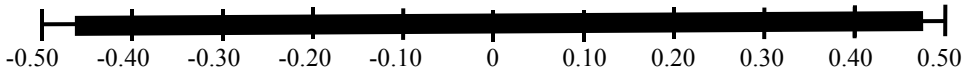
then the expression $\sum_{i=1}^{4}(x_i)^2$ is shorthand for:

(A) The following quantity: $(1 + 2 + 3 + 4)^2$
(B) The following quantity: $(6 + 8 + 15 + 7)^2$
(C) The following quantity: $(1)^2 + (2)^2 + (3)^2 + (4)^2$
(D) The following quantity: $(6)^2 + (8)^2 + (15)^2 + (7)^2$
(E) Since (B) and (D) represent the same quantity, they are both correct.

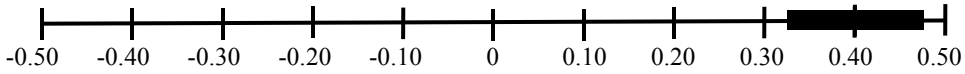
(D) Let's see if you understand "plus or minus" notation:

19) Suppose there is an interval on the x-axis. If the expression 0.40 ± 0.07 expresses the interval's endpoints, then the interval is:

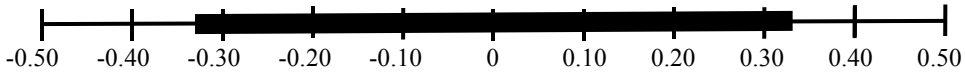
(A) The interval whose left-hand endpoint is at negative 0.47 and whose right-hand endpoint is at positive 0.47, as represented in the following figure:



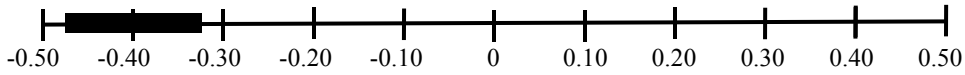
(B) The interval whose left-hand endpoint is at positive 0.33 and whose right-hand endpoint is at positive 0.47, as represented in the following figure:



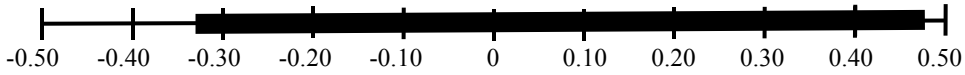
(C) The interval whose left-hand endpoint is at negative 0.33 and whose right-hand endpoint is at positive 0.33, as represented in the following figure:



(D) The interval whose left-hand endpoint is at negative 0.47 and whose right-hand endpoint is at negative 0.33, as represented in the following figure:



(E) The interval whose left-hand endpoint is at negative 0.33 and whose right-hand endpoint is at positive 0.47, as represented in the following figure:



PART III: ALGEBRA MANIPULATIONS AND UNDERSTANDING.

(A) Let's see if you can perform basic algebraic manipulations:

20) Solve for the variable b in the following equation: $a = \frac{b-c}{d}$

(A) b = ad + c

(B) b = ad – c

(C) b = (a – c)d

(D) b = (a + c)d

(E) b = a + d + c

21) Solve for the variable d in the following equation: $a = b * \frac{c}{\sqrt{d}}$

(A) d = $\sqrt{\frac{bc}{a}}$

(B) d = $\frac{b^2c^2}{a}$

(C) d = $\frac{bc}{a^2}$

(D) d = $\frac{bc}{a}$

(E) d = $\left(\frac{bc}{a}\right)^2$

22) Suppose the number of people, y, on a bus, as a function of time, x, (in minutes), is given the equation y = 4 + 2x. The number of people on the bus after 20 minutes would be obtained by:

(A) Substituting 20 for y, and thus finding x = 44 (people).
(B) Substituting 20 for y, and thus finding x = 8 (people).
(C) Substituting 20 for x, and thus finding y = 44 (people).
(D) Substituting 20 for x, and thus finding y = 8 (people).
(E) No substitution is needed; the answer would be 20.

23) Suppose the number of people, y, on a bus, as a function of time, x, (in minutes), is given by the equation y = 4 + 2x. The time when there were 20 people on the bus would be obtained by:

(A) Substituting 20 for y, and thus find x = 44 (minutes).
(B) Substituting 20 for y, and thus find x = 8 (minutes).
(C) Substituting 20 for x, and thus find y = 44 (minutes).
(D) Substituting 20 for x, and thus find y = 8 (minutes).
(E) No substitution is needed; the answer would be 20.

(B) Let's see if you understand order-of-operations on a calculator:

24) Suppose I want to use a calculator to evaluate the expression $\frac{150-100}{25}$. If I type: **"150 – 100 / 25"**, Will I get the intended answer? Why or why not? How would you fix it?

(A) Yes. The calculator will divide first, then subtract which is correct.
(B) Yes. The calculator will subtract first, then divide which is correct.
(C) No. The calculator will divide first; parentheses must be placed around "150-100".
(D) No. The calculator will subtract first; parentheses must be placed around "150-100".
(E) None of the above are entirely correct.

25) Suppose I want to use a calculator to evaluate the expression (.37)(1-.37). If I type: **"0.37*1-0.37"**, Will I get the intended answer? Why or why not? How would you fix it?

(A) Yes. The calculator will multiple first, then subtract which is correct.
(B) Yes. The calculator will subtract first, then multiply which is correct.
(C) No. The calculator will multiple first; parentheses must be placed around "1-0.37".
(D) No. The calculator will subtract first; parentheses must be placed around "1-0.37".
(E) None of the above are entirely correct.

26) Suppose I want to use a calculator to evaluate the expression $\sqrt{\frac{(.2)(.8)}{50}}$. If I type: **"√(0.2)(0.8)/50"**, Will I get the intended answer? Why or why not?

(A) Yes. The calculator will multiple and divide first, then take the square root which is correct.
(B) Yes. The calculator will take the square root first, then multiply and divide which is correct.
(C) No. The square root is only on (0.2); brackets must be placed around "(0.2)(0.8)/50".
(D) No. The square root is only on (0.2)(0.8); brackets must be placed around "(0.2)(0.8)/50".
(E) None of the above are entirely correct.

27) Suppose I want to use a calculator to evaluate the expression $\frac{2}{5/10}$. If I type: **"2/5/10"**, Will I get the intended answer? Why or why not?

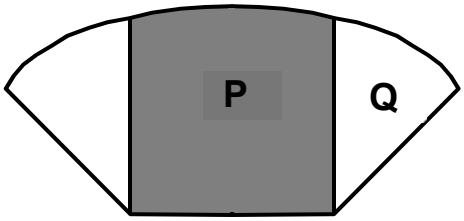
(A) Yes. The calculator will divide in the intended order.
(B) No. The calculator will divide 2 by 5 but not by 10.
(C) No. The calculator will divide improperly; parentheses must be placed around "5/10".
(D) No. The calculator will divide improperly; parentheses must be placed around "2/5".
(E) None of the above are entirely correct.

PART IV: GEOMETRIC AND GRAPHICAL UNDERSTANDING.

(A) Let's see if you can perform elementary spatial reasoning:

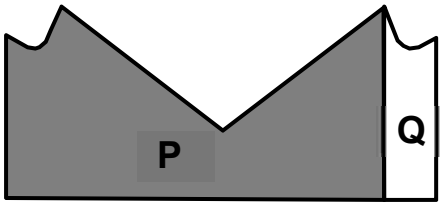
28) Suppose the following shape is perfectly symmetric, left-to-right, and suppose the total area of the entire shape is 100 units^2. If the area of the central, shaded portion labeled "P" is 75 units, what calculation gives the area of <u>just</u> the right-side portion labeled "Q"?

(A) Q = 100 + 75
(B) Q = 100 – 75
(C) Q = 75 – 100
(D) Q = 2(100 – 75)
(E) Q = ½(100 – 75)



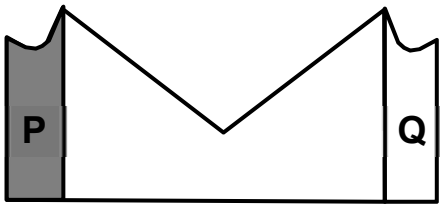
29) Suppose the following shape is perfectly symmetric, left-to-right, and suppose the total area of the entire shape is 100 units^2. If the area of the large shaded portion labeled "P" is 95 units, what calculation gives the area of <u>just</u> the right-side portion labeled "Q"?

(A) Q = 100 + 95
(B) Q = 100 – 95
(C) Q = 95 – 100
(D) Q = 2(100 – 95)
(E) Q = ½(100 – 95)



30) Suppose the following shape is perfectly symmetric, left-to-right, and suppose the total area of the entire shape is 100 units^2. If the thin, left-side shaded portion labeled "P" in the following picture is 5 units^2, which of the following gives the area of just the thin <u>right</u>-side portion labeled "Q"?

(A) Q = 100 – 5
(B) Q = 50 – 5
(C) Q = 2(100 – 5)
(D) Q = 200 – 5
(E) Q = 5



(B) Let's see if you remember the coordinate system:

31) In the standard 2-dimensional coordinate system, which of the following is typically true?

(A) The <u>horizontal</u> axis is "x", and the <u>vertical</u> axis is "y".
(B) The <u>vertical</u> axis is "x", and the <u>horizontal</u> axis is "y".
(C) <u>Both</u> axes (horizontal and vertical) are "x".
(D) <u>Both</u> axes (horizontal and vertical) are "y".
(E) None of the above are entirely true.

(B) Let's see if you remember the coordinate system: (continued…)

32) In the standard 2-dimensional coordinate system, which of the following is generally true?
(A) The horizontal variable is the "output", and the vertical variable is the "input".
(B) The vertical variable is the "output", and the horizontal variable is the "input".
(C) Both variables (horizontal and vertical) are "output".
(D) Both variables (horizontal and vertical) are "input".
(E) None of the above are entirely true.

33) In the standard 2-dimensional coordinate system, the point notation "(2, 5)" would represent:
(A) A single point 2 units to the right and 5 units above the origin.
(B) A single point 5 units to the right and 2 units above the origin.
(C) Two points, one 2 units to the right of the origin and the other 5 units above the origin.
(D) Two points, one 5 units to the right of the origin and the other 2 units above the origin.
(E) None of the above are entirely true.

PART V: STRAIGHT LINES.

(A) Let's see if you understand slope, graphically:

34) A straight line whose graph *rises* from left to right:
(A) Must have a negative slope.
(B) Must have a positive slope.
(C) Must have a slope of zero.
(D) Must have a slope greater than its y-intercept.
(E) Must have a slope less than its y-intercept.

35) A straight line whose graph *falls* from left to right:
(A) Must have a negative slope.
(B) Must have a positive slope.
(C) Must have a slope of zero.
(D) Must have a slope greater than its y-intercept.
(E) Must have a slope less than its y-intercept.

36) There are two lines, the first having slope of 20, and the second having slope of 0.02. Then:
(A) The graph of the first line *rises* from left to right, but the graph of the second line *falls*.
(B) The graph of both lines rise from left to right, but the first line is steeper than the second.
(C) The graph of both lines rise from left to right, but the second line is steeper than the first.
(D) The graph of both lines fall from left to right, but the first line is steeper than the second.
(E) The graph of both lines fall from left to right, but the second line is steeper than the first.

(B) Let's see if you understand slope, conceptually:

37) Suppose I record the number of people in a bus over several minutes, so that the output, y, "number of people" is a linear function of the input, x, "time" (in minutes); and suppose the slope of the line is positive. Then:
(A) As each minute goes by, the number of people decreases.
(B) As each minute goes by, the number of people increases.
(C) As each minute goes by, the number of people does not change.
(D) As each person gets on the bus, the number of minutes goes up.
(E) As each person gets on the bus, the number of minutes goes down.

(B) Let's see if you understand slope, conceptually: (continued…)

38) Suppose I place books on a scale, so that the output, y, "weight" (in pounds) is a linear function of the input, x, "number of books"; and suppose the slope of the line is 0.1. Then:
(A) As each one book is added, the weight *increases* by ten pounds.
(B) As each one book is added, the weight *increases* by only a tenth of a pound.
(C) As each one book is added, the weight *increases* by one pound.
(D) As more books are added, the weight *decreases*.
(E) None of the above are entirely true.

39) Suppose I place books on a scale, so that the output, y, "weight" (in pounds) is a linear function of the input, x, "number of books"; and suppose the slope of the line is 10. Then:
(A) As each one book is added, the weight *increases* by ten pounds.
(B) For every ten books that are added, the weight *increases* by only one pound.
(C) For every ten books that are added, the weight *increases* by ten pounds.
(D) As more books are added, the weight *decreases*.
(E) None of the above are entirely true.

40) Suppose I record the number of people in a bus over several minutes, so that the output, y, "number of people" is a linear function of the input, x, "time" (in minutes). A slope of zero would mean:
(A) As each minute goes by, the number of people on the bus *increases*.
(B) As each minute goes by, the number of people on the bus *decreases*.
(C) As each minute goes by, the number of people on the bus remains constant.
(D) As each minute goes by, the number of people on the bus goes to zero.
(E) None of the above are entirely true.

(C) Let's see if you understand y-intercept, graphically:

41) A straight line with y-intercept of 5:
(A) Passes through the point where x=0 and y=0.
(B) Passes through the point where x=5 and y=0.
(C) Passes through the point where x=0 and y=5.
(D) Passes through the point where x=5 and y=5.
(E) Passes through the point where x=-5 and y=5.

42) A straight line with y-intercept of 4:
(A) Must cross the horizontal axis 4 units to the left of the origin.
(B) Must cross the horizontal axis 4 units to the right of the origin.
(C) Must cross the vertical axis 4 units above the origin.
(D) Must cross the vertical axis 4 units below the origin.
(E) Must pass through the origin.

(D) Let's see if you understand y-intercept, conceptually:

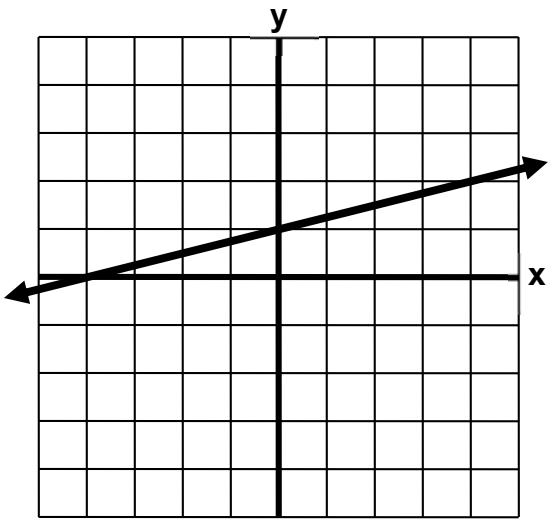
43) Suppose I record the number of people in a bus over several minutes, so that the output, y, "number of people" is a linear function of the input, x, "time" (in minutes). A y-intercept of 5 would mean:
(A) When I began, my watch read "5 minutes".
(B) When I began, there were 5 people on the bus.
(C) As each minute goes by, the number of people increases by 5.
(D) As each minute goes by, the number of people decreases by 5.
(E) None of the above are entirely true.

(D) Let's see if you understand y-intercept, conceptually: (continued…)

44) Suppose I place books on a scale, so that the output, y, "weight" (in pounds) is a linear function of the input, x, "number of books". If the y-intercept is 3, this means:
- (A) As each book is added, the weight increases by 3 pounds.
- (B) As each book is added, the weight decreases by 3 pounds.
- (C) With no books, the scale reads "3 pounds".
- (D) With 3 books, the scale reads "0 pounds".
- (E) None of the above are entirely true.

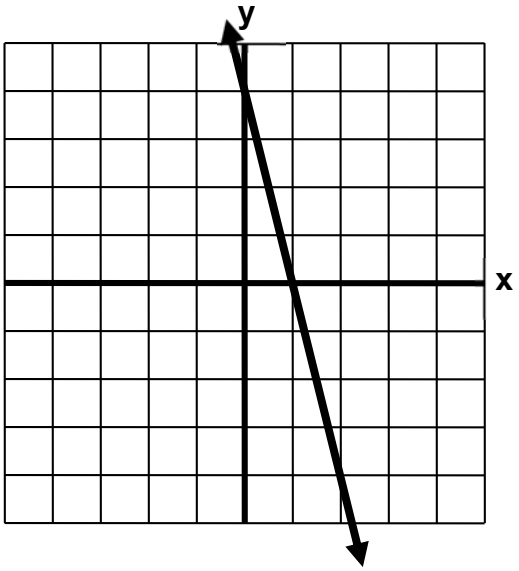
(E) Let's see if you understand straight line graphs:

45) Find the slope of the line shown to the right.
- (A) -4
- (B) -0.25
- (C) 0.25
- (D) 4
- (E) None of the above are accurate.



46) Find the y-intercept of the line shown to the right.
- (A) x = -4
- (B) y = -4
- (C) x = 1
- (D) y = 1
- (E) None of the above are accurate.

47) Find the slope of the line shown to the right.
- (A) -4
- (B) -0.25
- (C) 0.25
- (D) 4
- (E) None of the above are accurate.

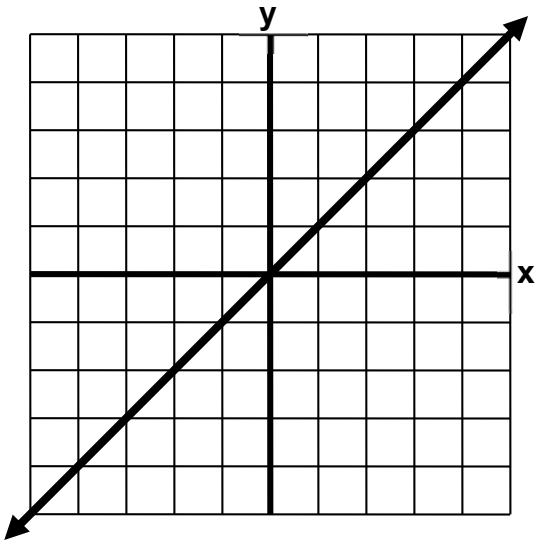


48) Find the y-intercept of the line shown to the right.
- (A) x = 4
- (B) y = 4
- (C) x = 1
- (D) y = 1
- (E) None of the above are accurate.

(E) Let's see if you understand straight line graphs: (continued…)

49) Find the slope of the line shown to the right.

(A) 1
(B) -1
(C) 0
(D) Undefined
(E) None of the above are accurate.

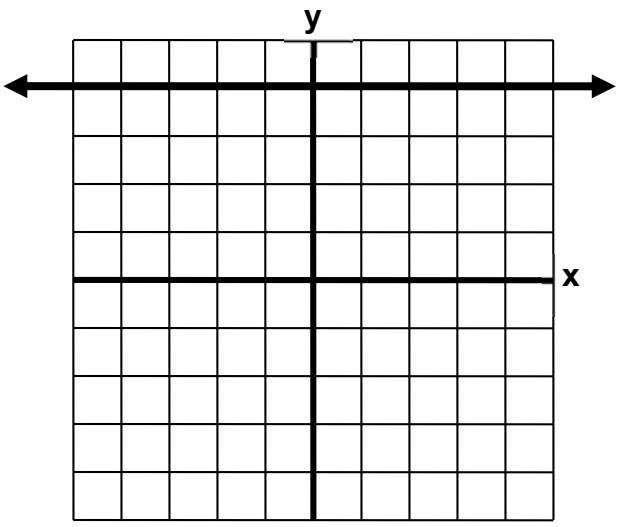


50) Find the y-intercept of the line shown to the right.

(A) x = 0
(B) y = 0
(C) x = 1
(D) y = 1
(E) None of the above are accurate.

51) Find the slope of the line shown to the right.

(A) 1
(B) -1
(C) 0
(D) Undefined
(E) None of the above are accurate.



52) Find the y-intercept of the line shown to the right.

(A) x = 0
(B) y = 0
(C) x = 4
(D) y = 4
(E) None of the above are accurate.

(F) Let's see if you understand straight line equations:

53) In algebra, straight lines are often written in the form "y = slope(x) + intercept". But in statistics, the x term is written last: "y = intercept + slope(x)". Using the statistics form, the equation of a line with slope 3 and y-intercept of 4 is:

(A) y = 3 + 4x
(B) y = 3 + 4
(C) y = 4 + 3
(D) y = 4 + 3x
(E) y = 3(4x)

(F) Let's see if you understand straight line equations: (continued…)

54) In algebra, straight lines are often written in the form "y = slope(x) + intercept". But in statistics, the x term is written last: "y = intercept + slope(x)". In the equation y = -2 + 0.75x, the slope is:
(A) -2
(B) 2
(C) 0.75
(D) x
(E) y

55) Suppose I sell lollipops, so that the amount of money, y, that I have (in dollars) as a function of lollipops sold, x, is given by the linear equation y = -15 + 0.75x. The meaning of the 0.75 is:
(A) It is the y value when x is zero; i.e. the amount of money I started with.
(B) My asking price for selling a lollipop is 75 cents.
(C) For every lollipop I sell, I lose 75 cents.
(D) It is how many lollipops I started with; i.e. I started with 75 lollipops.
(E) None of the above is entirely accurate.

56) Suppose I sell lollipops, so that the amount of money, y, that I have (in dollars) as a function of lollipops sold, x, is given by the linear equation y = -15 + 0.75x. The meaning of the -15 is:
(A) For every lollipop I sell, I lose 15 dollars.
(B) For every lollipop I sell, I earn 15 dollars.
(C) When I began (when I had sold no lollipops), I was 15 dollars in dept.
(D) When I began (when I had sold no lollipops), I had a profit of 15 dollars.
(E) None of the above is entirely accurate.

57) Suppose I sell lollipops, so that the amount of money, y, that I have (in dollars) as a function of lollipops sold, x, is given by the linear equation y = -15 + 0.75x. The meaning of the x-intercept is:
(A) How much money I lose each time I sell a lollipop.
(B) How much money I earn each time I sell a lollipop.
(C) How much debt I was in before I started selling any lollipops.
(D) The number of lollipops I must sell in order to cancel my debt.
(E) None of the above is entirely accurate.

58) Suppose I sell lollipops, so that the amount of money, y, that I have (in dollars) as a function of lollipops sold, x, is given by the linear equation y = -15 + 0.75x. Find the x-intercept.
(A) x = 15
(B) x = 20
(C) x = 0.75
(D) x = 15
(E) x = 11.25

59) I took AP Statistics because…
(A) I am interested in this course and what is has to offer.
(B) My counselor/teacher/parent suggested I should.
(C) I preferred to not take pre-calculus or IB-math studies.
(D) I preferred to not take calculus AB/BC or HL.
(E) Other (briefly explain): _____

60) I think I got ___ out of 60 questions correct in this packet (#59 and #60 included)…
(A) 0 – 20 (B) 21-40 (C) 41-50 (D) 51-55 (E) 56-60