Integrated Algebra Regents Exam 0812
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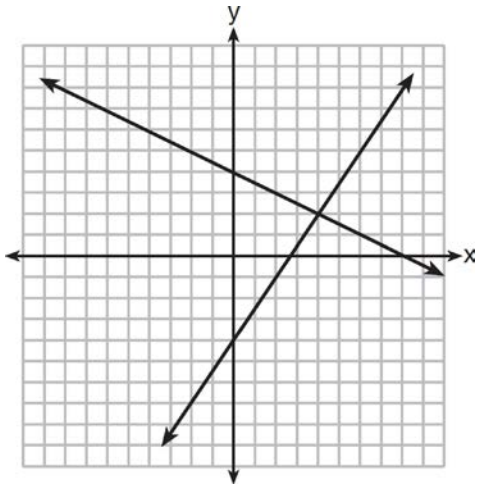
0812ia

1 A system of equations is graphed on the set of axes below.

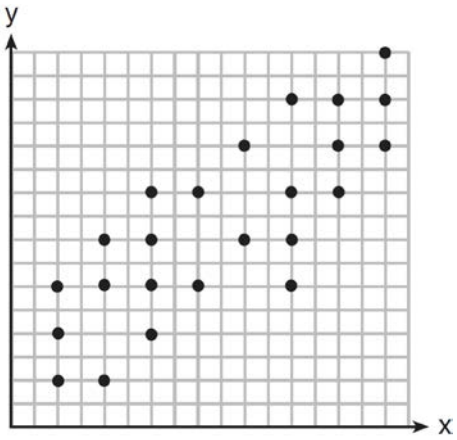


The solution of this system is
1) $(0, 4)$
2) $(2, 4)$
3) $(4, 2)$
4) $(8, 0)$

2 A cell phone can receive 120 messages per minute. At this rate, how many messages can the phone receive in 150 seconds?
1) 48
2) 75
3) 300
4) 18,000

3 The value of y in the equation $0.06y + 200 = 0.03y + 350$ is
1) 500
2) $1,666.\overline{6}$
3) 5,000
4) $18,333.\overline{3}$

4 The scatter plot shown below represents a relationship between x and y.



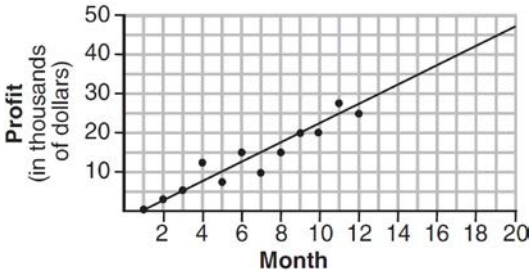
This type of relationship is
1) a positive correlation
2) a negative correlation
3) a zero correlation
4) not able to be determined

5 The sum of $3x^2 + 5x - 6$ and $-x^2 + 3x + 9$ is
1) $2x^2 + 8x - 15$
2) $2x^2 + 8x + 3$
3) $2x^4 + 8x^2 + 3$
4) $4x^2 + 2x - 15$

6 Jason's part-time job pays him $155 a week. If he has already saved $375, what is the minimum number of weeks he needs to work in order to have enough money to buy a dirt bike for $900?
1) 8
2) 9
3) 3
4) 4

7 The expression $9a^2 - 64b^2$ is equivalent to
1) $(9a - 8b)(a + 8b)$
2) $(9a - 8b)(a - 8b)$
3) $(3a - 8b)(3a + 8b)$
4) $(3a - 8b)(3a - 8b)$

8 The scatter plot below shows the profit, by month, for a new company for the first year of operation. Kate drew a line of best fit, as shown in the diagram.



Using this line, what is the best estimate for profit in the 18th month?
1) $35,000
2) $37,750
3) $42,500
4) $45,000

9 Which statement illustrates the additive identity property?
1) $6 + 0 = 6$
2) $-6 + 6 = 0$
3) $4(6 + 3) = 4(6) + 4(3)$
4) $(4 + 6) + 3 = 4 + (6 + 3)$

10 Peter walked 8,900 feet from home to school.

1 mile = 5,280 feet

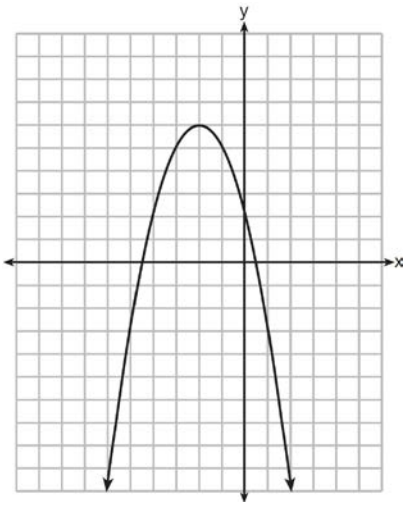
How far, to the *nearest tenth of a mile*, did he walk?
1) 0.5
2) 0.6
3) 1.6
4) 1.7

11 Is the equation $A = 21000(1 - 0.12)^t$ a model of exponential growth or exponential decay, and what is the rate (percent) of change per time period?
1) exponential growth and 12%
2) exponential growth and 88%
3) exponential decay and 12%
4) exponential decay and 88%

12 The length of a rectangle is 15 and its width is w. The perimeter of the rectangle is, *at most*, 50. Which inequality can be used to find the longest possible width?
1) $30 + 2w < 50$
2) $30 + 2w \leq 50$
3) $30 + 2w > 50$
4) $30 + 2w \geq 50$

13 Craig sees an advertisement for a car in a newspaper. Which information would *not* be classified as quantitative?
1) the cost of the car
2) the car's mileage
3) the model of the car
4) the weight of the car

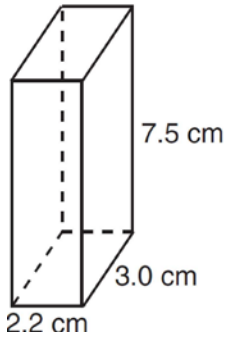
14 What are the coordinates of the vertex and the equation of the axis of symmetry of the parabola shown in the graph below?



1) $(0, 2)$ and $y = 2$
2) $(0, 2)$ and $x = 2$
3) $(-2, 6)$ and $y = -2$
4) $(-2, 6)$ and $x = -2$

15 A correct translation of "six less than twice the value of x" is
1) $2x < 6$
2) $2x - 6$
3) $6 < 2x$
4) $6 - 2x$

16 The rectangular prism shown below has a length of 3.0 cm, a width of 2.2 cm, and a height of 7.5 cm.



What is the surface area, in square centimeters?
1) 45.6
2) 49.5
3) 78.0
4) 91.2

17 Which set of coordinates is a solution of the equation $2x - y = 11$?
1) $(-6, 1)$
2) $(-1, 9)$
3) $(0, 11)$
4) $(2, -7)$

18 The graph of a parabola is represented by the equation $y = ax^2$ where a is a positive integer. If a is multiplied by 2, the new parabola will become
1) narrower and open downward
2) narrower and open upward
3) wider and open downward
4) wider and open upward

19 Which equation represents a line that has a slope of $\frac{3}{4}$ and passes through the point $(2, 1)$?
1) $3y = 4x - 5$
2) $3y = 4x + 2$
3) $4y = 3x - 2$
4) $4y = 3x + 5$

20 What is the value of $\left| \frac{4(-6) + 18}{4!} \right|$?
1) $\frac{1}{4}$
2) $-\frac{1}{4}$
3) 12
4) -12

21 Given: $A = \{1, 3, 5, 7, 9\}$
$B = \{2, 4, 6, 8, 10\}$
$C = \{2, 3, 5, 7\}$
$D = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
What statement is *false*?
1) $A \cup B \cup C = D$
2) $A \cap B \cap C = \{\}$
3) $A \cup C = \{1, 2, 3, 5, 7\}$
4) $A \cap C = \{3, 5, 7\}$

22 Which expression is equivalent to $\frac{2x^6 - 18x^4 + 2x^2}{2x^2}$?
1) $x^3 - 9x^2$
2) $x^4 - 9x^2$
3) $x^3 - 9x^2 + 1$`
4) $x^4 - 9x^2 + 1$

23 In a given linear equation, the value of the independent variable decreases at a constant rate while the value of the dependent variable increases at a constant rate. The slope of this line is
1) positive
2) negative
3) zero
4) undefined

24 The volume of a cylindrical can in 32π cubic inches. If the height of the can is 2 inches, what is its radius, in inches?
1) 8
2) 2
3) 16
4) 4

25 The expression $\frac{14+x}{x^2-4}$ is undefined when x is

1) -14, only
2) 2, only
3) -2 or 2
4) -14, -2, or 2

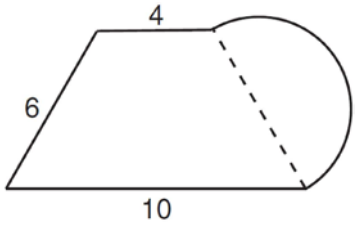
26 What is the solution of $\frac{2}{x+1} = \frac{x+1}{2}$?

1) -1 and -3
2) -1 and 3
3) 1 and -3
4) 1 and 3

27 The total score in a football game was 72 points. The winning team scored 12 points more than the losing team. How many points did the winning team score?

1) 30
2) 42
3) 54
4) 60

28 What is the perimeter of the figure shown below, which consists of an isosceles trapezoid and a semicircle?



1) $20+3\pi$
2) $20+6\pi$
3) $26+3\pi$
4) $26+6\pi$

29 The probability it will rain tomorrow is $\frac{1}{2}$. The probability that our team will win tomorrow's basketball game is $\frac{3}{5}$. Which expression represents the probability that it will rain and that our team will *not* win the game?

1) $\frac{1}{2}+\frac{3}{5}$
2) $\frac{1}{2}+\frac{2}{5}$
3) $\frac{1}{2}\times\frac{3}{5}$
4) $\frac{1}{2}\times\frac{2}{5}$

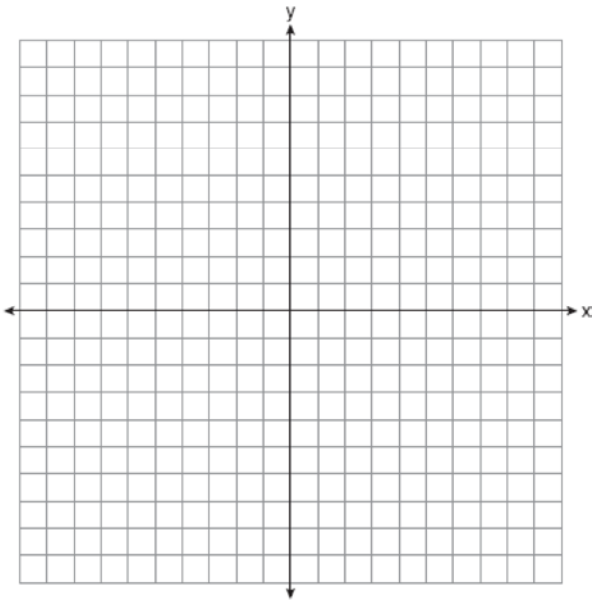
30 The formula for the volume of a pyramid is $V=\frac{1}{3}Bh$. What is h expressed in terms of B and V?

1) $h=\frac{1}{3}VB$
2) $h=\frac{V}{3B}$
3) $h=\frac{3V}{B}$
4) $h=3VB$

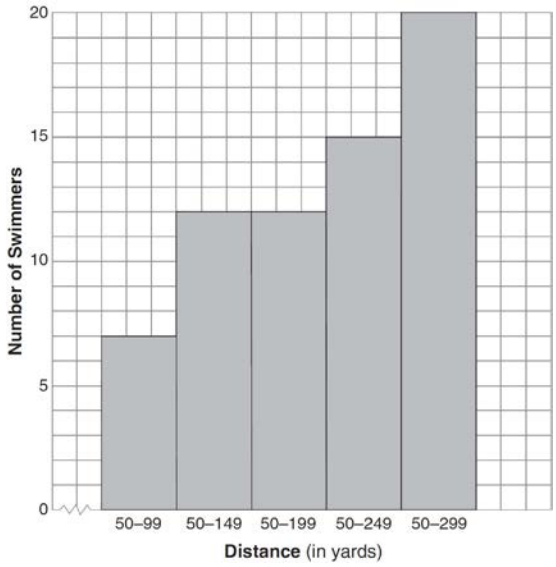
31 State the value of the expression $\frac{(4.1\times10^2)(2.4\times10^3)}{(1.5\times10^7)}$ in scientific notation.

32 Express the product of $\frac{x+2}{2}$ and $\frac{4x+20}{x^2+6x+8}$ in simplest form.

33 On the set of axes below, graph $y = 3^x$ over the interval $-1 \le x \le 2$.



34 The following cumulative frequency histogram shows the distances swimmers completed in a recent swim test.



Based on the cumulative frequency histogram, determine the number of swimmers who swam between 200 and 249 yards. Determine the number of swimmers who swam between 150 and 199 yards. Determine the number of swimmers who took the swim test.

35 Ashley measured the dimensions of a rectangular prism to be 6 cm by 10 cm by 1.5 cm. The actual dimensions are 5.9 cm by 10.3 cm by 1.7 cm. Determine the relative error, to the *nearest thousandth*, in calculating the volume of the prism.

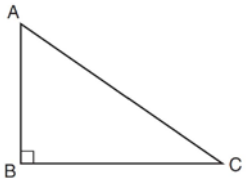
36 Solve the following system of equations algebraically for *all* values of x and y.

$$y = x^2 + 2x - 8$$

$$y = 2x + 1$$

37 A company is running a contest and offering a first, second, and third prize. First prize is a choice of a car or $15,000 cash. Second prize is a choice of a motorbike, a trip to New York City, or $2,000 cash. Third prize is a choice of a television or $500 cash. If each prize is equally likely to be selected, list the sample space or draw a tree diagram of *all* possible different outcomes of first, second, and third prizes. Determine the number of ways that *all* three prizes selected could be cash. Determine the number of ways that *none* of the three prizes selected could be cash.

38 In right triangle ABC shown below, $AC = 29$ inches, $AB = 17$ inches, and $m\angle ABC = 90$. Find the number of degrees in the measure of angle BAC, to the *nearest degree*.



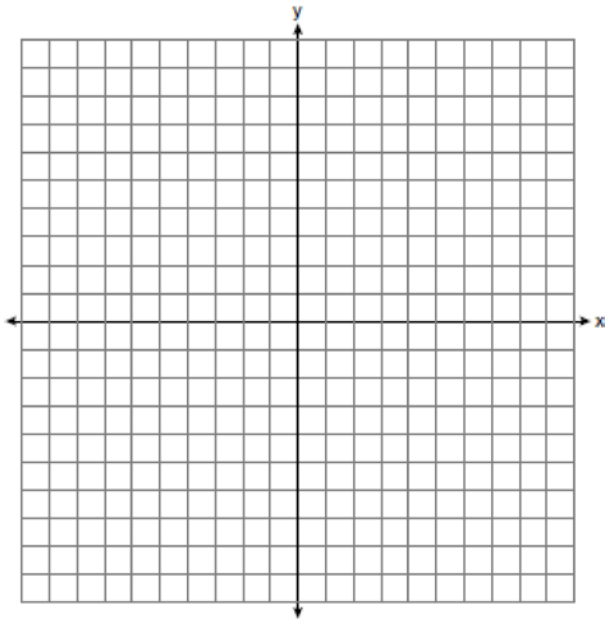
Find the length of $\overline{BC}$ to the *nearest inch*.

39 On the set of axes below, graph the following system of inequalities.

$$y + x \geq 3$$

$$5x - 2y > 10$$

State the coordinates of *one* point that satisfies $y + x \geq 3$, but does *not* satisfy $5x - 2y > 10$.



0812ia
Answer Section

1 ANS: 3 PTS: 2 REF: 081201ia STA: A.G.7
TOP: Solving Linear Systems

2 ANS: 3

$$\frac{120}{60} = \frac{m}{150}$$

$$m = 300$$

PTS: 2 REF: 081202ia STA: A.M.1 TOP: Using Rate

3 ANS: 3

$$0.06y + 200 = 0.03y + 350$$

$$0.03y = 150$$

$$y = 5,000$$

PTS: 2 REF: 081203ia STA: A.A.25 TOP: Solving Equations with Decimals

4 ANS: 1 PTS: 2 REF: 081204ia STA: A.S.12
TOP: Scatter Plots

5 ANS: 2 PTS: 2 REF: 081205ia STA: A.A.13
TOP: Addition and Subtraction of Polynomials KEY: addition

6 ANS: 4

$$375 + 155w \geq 900$$

$$155w \geq 525$$

$$w \geq 3.4$$

PTS: 2 REF: 081206ia STA: A.A.6 TOP: Modeling Inequalities

7 ANS: 3 PTS: 2 REF: 081207ia STA: A.A.19
TOP: Factoring the Difference of Perfect Squares

8 ANS: 3 PTS: 2 REF: 081208ia STA: A.S.17
TOP: Scatter Plots

9 ANS: 1 PTS: 2 REF: 081209ia STA: A.N.1
TOP: Properties of Reals

10 ANS: 4

$$8900 \text{ ft} \times \frac{1 \text{ mi}}{5280 \text{ ft}} \approx 1.7 \text{ mi}$$

PTS: 2 REF: 081210ia STA: A.M.2 TOP: Conversions
KEY: dimensional analysis

11 ANS: 3 PTS: 2 REF: 081211ia STA: A.A.9
TOP: Exponential Functions

12 ANS: 2 PTS: 2 REF: 081212ia STA: A.A.5
TOP: Modeling Inequalities

13 ANS: 3
The other situations are qualitative.

PTS: 2 REF: 081213ia STA: A.S.1 TOP: Analysis of Data
14 ANS: 4 PTS: 2 REF: 081214ia STA: A.G.10
TOP: Identifying the Vertex of a Quadratic Given Graph
15 ANS: 2 PTS: 2 REF: 081215ia STA: A.A.1
TOP: Expressions
16 ANS: 4
$SA = 2lw + 2hw + 2lh = 2(3)(2.2) + 2(7.5)(2.2) + 2(3)(7.5) = 91.2$

PTS: 2 REF: 081216ia STA: A.G.2 TOP: Surface Area
17 ANS: 4
$2(2) - (-7) = 11$

PTS: 2 REF: 081217ia STA: A.A.39 TOP: Identifying Points on a Line
18 ANS: 2 PTS: 2 REF: 081218ia STA: A.G.5
TOP: Graphing Quadratic Functions
19 ANS: 3

$y = mx + b \qquad y = \frac{3}{4}x - \frac{1}{2}$

$1 = \left(\frac{3}{4}\right)(2) + b \quad 4y = 3x - 2$

$1 = \frac{3}{2} + b$

$b = -\frac{1}{2}$

PTS: 2 REF: 081219ia STA: A.A.34 TOP: Writing Linear Equations
20 ANS: 1

$\left|\frac{4(-6) + 18}{4!}\right| = \left|\frac{-6}{24}\right| = \frac{1}{4}$

PTS: 2 REF: 081220ia STA: A.N.6 TOP: Evaluating Expressions
21 ANS: 3
$A \cup C = \{1, 2, 3, 5, 7, 9\}$

PTS: 2 REF: 081221ia STA: A.A.31 TOP: Set Theory
22 ANS: 4

$\frac{2x^2(x^4 - 9x^2 + 1)}{2x^2}$

PTS: 2 REF: 081222ia STA: A.A.16 TOP: Rational Expressions
KEY: a > 0
23 ANS: 2 PTS: 2 REF: 081223ia STA: A.A.32
TOP: Slope

24 ANS: 4

$V = \pi r^2 h$

$32\pi = \pi r^2(2)$

$16 = r^2$

$4 = r$

PTS: 2 REF: 081224ia STA: A.G.2 TOP: Volume

25 ANS: 3

$x^2 - 4 = 0$

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

$x = \pm 2$

PTS: 2 REF: 081225ia STA: A.A.15 TOP: Undefined Rationals

26 ANS: 3

$\frac{2}{x+1} = \frac{x+1}{2}$

$x^2 + 2x + 1 = 4$

$x^2 + 2x - 3 = 0$

$(x + 3)(x - 1) = 3$

$x = -3, 1$

PTS: 2 REF: 081226ia STA: A.A.26 TOP: Solving Rationals

27 ANS: 2

$W + L = 72$

$W - L = 12$

$2W = 84$

$W = 42$

PTS: 2 REF: 081227ia STA: A.A.7 TOP: Writing Linear Systems

28 ANS: 1

$4 + 6 + 10 + \frac{6\pi}{2} = 20 + 3\pi$

PTS: 2 REF: 081228ia STA: A.G.1 TOP: Compositions of Polygons and Circles
KEY: perimeter

29 ANS: 4 PTS: 2 REF: 081229ia STA: A.S.23
TOP: Theoretical Probability KEY: independent events

30 ANS: 3 PTS: 2 REF: 081230ia STA: A.A.23
TOP: Transforming Formulas

31 ANS:

6.56×10^{-2}

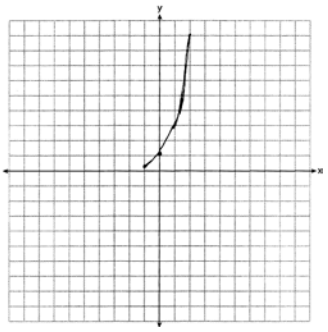
PTS: 2 REF: 081231ia STA: A.N.4 TOP: Operations with Scientific Notation

32 ANS:

$\frac{x+2}{2} \times \frac{4(x+5)}{(x+4)(x+2)} = \frac{2(x+5)}{x+4}$

PTS: 2 REF: 081232ia STA: A.A.18 TOP: Multiplication and Division of Rationals
KEY: multiplication

33 ANS:



PTS: 2 REF: 081233ia STA: A.G.4 TOP: Graphing Exponential Functions

34 ANS:

3, 0, 20. $15 - 12 = 3$. $12 - 12 = 0$

PTS: 3 REF: 081234ia STA: A.S.9
TOP: Frequency Histograms, Bar Graphs and Tables

35 ANS:

$\frac{(5.9 \times 10.3 \times 1.7) - (6 \times 10 \times 1.5)}{5.9 \times 10.3 \times 1.7} \approx 0.129$

PTS: 3 REF: 081235ia STA: A.M.3 TOP: Error
KEY: volume and surface area

36 ANS:

$(-3, -5)$, $(3, 7)$. $x^2 + 2x - 8 = 2x + 1$. $y = 2(3) + 1 = 7$

$x^2 - 9 = 0$ $y = 2(-3) + 1 = -5$

$x = \pm 3$

PTS: 3 REF: 081236ia STA: A.A.11 TOP: Quadratic-Linear Systems

37 ANS:

(C,B,T), (C,B,5), (C,N,T), (C,N,5), (C,2,T), (C,2,5), (F,B,T), (F,B,5), (F,N,T), (F,N,5), (F,2,T), (F,2,5). 1, 2.

PTS: 4 REF: 081237ia STA: A.S.19 TOP: Sample Space

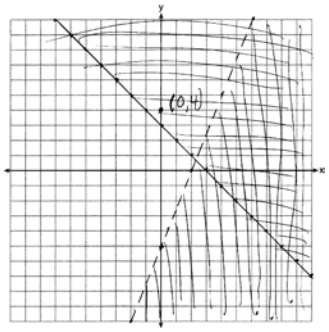
38 ANS:

54, 23. $\cos A = \frac{17}{29}$. $\sqrt{29^2 - 17^2} \approx 23$

$x \approx 54$

PTS: 4 REF: 081238ia STA: A.A.43 TOP: Using Trigonometry to Find an Angle

39 ANS:



PTS: 4 REF: 081239ia STA: A.G.7 TOP: Systems of Linear Inequalities