Kansas City Area Teachers of Mathematics
2016 KCATM Math Competition

ALGEBRA
GRADE 7

INSTRUCTIONS

- **Do not open this booklet** until instructed to do so.
- Time limit: **20 minutes**
- You **may use calculators**.
- Mark your answer on the answer sheet by **FILLING in the oval**.
- Letter **"E" is "None of the above"**, which is a correct answer for some of the problems.

Student _____ # _____

School _____

151. Simplify: $6x^2 + 3x^2 – 3y – 13 – 4x^2 + 5y + 9 + 3x$

A. $5x^2 – 8y – 4 + 3x$ B. $5x^2 + 3x + 2y – 4$
C. $5x^2 + 3x – 8y – 4$ D. $5x^2 + 2y – 4$
E. None of the above

152. What is the GCF of 135, 75, and 315?

A. 3 B. 15 C. 5 D. 27 E. None of the above

153. Which property is used: ⅔ (3h – 6) = 2h – 4

A. Commutative of Multiplication B. Multiplication Property of Equality
C. Identity Property of Addition D. Distributive Property
E. None of the above

154. Write the expression: thirty-three less than one-third a number minus four
A. ⅓(4 – 33n) B. ⅓(33n) – 4 C. (⅓ n – 33) - 4
D. (⅓ n – 4) – 33 E. None of the above

155. Multiply the two binomial factors: (t - 4)(t - 4)
A. $t^2 – 16$ B. $t^2 - 8t + 16$ C. $t^2 + 16$
D. $t^2 + 8t + 16$ E. None of the above

156. Which **CANNOT** be used to find the answer to:
"seventeen percent of what number is 83?"

A. x = (83) ÷ (0.17) B. (0.17)x = 83 C. $\frac{83}{x} = \frac{17}{100}$
D. (0.17)(83) = x E. None of the above

157. Simplify: $(6x^3y^2)(6xy^3)$

A. $36x^4y^5$ B. $36x^3y^6$ C. $36x^3y^5$ D. $36x^4y^4$
E. None of the above

158. Evaluate 7d(6) + (-4)(3e) for d = -2 and e = 3

A. 120 B. -120 C. 48 D. -48 E. None of the above

159. Which expression is NOT equivalent to 4k – 3m when k = -4 and m = 3?

A. km – 13 B. 3k – 4m –1 C. 2km – 1 D. 2k – 6m +1
E. All are equivalent

160. Simplify the radical expression: $\sqrt{90}$

A. $3\sqrt{5}$ B. $5\sqrt{3}$ C. $10\sqrt{3}$ D. $3\sqrt{10}$ E. None of the above

161. Factor out the GCF: $18p^4 – 9p^3 + 36p^2$

A. $9(2p^4 – p^3 + 4p^2)$ B. $p^2 (18p^2 – 9p + 36)$ C. $9p^2 (2p^2 – p + 4)$
D. $9p(2p^3 – p^2 + 4p)$ E. None of the above

162. Which statement is equivalent to "the opposite of (r - w)?

A. – r – w B. – r + w C. r – w D. – (r + w) E. None of the above

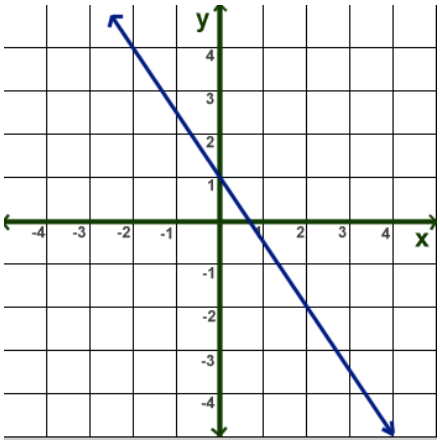
163. Find the sum of: (8j – 9k + 5) and (3k – 9).

A. 8j – 6k – 4 B. 11j – 9k – 4 C. 24jk – 6k – 4 D. 8j – 12k – 4
E. None of the above

164. What is the value of f(-7) in the function: f(x) = | x – 5|

A. -12 B. -2 C. 2 D. 12 E. None of the above

165. What is the slope of the line on the graph?



A. -3/1 B. 3/2 C. -3/2
D. 2/3 E. None of the above

166. Two points on a line are (-5,4) and (-3, 9). What is the slope?

A. $-\frac{5}{2}$ B. $\frac{2}{5}$ C. $\frac{5}{2}$ D. $\frac{-1}{13}$ E. None of the above

167. What is the point of intersection of x + y = 14 and 2y – x = 1 ?

A. (5, 9) B. (9, 5) C. (10, 4) D. (12, 2) E. None of the above

168. Factor the quadratic: $x^2 - 5x + 6$

A. $(x - 5)(x + 6)$ B. $(x - 2)(x + 3)$ C. $(x - 2)(x - 3)$
D. $(x + 2)(x - 3)$ E. None of the above

169. Factor by grouping: $16x^3 - 12x^2 + 12x - 9$

A. $(4x^2 - 3)(4x + 3)$ B. $4x^2 (4x - 3) - 9$ C. $(4x^2 - 1)(4x - 9)$
D. $(4x - 3)(4x^2 + 3)$ E. None of the above

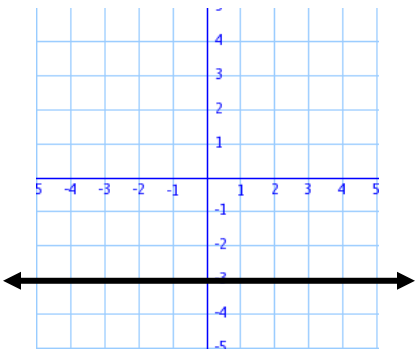
170. The sum of money shared by Olatunji and Marco is in a ratio of 3:8. If the sum of the money is $121, how much did Olatunji get?

A. $44 B. $11 C. $88 D. $33 E. None of the above

171. What is the multiplicative inverse of the expression: $(3x - 4)$?

A. $-3x + 4$ B. $3x - 4$ C. $1/(3x - 4)$ D. $(3x - 4)^2$
E. None of the above

172. What is the equation of the line?

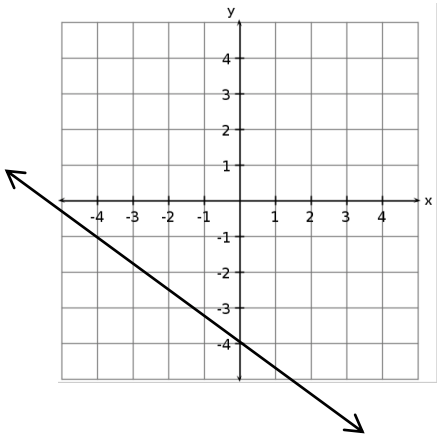


A. $x = -3$ B. $y = x - 3$
C. $y = -x - 3$ D. $y = -3$
E. None of the above

173. Solve the inequality: $-5x - 9 < 21$

A. $x > -6$ B. $x < -6$ C. $x > -2.4$ D. $x > 2.4$
E. None of the above

174. Given the graph, write the equation of the line.

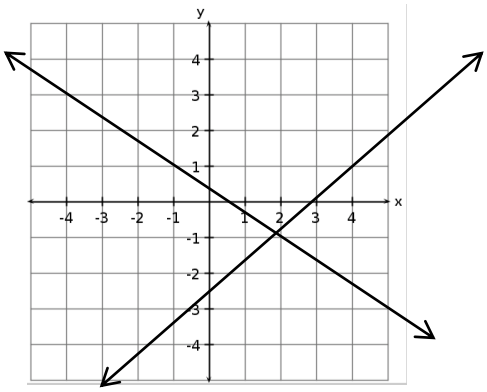


A. y = -1x – 4 B. y = -¾ x – 4

C. y = -4/3 x – 4 D. y = -4/5 x – 4

E. None of the above

175. Name the point of intersection of the two lines.



A. (2, 1)

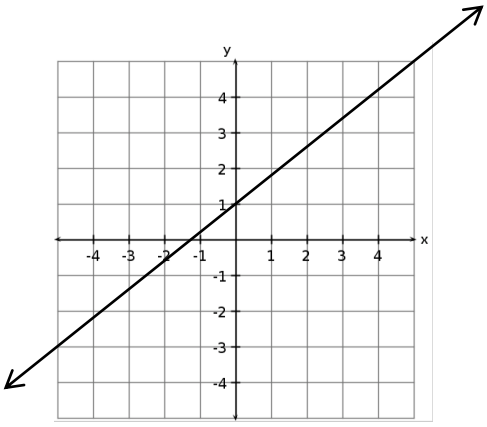
B. (-2, 1)

C. (-1, 2)

D. (2, -1)

E. None of the above

176. Find the distance between the two points on the graph. The formula is:



$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

What is the distance between points (1, 2) and (5, 5)?

A. 3 B. 4 C. 5 D. $\sqrt{85}$

E. None of the above

177. Simplify the expression: $\frac{40x^2-20x+5}{5}$

A. $8x^2 – 4x - 1$ B. 13x C. $9x^2 – 4x + 1$

D. $12x^2 + 4x + 1$ E. None of the above

178. The perimeter of the rectangle is 24 m. If the length is three times its width, find the dimensions of the rectangle.

A. Width: 3 m, Length: 9 m

B. Width: 9 m, Length: 3 m

C. Width: 4 m, Length: 12 m

D. Width: 12 m, Length: 4 m

E. None of the above

179. Which property is **NOT** used in finding the sum of 9y - 5 and -6y?

(9y - 5) + -6y
9y + (-5 + - 6y)
9y + (-6y + -5)
(9y + -6y) + -5
(9 + -6)y + -3
3y + -3
3(y - 1)

A. Associative Property of Addition
B. Commutative Property of Addition
C. Distributive Property
D. Additive Identity
E. None of the above

180. Subtract: $(6x + 4y – 7) – (7x + 10)$

A. $–x + 4y – 17$ B. $–x + 4y + 3$ C. $-x + 4y – 3$
D. $13x + 4y + 3$ E. None of the above

181. Factor completely: $8x^2 – 20x – 12$

A. $(8x – 4)(x + 3)$ B. $4(2x + 1)(x – 3)$ C. $(4x + 3)(2x + 4)$
D. $(2x – 3)(4x + 4)$ E. None of the above

182. Jeffrey purchased a gallon of gas in 1960 for \$0.25 and another gallon in 2015 for \$3.99. **What does the rate of change mean?**

A. The price of the gallon went up \$3.74.
B. The price of the gallon went up \$0.14 per year.
C. The cost of gallon went up because the cost of living went up.
D. The price of gallon increased by \$0.068 per year.
E. None of the above

183. Which inequality has the following graph?

A. -5 > x > -2½ B. -5 < x < 2½ C. x < 2½

D. x > 2½ E. None of the above

184. Change the equation into slope-intercept form: 5x + 15y = 20

A. $y = ⅓x + 1⅓$ B. $y = ⅓x + 6⅔$ C. $y = -⅓x + 1⅓$ D. $y = -⅓x + 4$

E. None of the above

185. Factor and solve the quadratic: $m^2 + 5x - 50 = 0$

A. {-5, -10} B. {5, -10} C. {2, - 25} D. {2, -25}
E. None of the above

186. If f(x) = 6x + 7 and g(x) = 3x, what is f(x)+g(x) ?

A. 3x + 7 B. 9x + 7 C. 2x + 7 D. $18x^2 + 21x$ E. None of the above

187. Simplify: $\frac{12x^6y^{-3}}{3x^5y^{-1}}$

A. $\frac{x^{11}}{4y^2}$ B. $\frac{4x}{y^2}$ C. $\frac{4y^1}{3}$ D. $\frac{4x^3}{y}$ E. None of the above

188. Simplify: $\frac{(4x^3y)^2}{x^{-4}y}$

A. $\frac{16x^{10}y}{1}$ B. $\frac{6x^7y^3}{1}$ C. $\frac{16x^2}{1}$ D. $\frac{16x^6y^2}{y}$ E. None of the above

189. What is the sum of the roots or solutions to: $0 = x^2 + 5x - 14$?

A. -9 B. 9 C. 5 D. -5 E. None of the above

190. What is the value of 7! ?

A. 27 B. 5040 C. 720 D. 49 E. None of the above

Shade the correct answer!

Example: ● B C D E

Name_____

School _____

151.	A	B	C	D	E	171.	A	B	C	D	E
152.	A	B	C	D	E	172.	A	B	C	D	E
153.	A	B	C	D	E	173.	A	B	C	D	E
154.	A	B	C	D	E	174.	A	B	C	D	E
155.	A	B	C	D	E	175.	A	B	C	D	E
156.	A	B	C	D	E	176.	A	B	C	D	E
157.	A	B	C	D	E	177.	A	B	C	D	E
158.	A	B	C	D	E	178.	A	B	C	D	E
159.	A	B	C	D	E	179.	A	B	C	D	E
160.	A	B	C	D	E	180.	A	B	C	D	E
161.	A	B	C	D	E	181.	A	B	C	D	E
162.	A	B	C	D	E	182.	A	B	C	D	E
163.	A	B	C	D	E	183.	A	B	C	D	E
164.	A	B	C	D	E	184.	A	B	C	D	E
165.	A	B	C	D	E	185.	A	B	C	D	E
166.	A	B	C	D	E	186.	A	B	C	D	E
167.	A	B	C	D	E	187.	A	B	C	D	E
168.	A	B	C	D	E	188.	A	B	C	D	E
169.	A	B	C	D	E	189.	A	B	C	D	E
170.	A	B	C	D	E	190.	A	B	C	D	E

Shade the correct answer!
Example: A ● C D E

Name_____

School _____

Answer Key

151.	A	●	C	D	E	171.	A	B	●	D	E
152.	A	●	C	D	E	172.	A	B	C	●	E
153.	A	B	C	●	E	173.	●	B	C	D	E
154.	A	B	●	D	E	174.	A	●	C	D	E
155.	A	●	C	D	E	175.	A	B	C	●	E
156.	A	B	C	●	E	176.	A	B	●	D	E
157.	●	B	C	D	E	177.	A	B	C	D	●
158.	A	●	C	D	E	178.	●	B	C	D	E
159.	A	B	C	D	●	179.	A	B	C	●	E
160.	A	B	C	●	E	180.	●	B	C	D	E
161.	A	B	●	D	E	181.	A	●	C	D	E
162.	A	●	C	D	E	182.	A	B	C	●	E
163.	●	B	C	D	E	183.	A	B	●	D	E
164.	A	B	C	●	E	184.	A	B	●	D	E
165.	A	B	●	D	E	185.	A	●	C	D	E
166.	A	B	●	D	E	186.	A	●	C	D	E
167.	A	●	C	D	E	187.	A	●	C	D	E
168.	A	B	●	D	E	188.	●	B	C	D	E
169.	A	B	C	●	E	189.	A	B	C	●	E
170.	A	B	C	●	E	190.	A	●	C	D	E