Kansas City Area Teachers of Mathematics
2015 KCATM Math Competition

ALGEBRA
GRADE 7

INSTRUCTIONS

- **Do not open this booklet** until instructed to do so.

- Time limit: **20 minutes**
- You **may NOT use calculators**.
- Mark your answer on the answer sheet by **FILLING in the oval**.
- You **may not use rulers, protractors, or other measurement devices** on this test.
- Letter **"E" is "None of the above"** , which is a correct answer for some of the problems.
- With circles, **exact answers** will be given in terms of π .

Student Name _ Student Number _

School _

151. Which property is **NOT** used in finding the sum of 7y - 3 and -4y?

(7y - 3) + -4y
7y + (-3 + - 4y)
7y + (-4y + -3)
(7y + -4y) + -3
(7 + -4)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

152. Find the sum of (4m - 7n + 3) and (4n - 8)

A. 4m - 3n -5 B. 8m - 7n -5 C. 15mn -5
D. 1n -5 E. None of the above

153. Write the expression in standard form: 3(3a) + 4(-6b) - c(2)(-5)

A. 9a - 24b + 15c B. 9a – 24b + 25c C. 9a – 24b + 10c
D. 9a + 24b - 10c E. None of the above

154. Evaluate the expression: (4q)(-7) for q = -6

A. -31 B. +31 C. -168 D. -17q E. None of the above

155. Evaluate 4g(6) + (-7)(3h) for g = -3 and h = 4

A. 156 B. -156 C. 12 D. -12 E. None of the above

156. Evaluate 7(-j) + -6(5k) for j = 2 and k = -1/3

A. -4 B. 24 C. -24 D. 4 E. None of the above

157. Which expression is NOT equivalent to 2d - 5e when d = -3 and e = -4?

A. -2(d+e) B. de - 2 C. -(7)e/2 D. 2e - 5d + 7 E. All are the equivalent

158. Which statement is equivalent to "the opposite of (v + w)" ?

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

159. Simplify the expression: $\frac{-7x^2 + 14x - 28}{-7}$

A. $x^2 + 2x - 4$ B. $-x^2 - 2x - 4$ C. $x^2 - 2x - 4$ D. $x^2 - 2x + 4$ E. None of the above

160. Simplify the radical expression: $2\sqrt{27} + 4\sqrt{3} - 5\sqrt{75}$

A. $3\sqrt{}$ B. $3\sqrt{3}$ C. $-3\sqrt{3}$ D. $\sqrt{45}$ E. None of the above

161. Simplify the radical expression: $\sqrt{16}\ (2\sqrt{27})$

A. $6\sqrt{2}$ B. $24\sqrt{3}$ C. $2\sqrt{43}$ D. $72\sqrt{3}$ E. None of the above

162. What is the value of 6! ?

A. 120 B. 720 C. 6 D. 30 E. None of the above

163. Subtract $(5x + 3y - 6) - (6x + 9)$

A. $-x + 3y - 15$ B. $-x - 9y + 3$ C. $11x + 3y + 3$

D. $6x + 3y + 15$ E. None of the above

164. Simplify the expression: $(6x)^0(8x)^2$

A. $16x^2$ B. $48x^2$ C. $48x^3$ D. $64x^2$ E. None of the above

165. Factor the quadratic: $x^2 - 9x + 14$

A. $(x - 9)(x + 14)$ B. $(x - 7)(x + 2)$ C. $(x - 7)(x - 2)$
D. $(x + 7)(x - 2)$ E. None of the above

166. Factor and solve: $x^2 - 8x + 8 = 0$

A. 8, 1 B. -8, 1 C. -7, -1 D. 7, 1 E. None of the above

167. Factor by grouping: $9x^3 - 3x^2 + 12x - 4$

A. $(3x^2 - 2)3x + 2)$ B. $3x^2\,(3x - 1) - 4$ C. $(3x^2 - 1)(3x - 4)$

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

168. A sum of money was shared between Ja'nae and Steven in a ratio of 2:5. If the sum of the money was $56.00, how much did Steven get?

A. $8 B. $28 C. $35 D. $40 E. None of the above

169. Find the midpoint of $\overline{CD}$ if C (-6, -3) and D (-2, -8)

A. (-8, 11) B. (- 4 , -5½) C. (-4, 2½) D. (-2 , 5½) E. None of the above

170. Use the distance formula: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ to find the distance between the points (13, -6) and (-7, 15) on a coordinate graph.

A. 29 B. 41 C. 20 D. 21 E. None of the above

171. Find f(-3) when $f(x) = x^2 - 5x + 8$

A. 2 B. 32 C. 29 D. --17 E. None of the above

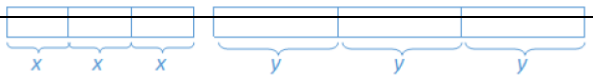
172. Find h(¼) when h(x) = 23x – (3x - 6)

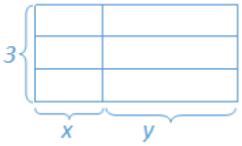
A. -1 B. ½ C. 11 D. 12 ½ E. None of the above

173. Which of these is NOT equivalent to 4(2x + y)

A.

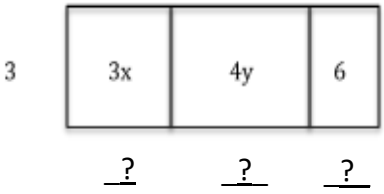
B. 8x + 4y

C. 

D. 

E. None of the above

174. What are the missing values?



A. x , 3y, 8 B. x , (2/4)y , 4 C. x , (4/3)y , 2
D. 9x, 12y , 18 E. None of the above

175. What is the multiplicative inverse of $(2x - 7)$?

A. $-2x + 7$ B. $2x - 7$ C. $1/(2x - 7)$ D. $(2x - 7)^2$ E. None of the above

176. Simplify the expression using scientific notation: $\frac{8\times10^{-3}}{2\times10^{2}}$

A. 4×10^{-5} B. 4×10^{-1} C. 4×10^{5} D. 4×10^{1} E. None of the above

177. Simplify: $\frac{9r^2 - 12r}{15r}$

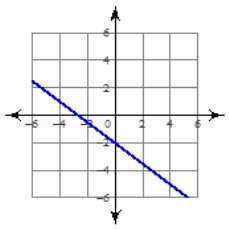
A. $\frac{(x-3)}{5x}$ B. $\frac{(x-3)}{5}$ C. $\frac{(3x-3)}{x}$ D. $\frac{3(x-3)}{5x}$ E. None of the above

178. Factor **completely**: $6x^2 - 4x - 2$

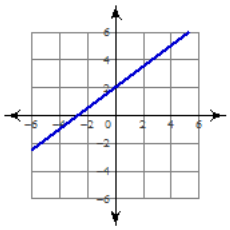
A. $(2x - 2)(3x - 1)$ B. $(x - 1)(6x + 2)$
C. $(2x - 1)(3x - 2)$ D. $(6x - 2)(1x + 1)$ E. None of the above

179. Which graph has y-intercept 2 and a slope of -1 ?

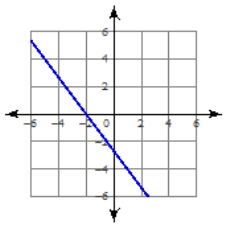
A)



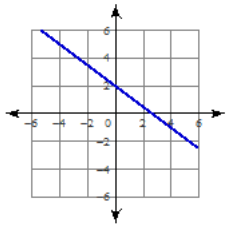
C)



B)

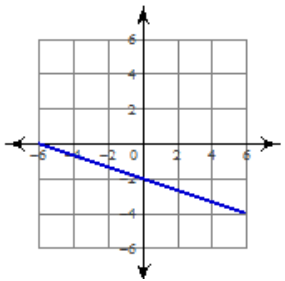


D)



E) None of the above

180. Given the graph, write the **equation** of the line.



A. $y = -1x - 2$
B. $y = -1/3x - 2$
C. $y = -2/3\ x - 2$
D. $x = -3/2\ x - 2$
E. None of the above

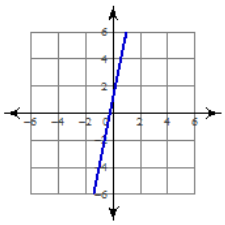
181. Write the equation in **Standard form**: $2y = \frac{3}{4}x + 3$

A. $8x - 3y = 12$ B. $x - 8y = -2x - 12$ C. $3x + 8y = 12$

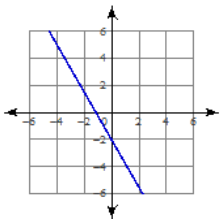
D. $3x - 8y = -12$ E. None of the above

182. Which graph best shows the linear equation: $x - 2y = 2$?

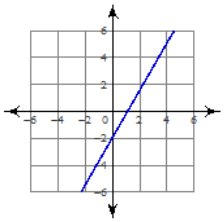
A)



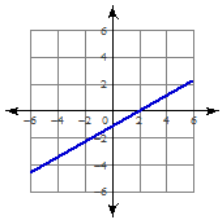
B)



C)

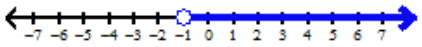


D)



E. None of the above

183. Which inequality statement is graphed:



A. $n - 5 < -6$ B. $n - 1 < -6$ C. $-2n < 2$

D. $3n - 1 \geq -13$ E. None of the above

184. The perimeter of a rectangle is 15 meters. If its length is four times it width, find the dimensions.

A. Width: 1 ½ in.; Length: 6 in.
B. Width: 2 ½ in.; Length: 7 ½ in.
C. Width: 1 ½ in.; Length: 4 ½ in.
D. Width: 3 in.; Length: 6 in.
E. None of the above

185. What is the rate of change of the following data given the year and the cost of a pair of gym shoes? (2006, $17) (2012, $31)

A. $7 every 3 years B. $3 every year C. $4 every two years

D. $2 every year E. None of the above

186. Simplify the radical expression: $6\sqrt{75}$

A. $150\sqrt{3}$ B. $30\sqrt{3}$ C. $11\sqrt{3}$ D. $18\sqrt{5}$ E. None of the above

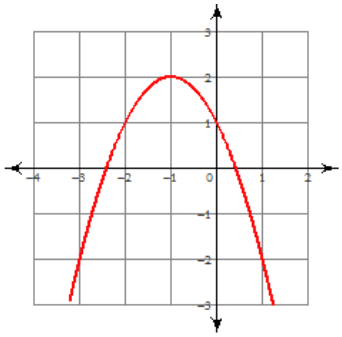
187. Five sixth of an hour.

A. 40 minutes B. 45 minutes C. 50 minutes D. 55 minutes
E. None of the above

188. What is the value of $512^{2/3}$?

A. 64 B. 32 C. 16 D. 128 E. None of the above

189. Which equation models the following parabolic graph.



A. $f(x) = -1(x + 1)^2 + 2$ B. $f(x) = (x + 1)^2 + 2$ C. $f(x) = -2(x - 1)^2 + 2$
D. $f(x) = -2(x - 1)^2 + 2$ E. None of the above

190. Write an expression for the following sum: $\frac{6t}{4} + \frac{2t-7}{2} - \frac{t-5}{3}$

A. $\frac{10w-2}{9}$ B. $\frac{6w-1}{4}$ C. $\frac{16w-9}{12}$ D. $\frac{23w-13}{24}$ E. None of the above

Shade the correct answer!
Example: A ● 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 - NEED TO CHANGE

151. A B C ● E
152. A B ● D E
153. A B C D ●
154. A ● C D E
155. ● B C D E
156. A ● C D E
157. A ● C D E
158. A B ● D E
159. ● B C D E
160. A B C ● E
161. A ● C D E
162. ● B C D E
163. A B ● D E
164. A B ● D E
165. A B C ● E
166. A B C ● E
167. A B ● D E
168. A B C ● E
169. ● B C D E
170. ● B C D E

171. ● B C D E
172. A B C D ●
173. A B ● D E
174. A B ● D E
175. ● B C D E
176. A ● C D E
177. A B C ● E
178. A B C ● E
179. A ● C D E
180. A B C ● E
181. A ● C D E
182. A B ● D E
183. ● B C D E
184. A B ● D E
185. A ● C D E
186. A B C D ●
187. A ● C D E
188. ● B C D E
189. ● B C D ●
190. A B C ● E