

Kansas City Area Teachers of Mathematics 2014 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 $2x + 1$ and $5x$?

$$(2x + 1) + 5x$$

$$2x + (1 + 5x)$$

$$2x + (5x + 1)$$

$$(2x + 5x) + 1$$

$$(2 + 5)x + 1$$

$$7x + 1$$

- 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 $(8a + 2b - 4)$ and $(3b - 5)$

- A. $8a + 5b - 9$
- B. $11a + 2b - 9$
- C. $13ab - 9$
- D. $6b - 9$
- E. None of the above

153. Write the expression in standard form: $4(2a) + 7(-4b) + (3)(c)(5)$

- A. $23a - 28b$
- B. $8a - 28b + 35c$
- C. $8a - 28b + 15c$
- D. $8a + 28b + 15c$
- E. None of the above

154. Evaluate the expression: $(5r)(-2)$ for $r = -3$

- A. -16
- B. +16
- C. -30
- D. $11r$
- E. None of the above

155. Evaluate $3b(8) + (-2)(7c)$ for $b = 2$ and $c = 3$

- A. -6
- B. 6
- C. 44
- D. -44
- E. None of the above

156. Evaluate $-4(3s) + 2(-t)$ for $s = 1/2$ and $t = -3$

- A. 0
- B. -6
- C. +6
- D. 12
- E. None of the above

157. Which expression is NOT equivalent to $3x + 4y$ when $x = -2$ and $y = -3$?

- A. $9x$
- B. $(3)(4) - xy$
- C. $6y$
- D. $4y + 2(-3) - 2$
- E. All are equivalent

158. Which statement is equivalent to “the opposite of $(x + 3)$ ” ?

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

159. Simplify the expression: $\frac{-6x^2 + 12x + 18}{-6}$

- A. $x^2 + 2x - 3$ B. $-x^2 - 2x - 3$ C. $x^2 - 2x - 3$ D. $x^2 - 2x + 3$ E. None of the above

160. Simplify the radical expression: $4\sqrt{8} + 3\sqrt{2} - 5\sqrt{32}$

- A. $-9\sqrt{2}$ B. $2\sqrt{42}$ C. $\sqrt{2}$ D. $-2\sqrt{2}$ E. None of the above

161. Simplify the radical expression: $(3\sqrt{8})(2\sqrt{9})$

- A. $6\sqrt{17}$ B. $12\sqrt{3}$ C. $12\sqrt{2}$ D. $36\sqrt{2}$ E. None of the above

162. What is the value of $5!$?

- A. 60 B. 120 C. 5 D. 20 E. None of the above

163. Subtract $(3x + 5y - 4) - (4x + 11)$

- A. $-x + 5y - 15$ B. $-x - y + 7$ C. $7x + 5y + 7$
D. $4x + 5y + 15$ E. None of the above

164. Simplify the expression: $(5x)^2(7x)^0$

- A. $10x^2$ B. $35x^2$ C. $35x^3$ D. $25x^2$ E. None of the above

165. Factor the quadratic: $x^2 - 7x + 12$

- A. $(x - 7)(x + 12)$ B. $(x - 4)(x + 3)$ C. $(x - 4)(x - 3)$
D. $(x + 4)(x - 3)$ E. None of the above

166. Factor and solve: $x^2 - 5x + 6 = 0$

- A. 6, 1 B. -6, 1 C. -3, -2 D. 3, 2 E. None of the above

167. Factor by grouping: $4x^3 - 2x^2 + 18x - 9$

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

168. A sum of money was shared between George and Brian in a ratio of 3:4. If the sum of the money was \$56.00, how much did George get?

- A. \$8 B. \$16 C. \$24 D. \$56 E. None of the above

169. Find the midpoint of $\overline{AB}$ if A (-2, 9) and B (-1, -7)

- A. (-3, 2) B. (-1½, 1) C. (-1, 8) D. (½, 1) 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 (3, 7) and (-3, -1) on a coordinate graph.

- A. 10 B. 7.5 C. 8 D. 6 E. None of the above

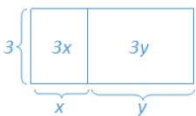
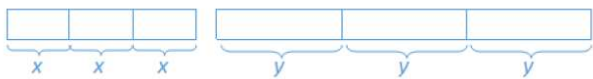
171. Find $f(-2)$ when $f(x) = x^2 - 3x + 7$

- A. -3 B. 17 C. 5 D. -2 E. None of the above

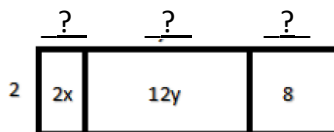
172. Find $g(\frac{1}{2})$ when $g(x) = 11x - (-2x + 2)$

- A. $4\frac{1}{2}$ B. $8\frac{1}{2}$ C. $5\frac{1}{2}$ D. $7\frac{1}{2}$ E. None of the above

173. Which of these is NOT equivalent to $3(x + y)$

A. 	B. $3x + 3y$	
D. 	E. None of the above	

174. What are the missing values?



- A. $x, 3y, 8$ B. $2x, 8y, 4$ C. $x, 6y, 4$
 D. $4x, 24y, 16$ E. None of the above

175. What is the multiplicative inverse of $(3x - 5)$?

- A. $-3x + 5$ B. $3x - 5$ C. $1/(3x - 5)$ D. $(3x - 5)^2$ E. None of the above

176. Simplify the expression using scientific notation: $\frac{6 \times 10^{-2}}{2 \times 10^2}$

- A. 3×10^{-4} B. 3×10^0 C. 3×10^4 D. 3×10^{-8} E. None of the above

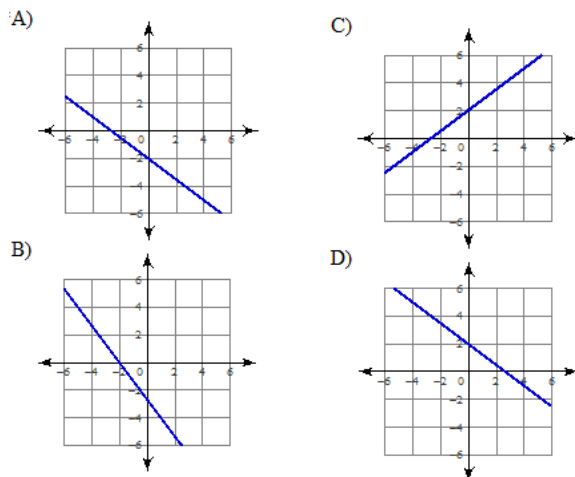
177. Simplify: $\frac{3x^2 - 9x}{12x}$

- A. $\frac{(x-3)}{4x}$ B. $\frac{(x-3)}{4}$ C. $\frac{(3x-3)}{x}$ D. $\frac{3(x-3)}{4x}$ E. None of the above

178. Factor **completely**: $3x^2 - 2x - 5$

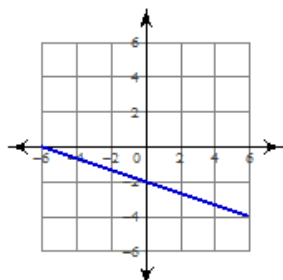
- A. $(3x - 5)(x - 2)$ B. $(3x + 5)(x - 1)$
C. $(3x - 1)(x - 5)$ D. $(3x - 5)(x + 1)$ E. None of the above

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



E) None of the above

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

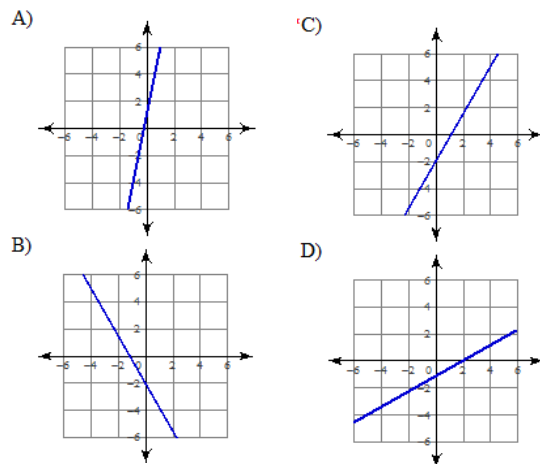


- A. $y = -1x - 2$
B. $y = -1/3x - 2$
C. $y = -2/3x - 2$
D. $x = -3/2x - 2$
E. None of the above

181. Write the equation in **Standard form**: $y = \frac{3}{4}x + 1$

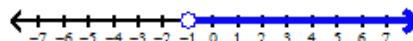
- A. $4x - 1y = 3$ B. $x - 4y = 2x - 3$ C. $3x + y = 4$
 D. $3x - 4y = -4$ E. None of the above

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



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 30 inches. If its length is three times its width, find the dimensions.

- A. Width: $3\frac{3}{4}$ in.; Length: $11\frac{1}{4}$ in.
 B. Width: $3\frac{1}{2}$ in.; Length: $12\frac{1}{2}$ in.
 C. Width: $4\frac{1}{4}$ in.; Length: $10\frac{3}{4}$ in.
 D. Width: $2\frac{3}{4}$ in.; Length: $10\frac{1}{4}$ 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? (2000, \$35) (2010, \$43)

- A. \$4 every 5 years B. \$2 every year C. \$3 every two years
 D. \$1 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

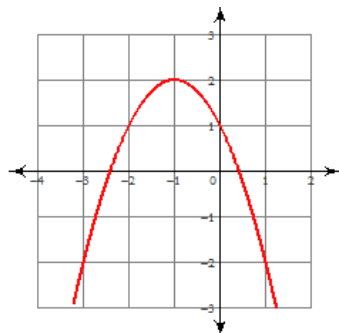
187.

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

188. What is the value of $64^{2/3}$?

- A. 32 B. 16 C. 24 D. 42 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: $\frac{9w}{6} + \frac{2w-7}{3} - \frac{w-5}{4}$

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

Shade the correct answer!

Example: A ● C D E

Name _____

School _____

151. A B C D E

152. A B C D E

153. A B C D E

154. A B C D E

155. A B C D E

156. A B C D E

157. A B C D E

158. A B C D E

159. A B C D E

160. A B C D E

161. A B C D E

162. A B C D E

163. A B C D E

164. A B C D E

165. A B C D E

166. A B C D E

167. A B C D E

168. A B C D E

169. A B C D E

170. A B C D E

171. A B C D E

172. A B C D E

173. A B C D E

174. A B C D E

175. A B C D E

176. A B C D E

177. A B C D E

178. A B C D E

179. A B C D E

180. A B C D E

181. A B C D E

182. A B C D E

183. A B C D E

184. A B C D E

185. A B C D E

186. A B C D E

187. A B C D E

188. A B C D E

189. A B C D E

190. A B C D E

Shade the correct answer!

Example: A ☒ B ☐ C ☐ D ☐ E

Name _____

School _____

ANSWER KEY - NEED TO CHANGE151. A B C ☒ D E152. ☒ A B C D E153. A B ☒ C D E154. A B C D ☒ E155. A ☒ B C D E156. ☒ A B C D E157. A ☒ B C D E158. A ☒ B C D E159. A B ☒ C D E160. ☒ A B C D E161. A B C ☒ D E162. A ☒ B C D E163. ☒ A B C D E164. A B ☒ C D E165. A B ☒ C D E166. A B C ☒ D E167. A B C ☒ D E168. A B ☒ C D E169. A B C ☒ D E170. ☒ A B C D E171. A ☒ B C D E172. ☒ A B C D E173. A B C D ☒ E174. A B ☒ C D E175. A B ☒ C D E176. ☒ A B C D E177. A ☒ B C D E178. A B C ☒ D E179. A B C ☒ D E180. A ☒ B C D E181. A B C ☒ D E182. A ☒ B C D E183. A B ☒ C D E184. ☒ A B C D E185. A B ☒ C D E186. A ☒ B C D E187. A B C D ☒ E188. A ☒ B C D E189. ☒ A B C D E190. A B C ☒ D E