

Kansas City Area Teachers of Mathematics
2017 KCATM Math Competition

ALGEBRA TEST
GRADE 7-8

INSTRUCTIONS

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- **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. What is the slope formula?

A. $y = mx + b$

B. $y - y_1 = m(x - x_1)$

C. $Ax + By = C$

D. $\frac{y_2 - y_1}{x_2 - x_1}$

E. None of the above

Solve the equations:

152. $-3x = 51$

A. 27

B. -27

C. 17

D. -17

E. None of the above

153. $2x - 15 = 61$

A. 23

B. 38

C. 33

D. 25

E. None of the above

154. $4(x + 7) = 100$

A. 18

B. 32

C. 19

D. 33

E. None of the above

155. $-2(4x + 1) = 38$

A. 8

B. -5

C. -6

D. 7

E. None of the above

156. $3x - (x + 7) = x$

A. 8

B. -5

C. -6

D. 7

E. None of the above

157. Which property is used to change the order: $6 + 2x = 2x + 6$

A. Associative B. Commutative C. Distributive D. Inverse E. None of the above

158. Which property is used to regroup: $3x + (5x + 4) = (3x + 5x) + 4$

A. Associative B. Commutative C. Distributive D. Inverse E. None of the above

159. Simplify: $11x^2 + 3x^2 - 1x + 4x - 7 - 1$

A. $8x^2 + 3x - 7$

B. $8x^2 - 3x - 8$

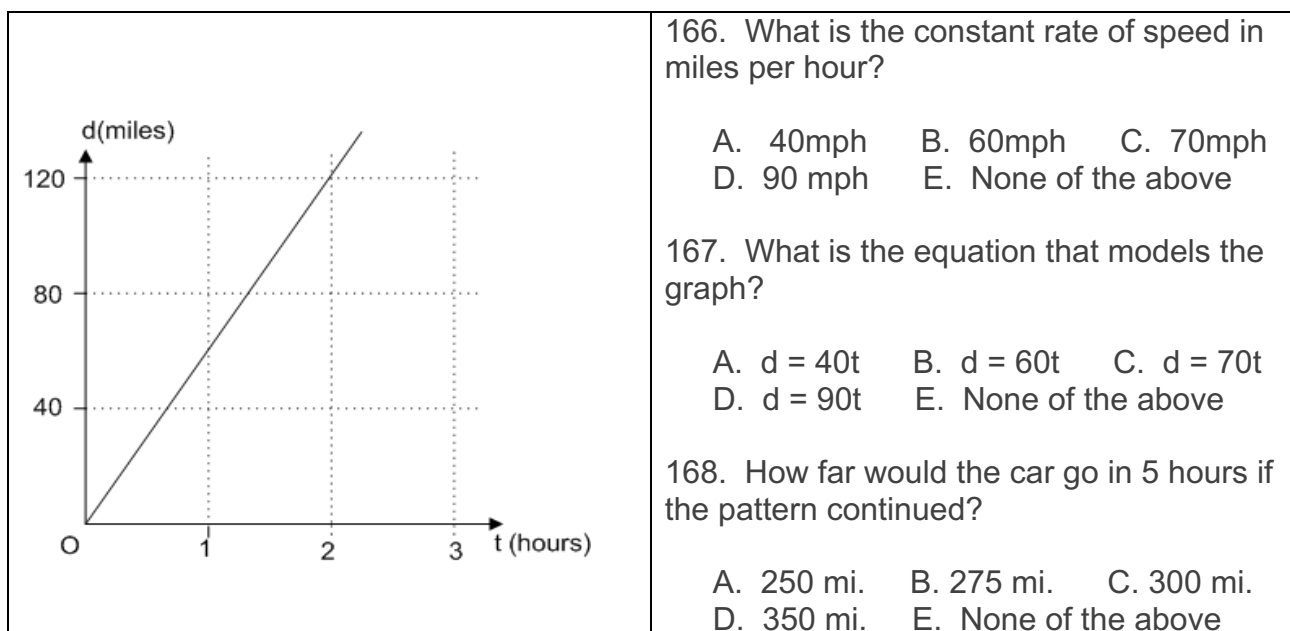
C. $11x^2 + 3x - 8$

D. $7x^2 + 3x - 6$

E. None of the above

160. What is the GCF of 24, 60, and 72?
- A. 3 B. 6 C. 12 D. 24 E. None of the above
161. What is the GCF of $8xy^2$, $4x^2y$, and $12xy^3$?
- A. $4xy^2$ B. $4xy$ C. $12x^2y^3$ D. $8xy$ E. None of the above
162. Evaluate: $f(x) = 4x^2 + 5x - 2$ for $f(-2)$
- A. -28 B. -4 C. 16 D. 4 E. None of the above
163. Evaluate: $(x - 2)(x - 7)$ when $x = 6$
- A. 26 B. 4 C. -4 D. 52 E. None of the above
164. What is the degree of this polynomial? $8x - 7x^2 + 5x^3 - 9$
- A. 8 B. 2 C. -9 D. 3 E. None of the above
165. What is the slope of the line: $y = -4/5 x + 7$
- A. 7 B. $4/5$ C. $-4/5$ D. -7 E. None of the above

#166-168. The graph shows a vehicle traveling at constant speed.



169. Write the expression: "Forty-five less than twice a number".
- A. $2(x - 45)$ B. $2x - 45$ C. $2(45 - x)$
D. $45 - 2x$ E. None of the above
170. Multiply the two binomial factors: $(2x - 5)(x + 4)$
- A. $2x^2 - 20$ B. $4x^2 - 20$ C. $2x^2 + 3x - 20$
D. $2x^2 + 3x - 20$ E. None of the above
171. Factor the trinomial: $x^2 - 13x - 30$
- A. $(x - 10)(x - 3)$ B. $(x - 10)(x + 3)$ C. $(x + 2)(x - 15)$
D. $(x + 15)(x - 2)$ E. None of the above
172. Factor the binomial: $4x^2 - 25$
- A. $(4x - 5)(x + 5)$ B. $(2x - 5)^2$ C. $(2x + 5)(2x + 5)$
D. $(4x + 5)(x - 5)$ E. None of the above
173. Solve for x: $2x^2 - 98 = 0$
- A. $\{7, -7\}$ B. $\{7\}$ C. $\{49, -49\}$ D. $\{49\}$ E. None of the above
174. Solve for x: $x^2 + 6 = 42$
- A. $\{36\}$ B. $\{6\}$ C. $\{-6, 6\}$ D. $\{-36, 36\}$ E. None of the above
175. Solve for x: $x^2 - 5x - 6 = 0$
- A. $\{2, 3\}$ B. $\{-2, -3\}$ C. $\{-6, -1\}$ D. $\{6, -1\}$ E. None of the above
176. Simplify: $(4xy^2)(-2x^3y^2)(3x)$
- A. $5xy^2$ B. $-24x^5y^4$ C. $-2x^4y^4$ D. $-24x^3y^4$ E. None of the above
177. Simplify: $(6x^{-2}y^3)^2$
- A. $\frac{36y^6}{x^4}$ B. $\frac{12y^6}{x^4}$ C. $\frac{y^6}{36x^4}$ D. $\frac{1}{12x^4y^6}$ E. None of the above

178. Which **CANNOT** be used to find the answer to: the scale factor is $.25m = 3km$, what is the scale drawing if the actual length is $16.4km$?

- A. $\frac{0.25}{3} = \frac{x}{16.4}$ B. $(0.25)(16.4) = 3x$ C. $\frac{0.25}{3} = \frac{16.4}{x}$
 D. $\frac{(0.25)(83)}{3} = x$ E. None of the above

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

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

180. Factor out the GCF: $28x^4 - 42x^3 + 14x^2$

- A. $7(4x^4 - 6x^3 + 2x^2)$ B. $14(2x^4 - 3x^3 + x^2)$ C. $14x^2(2x^2 - 3x + 1)$
 D. $14x(2x^3 - 3x^2 + x)$ E. None of the above

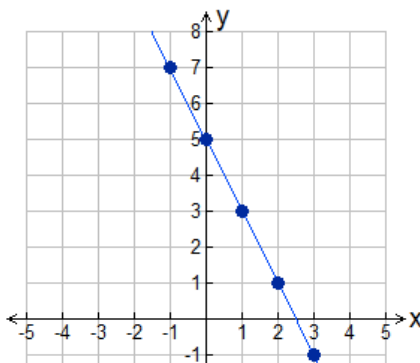
181. Find the difference of: $(8x^2 - 3x + 5) - (-x^2 + 3x - 9)$.

- A. $7x^2 - 6x - 4$ B. $9x^2 - 6x + 14$ C. $9x^2 - 6x - 4$ D. $9x^2 + 14$
 E. None of the above

182. What is the value of $f(-7)$ in the function: $f(x) = -2|x + 4|$

- A. -6 B. 6 C. 1 D. 22 E. None of the above

183. What is the equation of the line?



- A. $y = -2x - 5$
 B. $y = -1/2 x + 5$
 C. $y = 2x + 5$
 D. $y = 1/2 x + 5$
 E. None of the above

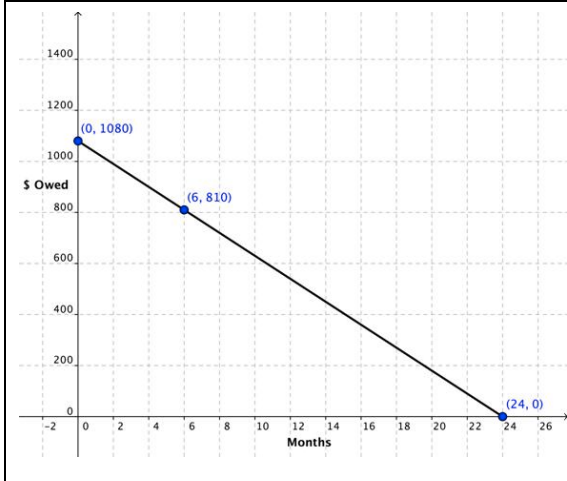
184. Two points on a line are $(-1, 7)$ and $(3, -2)$. What is the slope?

- A. $-\frac{9}{4}$ B. $\frac{9}{4}$ C. $\frac{5}{2}$ D. $\frac{1}{6}$ E. None of the above

185. What is the point of intersection of $2x + y = 10$ and $x - y = -1$?

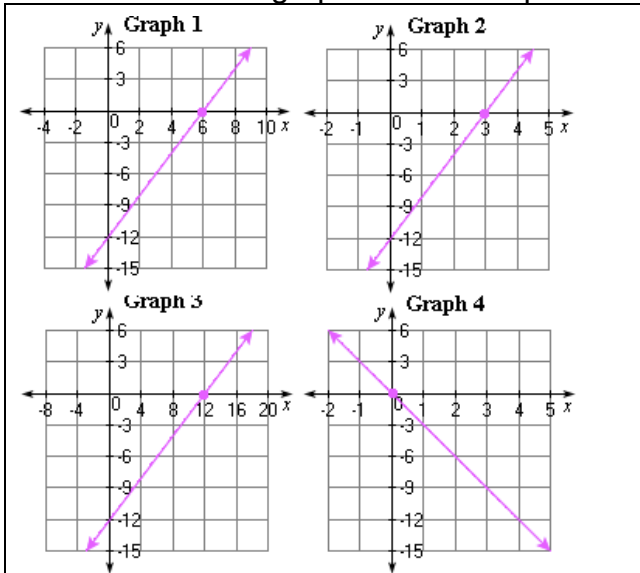
- A. $(-3, 4)$ B. $(3, -4)$ C. $(-3, -4)$ D. $(3, 4)$ E. None of the above

#186-187. Use the graph below on the amount of a used car loan.



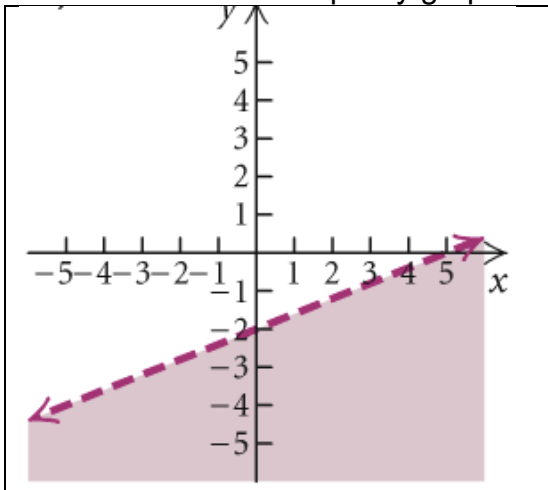
186. What does the x-intercept mean?
- A. the amount of the loan
 - B. the amount paid per month
 - C. the length of time it takes to pay off the loan
 - D. the amount owed after the downpayment
 - E. None of the above
187. How much was the monthly payment?
- A. \$85
 - B. \$105
 - C. \$205
 - D. \$45
 - E. None of the above

188. Which of the graphs have a slope of 1?



- A. Graph #1
- B. Graph #2
- C. Graph #3
- D. Graph #4
- E. None of the above

#189-190. Use the inequality graph.



189. Which inequality statement is correct?
- A. $y < \frac{2}{5}x - 2$
 - B. $y \leq \frac{2}{5}x - 2$
 - C. $y > \frac{2}{5}x - 2$
 - D. $y \geq \frac{2}{5}x - 2$
 - E. None of the above
190. Which point is a solution to the inequality?
- A. (4, 0)
 - B. (-4, 0)
 - C. (-2, -2)
 - D. (0, 0)
 - E. None of the above