Kingston Math League Senior Tournament

March 31, 2023

INDIVIDUAL ROUND

NAME : _____   SCHOOL:_____   TEAM #:_____

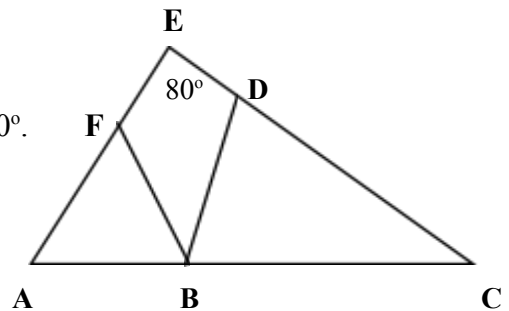_____ **1.** If $6x + 10 = 101$, what is the value of $12x + 10$?

_____ **2.** Solve for x: $1/15 - 1/18 = 1/x$

_____ **3.** The number of cubic millimeters in one cubic kilometer is 10^n. What is **n**?

_____ **4.** If $x * y = x^2 + 2xy + y^2$, what is $45 * 5 = ?$

_____ **5.** A car travels 6.5 kilometres in 5 minutes. At this speed, how many km does it travel in an hour?

_____ **6.** Given that $AB = AF$ and $BC = CD$ and $<DEF = 80°$. Find $<DBF$.

_____ **7.** Given $f(x) = x2$ and $g(x) = x - 6$, what is $f(g(8))$?

_____ **8.** There are four children of different integer ages under 18. Only one pair of children have a difference of two years. The product of their ages is 882. What is the sum of their ages?

_____ **9.** The numbers 49, 29, 9, 40, 22, 15, 53, 33, 13, 47 are grouped in pairs so that the sum of each pair is the same. Which number is paired with 15?
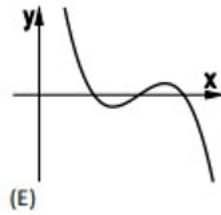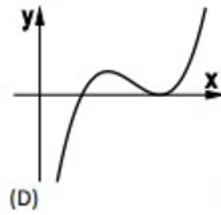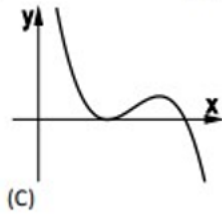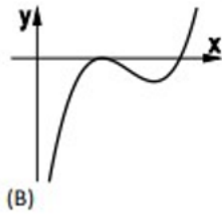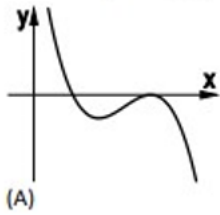
_____ **10.** How many real numbers satisfy the equation $x(x^2 - 1)(x^3 - 2)(x^4 - 5) = 0$?

_____ **11.** Find x: $(5 - 3x)^5 = -1$

_____ **12.** The sum of the seven digits of a seven-digit phone number **_aaabbbb_** is a two-digit number **_ab_**. What is the biggest value of the sum **a** + **b**?

_____ **13.** Two adjacent vertices of a square have coordinates (7, 1) and (4, 14). What is the area of the square, in units squared?

_____ **14.** Simplify $\dfrac{2^{100}}{2^{101}-2^{100}+2^{99}}$ as a fraction in lowest terms.

_____ **15.** Amongst the graphs shown below there is the graph of the function $f(x) = (a - x)(b - x)^2$ with $a < b$. Which graph is it?

(A)   (B)   (C)   (D)   (E)

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TEAM #:

1. **192**

2. **x = 90**

3. **18**

4. **2500**

5. **78**

6. **50**

7. **4**

8. **31**

9. **47**

10. **6**

11. **2**

12. **10**

13. **178**

14. **2/3**

15. **A**