

## Solutions for Meet 6

### Individual Questions

1. Either  $2x - 17 = x$ ,  $4x - 17 = x$ , or  $4x - 17 = 2x$ . Only the first equation has an integral solution,  $x = 17$ . The sum of the three numbers is then  $17 + 34 + 68 = 119$ .

2. Using the technique that creates perfect squares we can write  $(x^8 - 10x^4 + 25) - (4x^4)$ . We now have a difference of two squares  $(x^4 - 5)^2 - (2x^2)^2$  which can be factored as  $(x^4 + 2x^2 - 5)(x^4 - 2x^2 - 5)$ . Order of polynomials is irrelevant.

3. Draw a picture. Parallel lines cut off proportional line segments on any two transversals, so  $FC = 8$ .

4. There are only 10 sets of triples of numbers whose sum is 15: (1, 4, 10), (1, 5, 9), (1, 6, 8), (2, 3, 10), (2, 4, 9), (2, 5, 8), (2, 6, 7), (3, 4, 8), (3, 5, 7), and (4, 5, 6). Since  $\binom{10}{3} = 120$ , the required probability is  $\frac{10}{120} = \frac{1}{12}$

5. Since the current carried him for 3 miles at 5mph, the elapsed time was  $\frac{3}{5}$ hr. His forward motion across the stream was 4 miles in that time, making his still water rate  $\frac{4}{3/5} = \frac{20}{3}$  mph.

6. Draw a diagram. Using the exterior angles of triangles ODE, OCD, and OCE achieves the desired result, 54.