MATHEMATICS TIPS (MAY 2019)

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1. Cody is attending a birthday party and puts the gift he will be giving his friend inside a box measuring 8 inches high by 12 inches long by 12 inches wide. After wrapping the gift, Cody decides to create a bow for the top of the gift. The bow requires a length of ribbon that equals one-half the total measure of each edge of the box. What length of ribbon does Cody need?

(A) 62 in (B) 64 in (C) 66 in (D) 124 in (E) 128 in

Be aware that a rectangular box has 12 edges (4 lengths, 4 widths and 4 heights).

$$\frac{1}{2}[4(8) + 4(12) + 4(12)] = \frac{1}{2}[32 + 48 + 48]$$

$$= \frac{1}{2}[128] = 64$$

2. There are eight sprinters in a race. Awards are awarded to the top four finishers. In how many different ways can the awards be given out?

(A) 1,680 (B) 32 (C) 336 (D) 840 (E) 1,840

Use the Basic Counting Principle

$(8)(7)(6)(5) = (56)(30) = 1,680$

3. The ratio of boys to girls in a group is 8:11. If six more girls join the group, the ratio of boys to girls changes to 4:7. How many boys are in the group?

(A) 22 (B) 16 (C) 28 (D) 18 (E) 20

Let $8x$ = number of boys and $11x$ = number of girls

$$\frac{Boys}{Girls} = \frac{8x}{11x+6} = \frac{4}{7}$$

$$4(11x + 6) = 7(8x)$$

$$44x + 24 = 56x \; ; \quad 56x - 44x = 24$$

$$12x = 24 \; ; \quad x = 2$$

Number of boys = $8x = 8(2) = 16$

4. The angles in a quadrilateral are in a ratio of 10:11:32:37. What is the supplement of the second smallest of these angles?

(A) 136° (B) 140° (C) 158° (D) 148° (E) 152°

$$10x + 11x + 32x + 37x = 360$$

$$90x = 360 \; ; \quad x = 4$$

The second smallest of the angles is $11x = 11(4) = 44$.
Its supplement is $180 - 44 = 136$

5. A 45-45-90 right triangle is inscribed in a circle with a radius of 11 inches. What is the length of one of the legs?

(A) $\frac{11\sqrt{2}}{2}$ inches (B) $\frac{5.5\sqrt{2}}{2}$ inches (C) $22\sqrt{2}$ inches

(D) 5.5 inches (E) $11\sqrt{2}$ inches

Note : An angle inscribed in a semi-circle is a right angle. Thus, the hypotenuse of the 45-45-90 triangle is the diameter of the circle. Since the radius is 11 inches, its diameter is 22 inches.

$$\text{Hypotenuse} = \text{leg}\sqrt{2}$$

$$22 = x\sqrt{2} \; ; \; x = \frac{22}{\sqrt{2}} = \left(\frac{22}{\sqrt{2}}\right)\left(\frac{\sqrt{2}}{\sqrt{2}}\right) = \frac{22\sqrt{2}}{2} = 11\sqrt{2}$$