Preparing for College Entrance Exams

Strategy for Success

Problems in college entrance exams often involve right triangles. One thing you can do in preparing for the exams is to learn the common right-triangle lengths listed on page 295. These Pythagorean triples are often used on tests where calculators are not allowed. Also, keep in mind that if a, b, and c are the lengths of the sides of a right triangle, then for any $k > 0$, ak, bk, and ck are also lengths of sides of a right triangle.

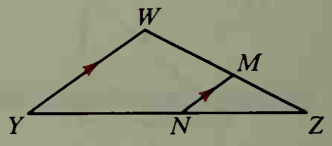
Indicate the best answer by writing the appropriate letter.

1. In $\triangle ABC$, $m\angle A : m\angle B : m\angle C = 2:5:5$. $m\angle B =$
   (A) 75 **(B)** 60 **(C)** 30 **(D)** 40 **(E)** 100

2. The proportion $\frac{t}{z} = \frac{m}{k}$ is *not* equivalent to:
   (A) $\frac{t-z}{z} = \frac{m-k}{k}$ **(B)** $\frac{k}{z} = \frac{m}{t}$ **(C)** $\frac{t}{m} = \frac{k}{z}$ **(D)** $tk = mz$ **(E)** $\frac{z}{t} = \frac{k}{m}$

3. If $\triangle ABC \sim \triangle DEF$, which statement is not necessarily true?
   (A) $\angle C \cong \angle F$ **(B)** $\overline{BC} \cong \overline{EF}$ **(C)** $\frac{AB}{BC} = \frac{DE}{EF}$
   (D) $m\angle A + m\angle E = m\angle B + m\angle D$ **(E)** $AC \cdot DE = DF \cdot AB$

4. If $ZY = 2x + 9$, $ZM = 10$, $ZN = x + 3$, and $MW = x$, then $x =$
   (A) $2 + \sqrt{34}$ **(B)** -12 **(C)** 12 **(D)** 5 **(E)** -5



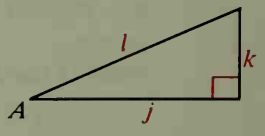
5. $\overrightarrow{BD}$ bisects $\angle ABC$ and D lies on $\overline{AC}$. If $AB = 6$, $BC = 14$, and $AC = 14$, find AD.
   (A) 6 **(B)** 8.4 **(C)** 9.8 **(D)** 7 **(E)** 4.2

6. Find the geometric mean of $2x$ and $2y$.
   (A) $2\sqrt{xy}$ **(B)** $\sqrt{2xy}$ **(C)** $2\sqrt{x+y}$ **(D)** $\sqrt{2(x+y)}$ **(E)** $4xy$

7. If $XY = 8$, $YZ = 40$, and $XZ = 41$, then:
   (A) $\triangle XYZ$ is acute **(B)** $\triangle XYZ$ is right **(C)** $\triangle XYZ$ is obtuse
   (D) $m\angle Y < m\angle Z$ **(E)** no $\triangle XYZ$ is possible

8. A rhombus contains a 120° angle. Find the ratio of the length of the longer diagonal to the length of the shorter diagonal.
   (A) $\sqrt{3}:1$ **(B)** $\sqrt{3}:3$ **(C)** $\sqrt{2}:1$ **(D)** $\sqrt{2}:2$ **(E)** cannot be determined

9. $k =$
   (A) $j \sin A$ **(B)** $j \tan A$ **(C)** $\frac{l}{\sin A}$
   (D) $l \cos A$ **(E)** $l \tan A$



10. The legs of an isosceles triangle have length 4 and the base angles have measure 65. If $\sin 65° \approx 0.91$, $\cos 65° \approx 0.42$, and $\tan 65° \approx 2.14$, then the approximate length of the base of the triangle is:
    (A) 1.7 **(B)** 1.9 **(C)** 3.4 **(D)** 3.6 **(E)** 4.4