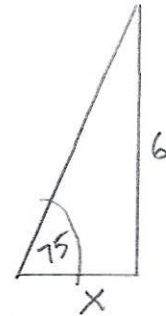


4.1.1 – 4.1.5
Trigonometry: Right Triangles
- Tangent Ratio



1

$$1) \frac{\tan 75}{1} = \frac{6}{X}$$

$$2) \frac{6}{\tan 75} = \frac{\cancel{\tan 75} X}{\cancel{\tan 75}}$$

$$3) \frac{6}{\tan 75} = X$$

32. The directions for assembling the pool state that the ladder should be placed at an angle of 75° relative to level ground. Which of the following expressions involving tangent gives the distance, in feet, that the bottom of the ladder should be placed away from the bottom edge of the pool in order to comply with the directions?

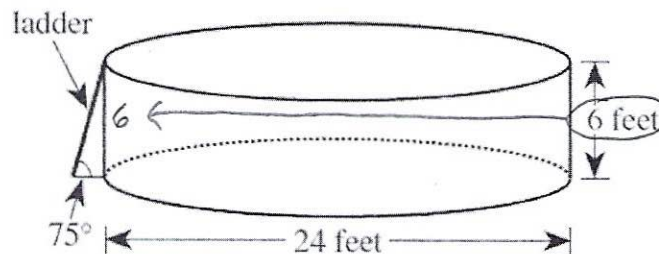
F. $\frac{6}{\tan 75^\circ}$

G. $\frac{\tan 75^\circ}{6}$

H. $\frac{1}{6 \tan 75^\circ}$

J. $6 \tan 75^\circ$

K. $\tan(6 \cdot 75^\circ)$



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2

50. In the right triangle below, the measure of $\angle C$ is 90° , $AB = 5$ units, and $CB = 2$ units. What is $\tan B$?

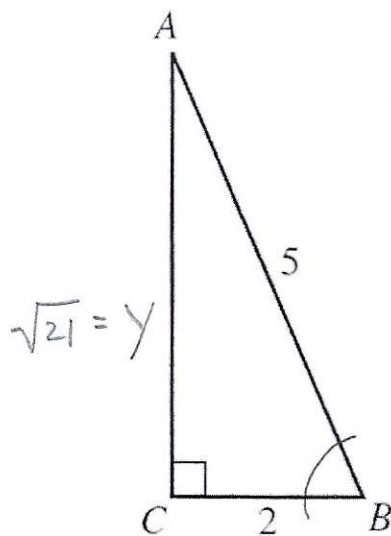
F. $\frac{\sqrt{21}}{2}$

G. $\frac{3}{2}$

H. $\frac{\sqrt{21}}{5}$

J. $\frac{3}{5}$

K. $\frac{2}{5}$



1) $a^2 + b^2 = c^2$

2) $2^2 + y^2 = 5^2$

3) $4 + y^2 = 25$

$$\begin{array}{r} -4 \\ \hline y^2 = 21 \end{array}$$

$\sqrt{y^2} = \sqrt{21}$

$y = \sqrt{21}$

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3

4) $\tan B = \frac{\sqrt{21}}{2}$

33. In triangle $\triangle DEF$ shown below, $\tan D = \frac{4}{9}$ and segment \overline{FE} measures 18 inches. To the nearest tenth of an inch, what is the measure of segment \overline{DF} ?

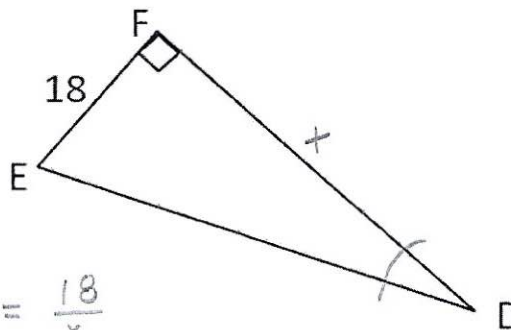
A. 8

B. 27

C. 36.3

D. 40.5

E. 44.3



1) $\frac{4}{9} = \frac{18}{x}$

2) $4x = 9(18)$

3) $\frac{4x}{4} = \frac{162}{4}$

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4

4) $x = 40.5$

4.1.1 – 4.1.5

Trigonometry: Right Triangles

- Sine
- Cosine
- Tangent

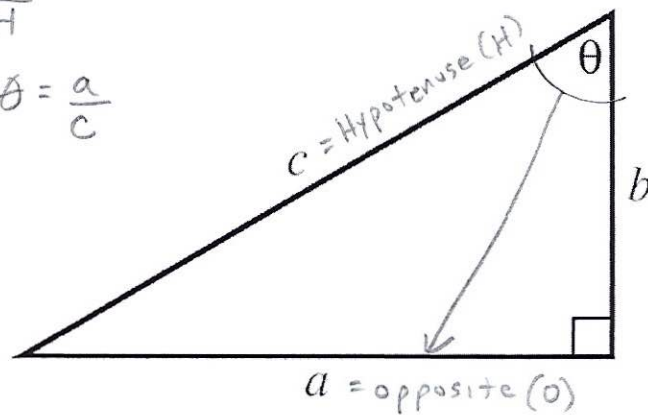
5

22. The dimensions of the right triangle shown below are given in feet. What is $\sin \theta$?

- F. $\frac{a}{b}$
- G. $\frac{a}{c}$
- H. $\frac{b}{c}$
- J. $\frac{b}{a}$

$$1) s = \frac{o}{H}$$

$$2) \sin \theta = \frac{a}{c}$$



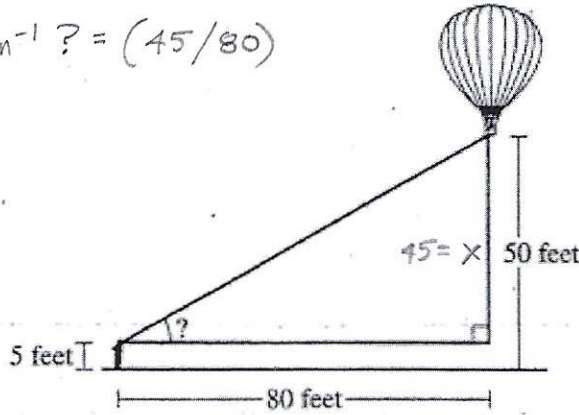
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6

$$1) \begin{array}{r} X = 50 \\ - 5 \\ \hline 45 \end{array}$$

51. Melanie is standing 80 feet from the launch site of a hot-air balloon when the balloon lifts off from the ground and rises vertically. Melanie's horizontal line of sight is 5 feet above the ground. When the bottom of the balloon is 50 feet above the ground, as shown below, which of the following expressions gives the angle that Melanie's horizontal line of sight makes with her line of sight to the bottom of the balloon?

$$2) \tan^{-1} ? = (45/80)$$

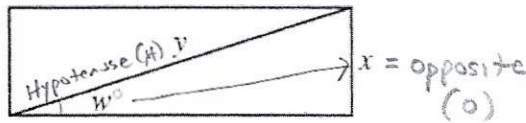


- A. $\tan^{-1}\left(\frac{45}{80}\right)$
- B. $\tan^{-1}\left(\frac{50}{75}\right)$
- C. $\tan^{-1}\left(\frac{75}{50}\right)$
- D. $\tan^{-1}\left(\frac{80}{45}\right)$
- E. $\tan^{-1}\left(\frac{80}{50}\right)$

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7

25. Which of the following trigonometric equations is valid for the side measurement x inches, diagonal measurement y inches, and angle measurement w° in the rectangle shown below?



$$1) S = \frac{O}{H}$$

$$2) \sin w = \frac{x}{y}$$

- A. $\cos w^\circ = \frac{x}{y}$
- B. $\cot w^\circ = \frac{x}{y}$
- C. $\sec w^\circ = \frac{x}{y}$
- D. $\sin w^\circ = \frac{x}{y}$
- E. $\tan w^\circ = \frac{x}{y}$

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8

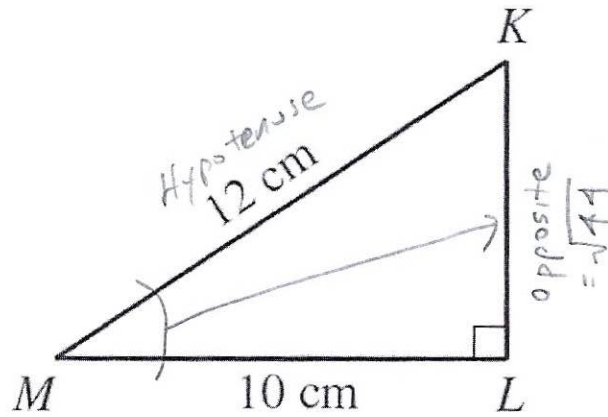
1) $a^2 + b^2 = c^2$
 2) $10^2 + b^2 = 12^2$
 3) $\begin{array}{r} 100 + b^2 = 144 \\ -100 \quad -100 \\ \hline b^2 = 44 \end{array}$

4) $\sqrt{b^2} = \sqrt{44}$
 5) $b = \sqrt{44}$

6) $S = \frac{O}{H}$
 7) $\sin M = \frac{\sqrt{44}}{12}$

38. For right triangle $\triangle KLM$ below, what is $\sin \angle M$?

- F. $\frac{10}{12}$
- G. $\frac{12}{10}$
- H. $\frac{\sqrt{44}}{10}$
- J. $\frac{10}{\sqrt{44}}$
- K.** $\frac{\sqrt{44}}{12}$

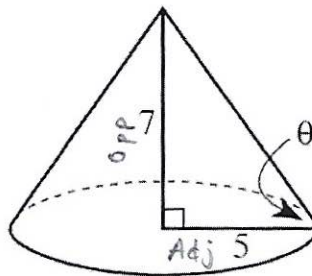


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9

30. The radius of the base of the right circular cone shown below is 5 inches, and the height of the cone is 7 inches. Solving which of the following equations gives the measure, θ , of the angle formed by a slant height of the cone and a radius?

- F. $\tan \theta = \frac{5}{7}$
- G.** $\tan \theta = \frac{7}{5}$
- H. $\sin \theta = \frac{5}{7}$
- J. $\sin \theta = \frac{7}{5}$
- K. $\cos \theta = \frac{7}{5}$



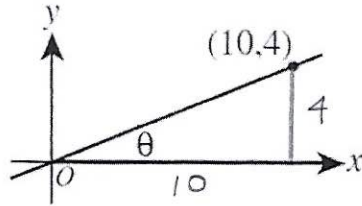
1) $\tan^{-1} \theta = \frac{O}{A}$
 2) $\tan^{-1} \theta = \frac{7}{5}$

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10

39. A line through the origin and (10,4) is shown in the standard (x,y) coordinate plane below. The acute angle between the line and the positive x-axis has measure θ . What is the value of $\tan \theta$?

- A. $\frac{\sqrt{29}}{2}$
- B. $\frac{2}{\sqrt{29}}$
- C. $\frac{5}{\sqrt{29}}$
- D. $\frac{2}{5}$**
- E. $\frac{5}{2}$



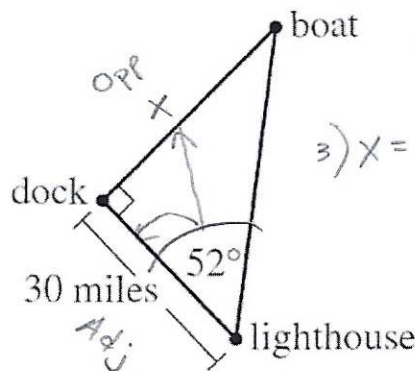
1) $\tan^{-1} = \frac{o}{A}$
 2) $\tan^{-1} \theta = \frac{4}{10}$
 3) $\tan^{-1} \theta = \frac{2}{5}$

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11

42. According to the measurements given in the figure below, which of the following expressions gives the distance, in miles, from the boat to the dock?

- F. $30 \tan 52^\circ$**
- G. $30 \cos 52^\circ$
- H. $30 \sin 52^\circ$
- J. $\frac{30}{\cos 52^\circ}$
- K. $\frac{30}{\sin 52^\circ}$



1) $T = \frac{o}{A}$
 2) $\tan 52 = \frac{X}{30}$
 3) $X = 30 \tan 52$

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12

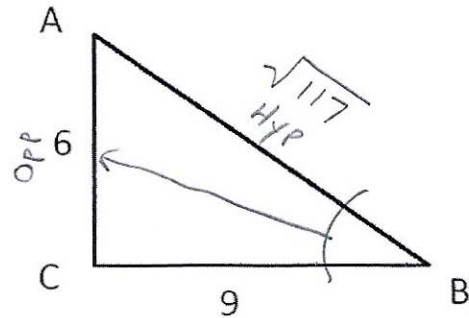
1) $a^2 + b^2 = c^2$
 2) $9^2 + 6^2 = c^2$
 3) $81 + 36 = c^2$

4) $117 = c^2$
 5) $\sqrt{117} = \sqrt{c^2}$
 6) $\sqrt{117} = c$

7) $S = \frac{O}{H}$
 8) $\sin B = \frac{6}{\sqrt{117}}$

37. For right triangle $\triangle ABC$ below, what is $\sin \angle B$?

- A. $\frac{2}{3}$
- B. $\frac{3}{2}$
- C. $\frac{6\sqrt{117}}{117}$**
- D. $\frac{9\sqrt{117}}{9}$
- E. $\frac{6}{15}$



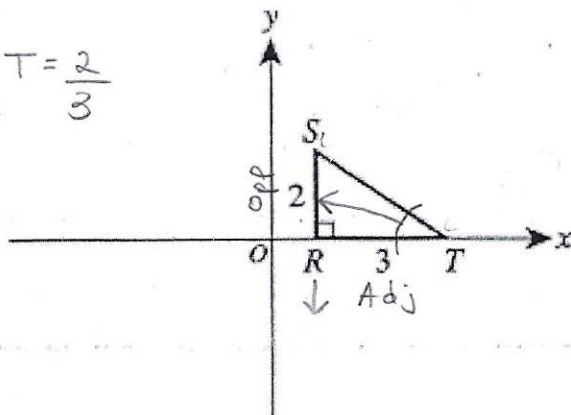
9) $\frac{6}{\sqrt{117}} \cdot \frac{\sqrt{117}}{\sqrt{117}} =$ } Rationalizing Denominator
 10) $\frac{6\sqrt{117}}{117}$

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15

In the standard (x,y) coordinate plane below, R is located at (1,0), S is located at (1,2), and T is located at (4,0) to form right triangle $\triangle RST$. The given lengths are in coordinate units.

1) $\tan^{-1} T = \frac{2}{3}$



- A. $\cos^{-1}\left(\frac{2}{3}\right)$
- B. $\sin^{-1}\left(\frac{2}{3}\right)$
- C. $\sin^{-1}\left(\frac{3}{2}\right)$
- D. $\tan^{-1}\left(\frac{2}{3}\right)$**
- E. $\tan^{-1}\left(\frac{3}{2}\right)$

43. Which of the following expressions gives the measure of $\angle STR$?

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16

31. In $\triangle ABC$ shown below, $\sin C = \frac{4}{5}$ and the length of \overline{AB} is 10 inches. What is the length, in inches, of \overline{AC} ?

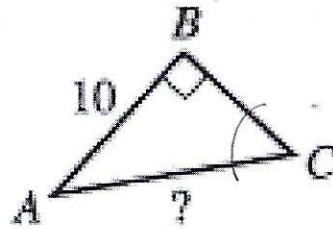
A. 3

B. $\sqrt{41}$

C. 8

D. 9

E. $\frac{25}{2}$



$$1) \frac{4}{5} = \frac{10}{?}$$

$$3) \frac{50}{4} = \frac{?}{4}$$

$$2) 5(10) = 4(?)$$

$$4) \frac{50}{4} = (?) = \frac{25}{2}$$

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17

30. The base of an escalator in a store is 26 meters long and has a vertical lift of 10 meters as shown below. Which of the following expressions is closest to the angle of inclination between the base of the escalator and the horizontal floor?

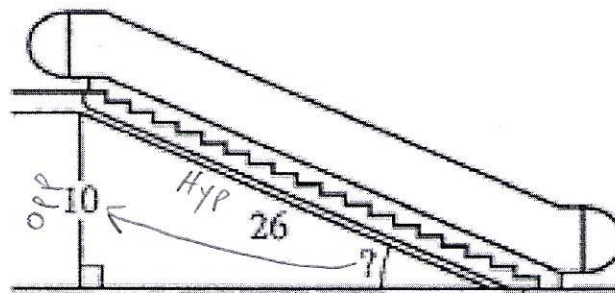
E. $\sin^{-1}\left(\frac{10}{26}\right)$

G. $\sin^{-1}\left(\frac{26}{10}\right)$

H. $\cos^{-1}\left(\frac{10}{26}\right)$

J. $\tan^{-1}\left(\frac{10}{26}\right)$

K. $\tan^{-1}\left(\frac{26}{10}\right)$



$$1) \sin^{-1} ? = \frac{10}{26}$$

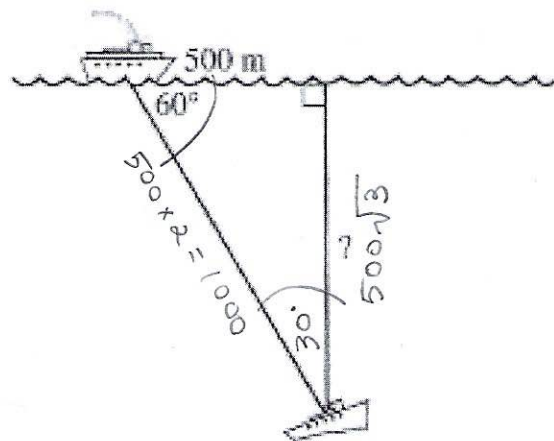
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18

5.2.1 – 5.2.2
 - Pythagorean Triples
 - Special Right Triangles

135

34. You're on a salvage ship in the Pacific Ocean when your ship's sonar locates a shipwreck at an angle of depression of 60° , as shown in the figure below. After your ship travels 500 meters on the surface of the water to be directly over the wreck, how many meters down would you have to dive to reach the wreck?



F. $\frac{500}{\sqrt{3}}$

G. 500

H. 1,000

J. $500\sqrt{2}$

K. $500\sqrt{3}$

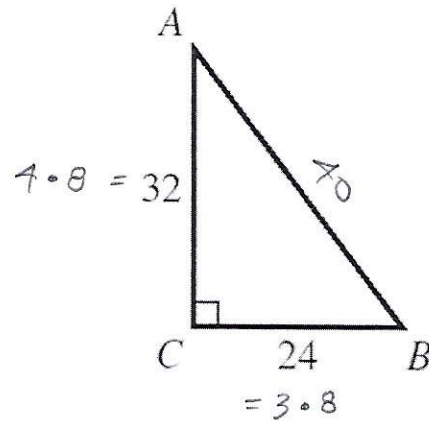
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136

30, 60, 90 Special Right Triangle:
 Hypotenuse is 2x the Short Leg,
 Long Leg is $\sqrt{3}$ x the Short Leg

19. The lengths of the 2 legs of right triangle $\triangle ABC$ shown below are given in inches. The midpoint of \overline{AB} is how many inches from A ?

- A. 16
 B. 20
 C. 21
 D. 28
 E. 40



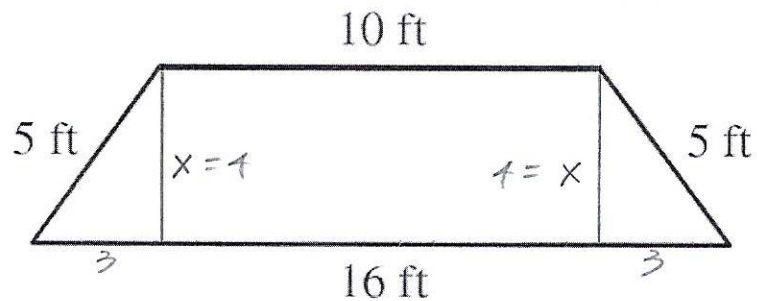
- 1) 3, 4, 5 Triple
 2) $3 \times 8 = 24$
 $4 \times 8 = 32$
 $5 \times 8 = 40$

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137

35. The parallel sides of the isosceles trapezoid shown below are 10 feet long and 16 feet long, respectively. What is the distance, in feet, between these 2 sides?

- A. 3
 B. 4
 C. 5
 D. 10
 E. 16



- 1) $\frac{16}{2} = 8$
 $\frac{10}{2} = 5$
 $8 - 5 = 3$
 2) $\frac{6}{2} = 3$
 3) 3, 4, 5 Triple

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138

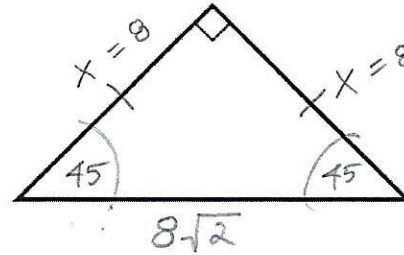
- 1) 45, 45, 90 Special Right Triangle
 2) Hypotenuse is $\sqrt{2}$ times the leg

$$3) \frac{x\sqrt{2}}{\sqrt{2}} = \frac{8\sqrt{2}}{\sqrt{2}}$$

$$4) x = 8$$

27. What is the perimeter, in inches, of the isosceles right triangle shown below, whose hypotenuse is $8\sqrt{2}$ inches long?

- A. 8
 B. $8 + 8\sqrt{2}$
 C. $8 + 16\sqrt{2}$
 D. 16
 E. $16 + 8\sqrt{2}$

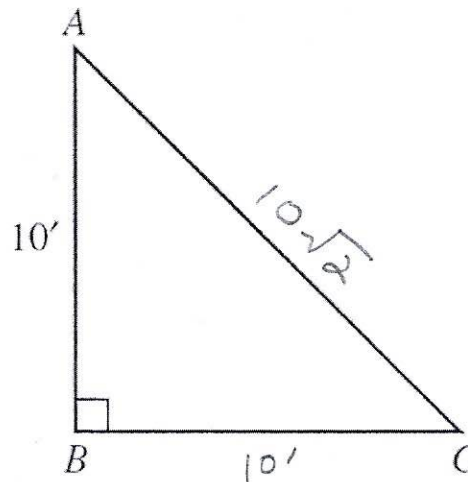


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139

13. In the isosceles right triangle below, $AB = 10$ feet. What is the length, in feet, of \overline{AC} ?

- A. 5
 B. 10
 C. 20
 D. $\sqrt{20}$
 E. $10\sqrt{2}$



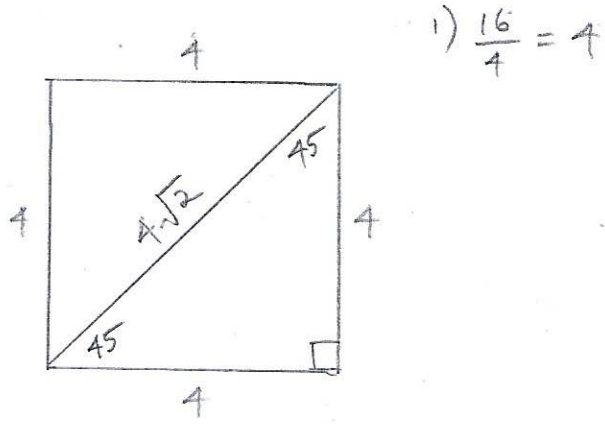
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140

- 1) 45, 45, 90 Special Right Triangle
- 2) Hypotenuse is $\sqrt{2}$ times the leg.

13. The perimeter of a square is 16. What is the length of one of its diagonals?

- A. 4
- B. $4\sqrt{2}$**
- C. 8
- D. $8\sqrt{2}$
- E. 12



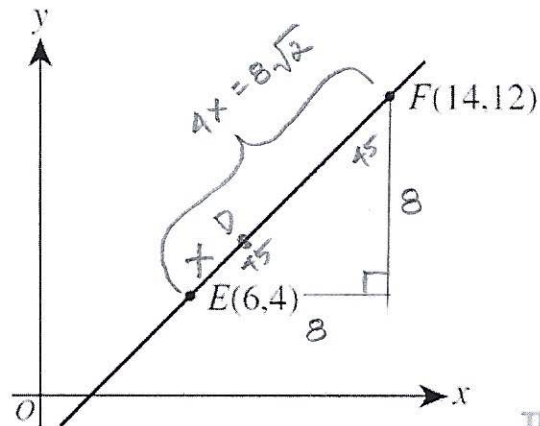
The ACT

141

44. The points $E(6,4)$ and $F(14,12)$ lie in the standard (x,y) coordinate plane shown below. Point D lies on \overline{EF} between E and F such that the length of \overline{EF} is 4 times the length of \overline{DE} . What are the coordinates of D ?

Handwritten notes: $1) \frac{14}{3} = 4$ and $2) \frac{12}{3} = 4$

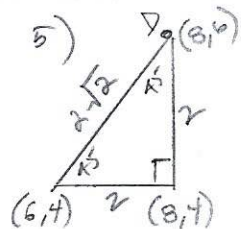
- F. (7, 5)
- G. (8, 6)**
- H. (8, 8)
- J. (10, 8)
- K. (12, 10)



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142

- 3) 45, 45, 90 Special Right Triangle
- 4) $\frac{4x}{4} = \frac{8\sqrt{2}}{4}$
- 5) $x = 2\sqrt{2}$



6) $x\text{-coordinate} = 6 + 2 = 8$
 $y\text{-coordinate} = 4 + 2 = 6$