

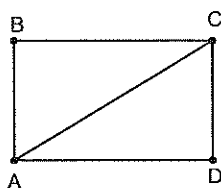
## Trapezoid and Isosceles Trapezoid Properties Worksheet

1. Which statement is true?

- (1) All parallelograms are quadrilaterals
- (2) All parallelograms are rectangles
- (3) All quadrilaterals are trapezoids
- (4) All trapezoids are parallelograms

3. In rectangle ABCD, diagonal  $\overline{AC}$  is drawn. Which is always true?

- (1)  $\overline{AB} \cong \overline{AC}$
- (2)  $\overline{AB} \cong \overline{AD}$
- (3)  $\angle DAC \cong \angle BAC$
- (4)  $\triangle DAC \cong \triangle BAC$

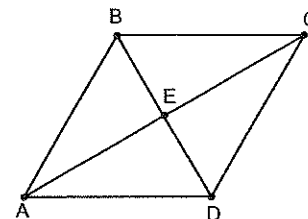


2. Which quad does not have congruent diagonals?

- (1) an isosceles trapezoid
- (2) a rhombus
- (3) a rectangle
- (4) a square

4. In rhombus ABCD, diagonals  $\overline{AC}$  and  $\overline{BD}$  intersect at E. Which statement is *not* true?

- (1)  $\triangle AEB \cong \triangle BEC$
- (2)  $\overline{AE} \cong \overline{ED}$
- (3)  $\overline{AB} \cong \overline{BC}$
- (4)  $\triangle ABD \cong \triangle CBD$



5. In isosceles trapezoid DEFG, with bases  $\overline{DE}$  and  $\overline{FG}$ ,  $m\angle F = (7x - 1)^\circ$  and

$m\angle G = (5x + 13)^\circ$ . Find  $m\angle E$ .

Handwritten work for problem 5:

$$5x + 13 = 7x - 1$$

$$14 = 2x$$

$$x = 7$$

$$m\angle F = 48$$

$$180 - 48 = 132$$

$$m\angle E = 132$$

7. In isosceles trapezoid QRST,  $\overline{RS}$  and  $\overline{TQ}$

are the bases. If  $QR = 3x + 15$  and  $ST = 5x + 8$ , find the value of  $x$ .

Handwritten work for problem 7:

$$3x + 15 = 5x + 8$$

$$7 = 2x$$

$$x = 3.5$$

6. In isosceles trapezoid ABCD, diagonal  $\overline{BD}$  is

drawn. If  $m\angle ABD = \left(\frac{1}{3}x + 35\right)^\circ$  and

$m\angle BDC = (x + 5)^\circ$ , find  $m\angle ABD$ .

Handwritten work for problem 6:

$$\frac{x}{3} + 35 = x + 5$$

$$-35 \quad -35$$

$$\frac{x}{3} = x - 30$$

$$3 \cdot \frac{x}{3} = (x - 30) \cdot 3$$

$$x = 3x - 90$$

$$-2x = -90$$

$$x = 45$$

$$\frac{45}{3} + 35 = 50$$

$$m\angle ABD = 50$$

8. In isosceles trapezoid DEFG,  $\overline{DE} \parallel \overline{FG}$  and

$\overline{EG}$  is a diagonal. Find:

- a)  $m\angle a = 30$
- b)  $m\angle b = 45$
- c)  $m\angle c = 75$

Handwritten work for problem 8:

$$180 - 75 - 30 = c$$

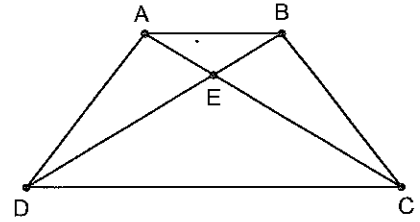
$$75 - 30 = b$$

9. In which quadrilaterals are the diagonals congruent, but do not bisect each other?

- (1) a square
- (2) a rhombus
- (3) a rectangle
- (4) an isosceles trapezoid

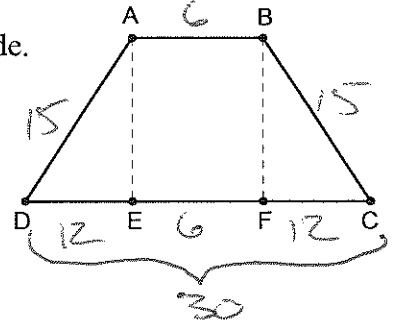
10. In the diagram of isosceles trapezoid ABCD, diagonals  $\overline{AC}$  and  $\overline{BD}$  intersect at E. Which statement is always true?

- (1)  $\overline{AE} \cong \overline{EC}$  (3)  $\triangle ACD \cong \triangle BDC$   
 (2)  $\triangle AEB$  is a right triangle (4)  $\overline{AD} \parallel \overline{BC}$



11. In isosceles trapezoid ABCD, altitudes  $\overline{AE}$  and  $\overline{BF}$  are drawn from base  $\overline{AB}$  to  $\overline{DC}$ . If  $AB = 6$ ,  $DC = 30$ , and  $AD = 15$ , find the length of an altitude.

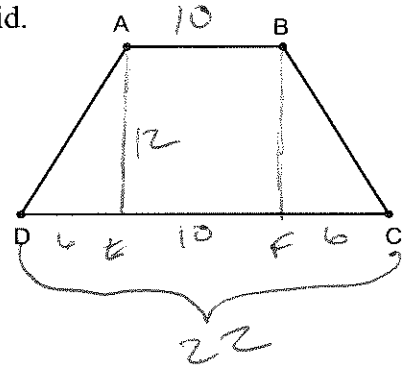
3-4-5  
 PYTHAGOREAN TRIPLE  $\rightarrow a^2 + b^2 = c^2$   
 $12^2 + b^2 = 15^2$   
 $\overline{AE} = 9$



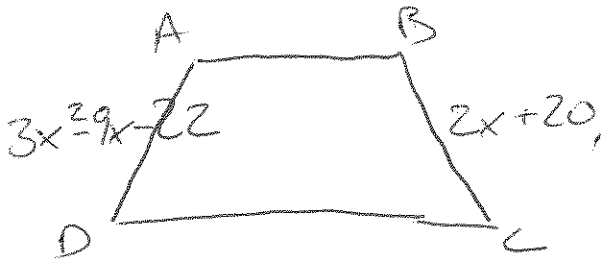
12. In isosceles trapezoid ABCD, altitudes  $\overline{AE}$  and  $\overline{BF}$  are drawn from base  $\overline{AB}$  to  $\overline{DC}$ . If  $AB = 10$ ,  $DC = 22$ , and  $AE = 12$ , find the length of a leg of the trapezoid.

$\sqrt{180}$   
 $\wedge$   
 9 20  
 $\wedge$   $\wedge$   
 (3) (3) (10) (2)  
 $\wedge$   
 (5) (2)

$6^2 + 12^2 = \overline{AD}^2$   
 $36 + 144 = \overline{AD}^2$   
 $\sqrt{180} = \overline{AD}$   
 $\overline{AD} = 6\sqrt{5}$   
 $\overline{BC} = 6\sqrt{5}$



13. (H) In isosceles trapezoid ABCD,  $\overline{AB}$  and  $\overline{CD}$  are the bases. If  $\overline{AD} = 3x^2 - 9x - 22$  and  $\overline{BC} = 2x + 20$ . Find  $x$  and the length of  $\overline{AD}$ . \*ALGEBRA II STUDENTS ONLY!



$3x^2 - 9x - 22 = 2x + 20$

$3x^2 - 11x - 42 = 0$   
 $(3x + 7)(x - 6)$

$x = 6$   
 $\overline{AD} = 32$

14. (H) In an isosceles trapezoid, the length of an altitude drawn to the base is  $5\sqrt{3}$  in. If the shorter base and longer base measure  $6\sqrt{5}$  in and  $16\sqrt{5}$  in respectively, find the length of a leg of the trapezoid.

$(5\sqrt{3})^2 + (5\sqrt{3})^2 = c^2$   
 $125 + 75 = c^2$   
 $\sqrt{200} = c$   
 $\wedge$   
 $2 \sqrt{100}$   
 $\wedge$   
 $10\sqrt{2}$

