Geometry Final Exam Solutions

krista king
MATH

Geometry Final Exam Answer Key

1. (5 pts)	A	B	C	■	E
2. (5 pts)	■	B	C	D	E
3. (5 pts)	A	■	C	D	E
4. (5 pts)	A	B	C	D	■
5. (5 pts)	A	B	■	D	E
6. (5 pts)	A	■	C	D	E
7. (5 pts)	A	B	C	■	E
8. (5 pts)	A	B	C	D	■

9. (15 pts) $x = 3^\circ$

10. (15 pts) $A = 220$ mm^2

11. (15 pts) $d = \sqrt{21}$

12. (15 pts) $A'(-2,6)$, $B'(0,6)$, $C'(1,3)$, $D'(-3,3)$

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1. D. Find the slope of line AB using the slope formula.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{7 - 3}{7 - 1} = \frac{4}{6} = \frac{2}{3}$$

The slope of the line parallel to AB is $2/3$.

2. A. The midsegment of a triangle is half the length of the base of the triangle. So,

$$3x - 1 = \frac{1}{2} \cdot 34$$

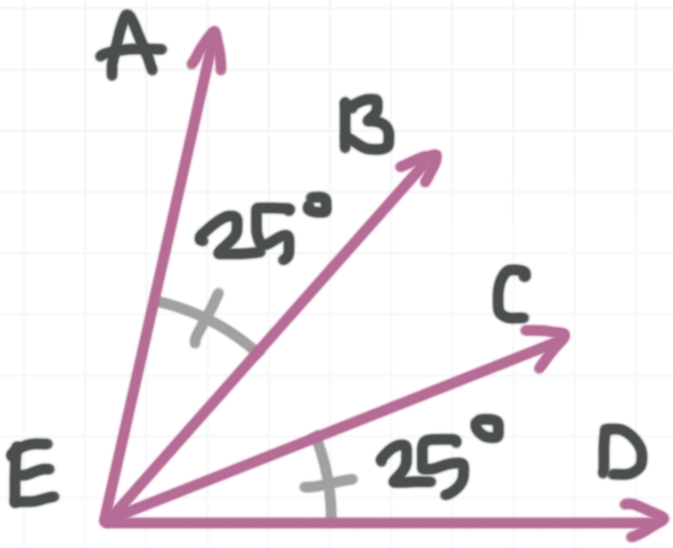
$$3x - 1 = 17$$

$$3x = 18$$

$$x = 6$$

3. B. We know that $m\angle CED = m\angle AEB = 25^\circ$. We also know the measure of the entire angle, $m\angle AED = 85^\circ$, and that $m\angle AED = m\angle AEB + m\angle BEC + m\angle CED$. Let's let $x = m\angle BEC$. Then we get

$$m\angle AED = m\angle AEB + x + m\angle CED$$



$$85^\circ = 25^\circ + x + 25^\circ$$

$$85^\circ = 50^\circ + x$$

$$x = 35^\circ$$

So $m\angle BEC = 35^\circ$. From the figure, we know that $m\angle BED = m\angle BEC + m\angle CED$. So

$$m\angle BED = 35^\circ + 25^\circ$$

$$m\angle BED = 60^\circ$$

4. E. We know that the measure of the central angle that corresponds to $\widehat{WC}$ is 45°, so the measure of the central angle corresponding to $\widehat{WSC}$ is $360^\circ - 45^\circ = 315^\circ$. Additionally, we know that $\overline{OC}$ is a radius, so the radius of the circle is 20. Plugging the values of m and r into the arc length formula gives

$$L = \frac{m}{360} \cdot 2\pi r$$

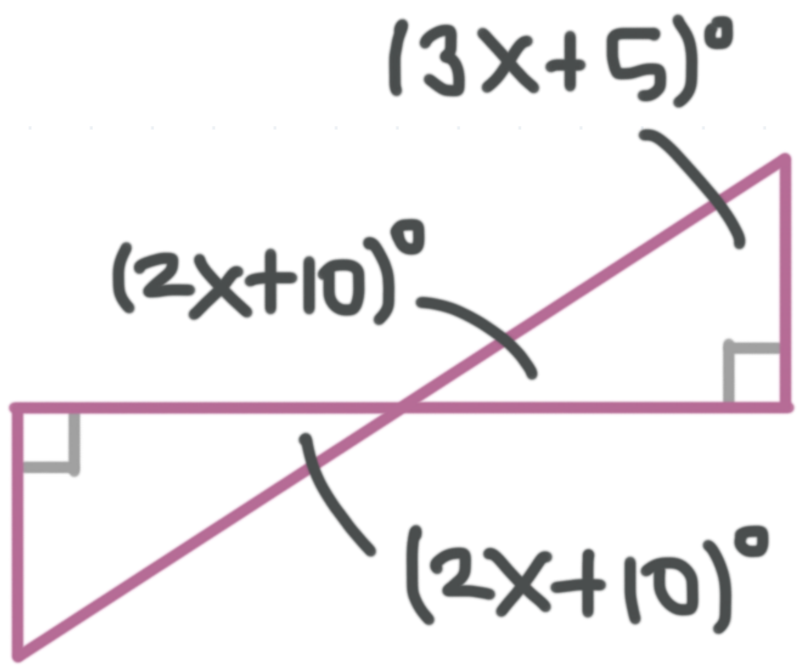
$$L = \frac{315}{360} \cdot 2\pi \cdot 20$$

$$L = \frac{7}{8} \cdot 40\pi$$

$$L = 35\pi$$

$$L \approx 109.9$$

5. C. In the triangle on the right, one of the angles is a right angle (and therefore has measure 90°), and another angle has measure $(3x + 5)^\circ$. The third angle and the angle of measure $(2x + 10)^\circ$ in the triangle on the left are a vertical angle pair, so they're congruent. Therefore, the measure of the third angle in the triangle on the right is also $(2x + 10)^\circ$.



The measures of the interior angles of a triangle sum to 180°, so we can set up an equation to solve for the variable. From the triangle on the right, we have

$$(2x + 10)^\circ + (3x + 5)^\circ + 90^\circ = 180^\circ$$

$$5x^\circ + 105^\circ = 180^\circ$$

$$5x^\circ = 75^\circ$$

$$x^\circ = 15^\circ$$

$$x = 15$$

6. B. The measure of the inscribed angle $\angle WVX$ is half that of $\angle WCX$. We know

$$\frac{1}{2}m\angle WCX = m\angle WVX$$

and

$$m\angle WCX = 62^\circ$$

So

$$\frac{1}{2}(62^\circ) = m\angle WVX$$

$$31^\circ = m\angle WVX$$

7. D. Angles DAB and ABC are consecutive angles in this parallelogram (they're next to each other, not across the figure from each other), so they're supplementary.

$$m\angle DAB + m\angle ABC = 180^\circ$$

$$(4x + 10)^\circ + (46 + 32)^\circ = 180^\circ$$

$$4x + 88^\circ = 180^\circ$$

$$4x = 92^\circ$$

$$x = 23^\circ$$

8. E. The converse of a conditional statement switches what goes with the "if" and what goes with the "then." So instead of, "If two angles are congruent, then they have the same measure," we have, "If two angles have the same measure, then they are congruent."

9. The sum of the measures of the exterior angles is 360°. Therefore,

$$74^\circ + 11x^\circ + 12x^\circ + 37^\circ + 17x^\circ + 50^\circ + 12x^\circ + 43^\circ = 360^\circ$$

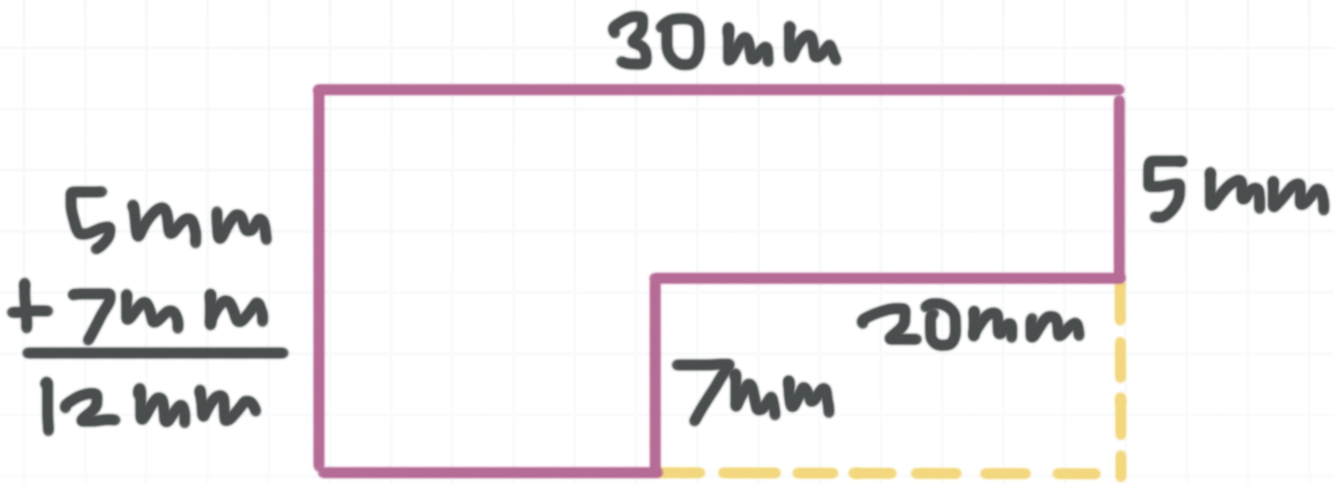
$$(11x^\circ + 12x^\circ + 17x^\circ + 12x^\circ) + (74^\circ + 37^\circ + 50^\circ + 43^\circ) = 360^\circ$$

$$52x^\circ + 204^\circ = 360^\circ$$

$$52x^\circ = 156^\circ$$

$$x = 3^\circ$$

10. To find the area of the figure, we can form a new large rectangle by drawing a rectangle that fills in the empty space.



The height of the new, large rectangle we formed is 12, and its base is 30, so its area is

$$A = bh$$

$$A = (12 \text{ mm})(30 \text{ mm})$$

$$A = 360 \text{ mm}^2$$

The rectangle we drew to fill in the empty space has a height of 7 mm, and base of 20 mm, so its area is

$$A = bh$$

$$A = (7 \text{ mm})(20 \text{ mm})$$

$$A = 140 \text{ mm}^2$$

We see that the area of the original figure is found by taking the area of the large rectangle and subtracting the area of the small rectangle.

$$A = 360\text{mm}^2 - 140\text{mm}^2$$

$$A = 220\ \text{mm}^2$$

11. To find the distance between two points plotted in three-dimensional space, use the distance formula.

$$d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2 + (z_1 - z_2)^2}$$

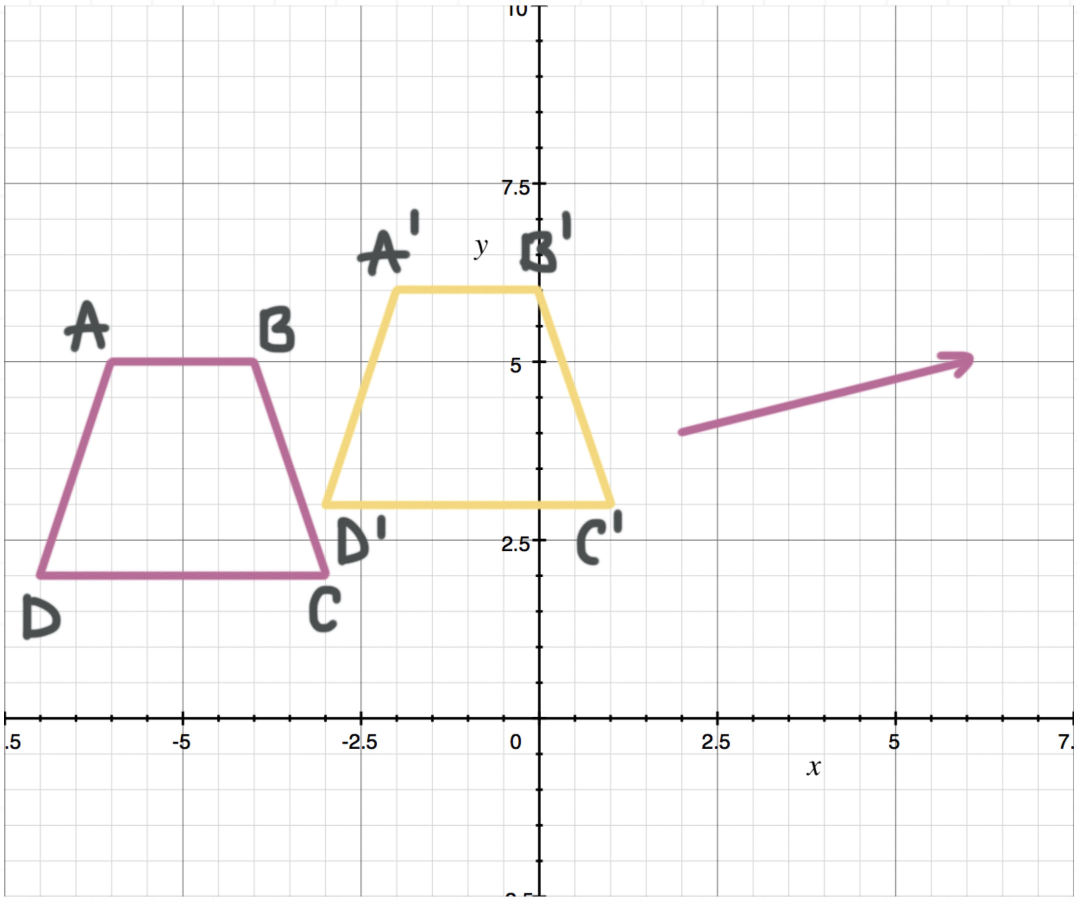
$$d = \sqrt{(-2 - 2)^2 + (2 - 1)^2 + (2 - 0)^2}$$

$$d = \sqrt{(-4)^2 + 1^2 + 2^2}$$

$$d = \sqrt{16 + 1 + 4}$$

$$d = \sqrt{21}$$

12. The vector starts at $(2,4)$ and ends at $(6,5)$. The change between the initial point and terminal point is an increase of 4 in the x-value and an increase of 1 in the y-value, so we can apply the transformation $T(x, y) = (x + 4, y + 1)$ to each vertex.



The vertex $A(-6,5)$ is transformed to

$$A'(-6+4,5+1)$$

$$A'(-2,6)$$

The vertex B is transformed to

$$B'(-4+4,5+1)$$

$$B'(0,6)$$

The vertex C is transformed to

$$C'(-3+4,2+1)$$

$$C'(1,3)$$

The vertex D is transformed to

$$D'(-7+4,2+1)$$

$$D'(-3,3)$$

So the vertices of the translated trapezoid are $A'(-2,6)$, $B'(0,6)$, $C'(1,3)$ and $D'(-3,3)$.

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