

# Geometry: Final Exam Prep

Math II

Name: Key!

**Directions:** The following questions are sample items similar to those found on the EOC Exam. Answer each to the best of your ability.

1. A city map is placed on a coordinate grid. The post office is located at the point  $P(5, 35)$ , the library is located at the point  $L(15, 10)$ , and the fire station is located at the point  $F(9, 25)$ . What is the ratio of the length of  $\overline{PF}$  to the length of  $\overline{LF}$ ?

- (A) 2 : 3  
 B 3 : 2  
 C 2 : 5  
 D 3 : 5

$$\overline{PF} = \sqrt{(5-9)^2 + (35-25)^2}$$

$$\overline{PF} = \sqrt{16 + 100} = \sqrt{116}$$

$$4 \sqrt{29} \quad \overline{PF}$$

$$\overline{PF} = 2\sqrt{29}$$

$$\overline{LF} = \sqrt{(15-9)^2 + (10-25)^2}$$

$$\overline{LF} = \sqrt{36 + 225} = \sqrt{261}$$

$$9 \sqrt{29} \quad \overline{LF}$$

$$\overline{LF} = 3\sqrt{29}$$

$$PF : LF$$

$$2\sqrt{29} : 3\sqrt{29}$$

$$\boxed{2 : 3}$$

2. A circular pond is modeled by the equation  $x^2 + y^2 = 225$ . A bridge over the pond is modeled by a segment of the equation  $x - 7y = -75$ . What are the coordinates of the points where the bridge meets the edge of the pond? (I'd just plug & chug the ans)!

- (A) (9, 12) and (-12, 9)  
 B (9, 12) and (12, 9)  
~~C (9, -12) and (-12, -9)~~  
~~D (-9, 12) and (12, -9)~~

$$x = 7y - 75$$

$$(7y - 75)^2 + y^2 = 225$$

$$(7y - 75)(7y - 75) + y^2 = 225$$

$$49y^2 - 1050y + 5625 + y^2 = 225$$

$$50y^2 - 1050y + 5400 = 0$$

$$y^2 - 21y + 108 = 0$$

$$(y - 12)(y - 9) = 0$$

$$y = 12 \quad y = 9$$

$$x = 7(12) - 75 \quad x = 7(9) - 75$$

$$x = 9 \quad x = -12$$

$$(9, 12) \quad (-12, 9)$$

3. A plane intersects a regular triangular pyramid. The plane is parallel to one of the faces of the pyramid. What type of polygon is formed at the intersection?

- A square  
 B right triangle  
 C isosceles trapezoid  
 (D) isosceles triangle

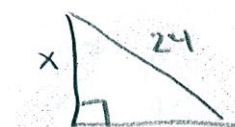
pyramids are named by their bases!



$$\begin{aligned} 6r - 18 &= 72 \\ 6r &= 90 \\ r &= 15 \end{aligned}$$

4. A garden has the shape of an isosceles right triangle. The length of the hypotenuse is 24 feet. What is the area of the garden?

- A 576 ft<sup>2</sup>  
 B 288 ft<sup>2</sup>  
 C 203 ft<sup>2</sup>  
 (D) 144 ft<sup>2</sup>



$$x^2 + x^2 = 24^2$$

$$2x^2 = 576$$

$$x^2 = 288$$

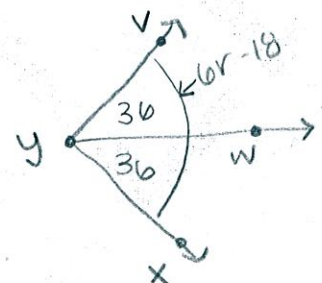
$$288 = 12\sqrt{2}$$

$$A = \frac{(12\sqrt{2})(12\sqrt{2})}{2}$$

$$A = 144$$

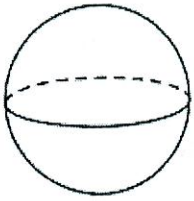
5. Given  $\angle VYX$  is bisected by  $\overline{YW}$ ,  $m\angle VYX = (6r - 18)$ , and  $m\angle VYW = 36$ . What is the value of  $r$ ?

- (A) 15  
 B 30  
 C 36  
 D 72

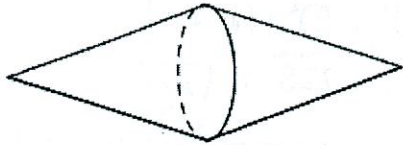


6. Kathleen rotated an isosceles trapezoid  $360^\circ$  around its longest base. Which choice could be the resulting solid?

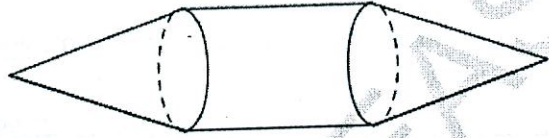
A



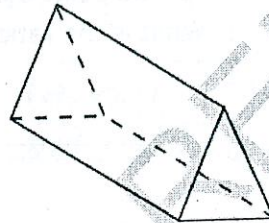
B



C



D



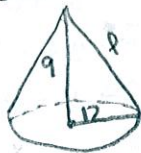
7. A cone has a radius of 12 cm and a height of 9 cm. What is the **approximate** lateral surface area of the cone? (To calculate the lateral surface area,  $A$ , use the formula  $A = \pi r l$ , where  $r$  is the radius and  $l$  is the slant height.)

A  $89 \text{ cm}^2$

B  $123 \text{ cm}^2$

C  $424 \text{ cm}^2$

D  $565 \text{ cm}^2$



$$A = (3.14)(12)(15)$$

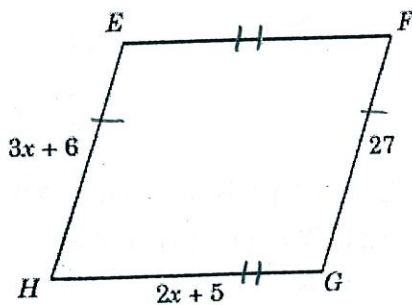
$$A = 565.2$$

$$9^2 + 12^2 = l^2$$

$$225 = l^2$$

$$15 = l$$

9. Given parallelogram  $EFGH$ , what is the length of side  $\overline{EF}$ ?



A 27

B 21

C 19

D 7

$$3x + 6 = 27$$

$$3x = 21$$

$$x = 7$$

$$EF = 2(7) + 5 = 19$$

8.  $M$  is the midpoint of  $\overline{RS}$ ,  $RM = (3x + 1)$ , and  $MS = (4x - 2)$ . What is  $RS$ ?

A 20

B 17

C 10

D 3



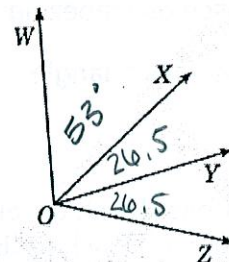
$$3x + 1 = 4x - 2$$

$$3 = x$$

$$RM = (3)(3) + 1 = 10$$

$$RS = 20$$

10.  $\overline{OX}$  is the bisector of  $\angle WOZ$  and  $\overline{OY}$  is the bisector of  $\angle XOZ$ .



If  $m\angle YOZ = 26.5$ , what is  $m\angle WOZ$ ?

A 53.0

B 79.5

C 106.0

D 132.5

$$53$$

$$+ 26.5$$

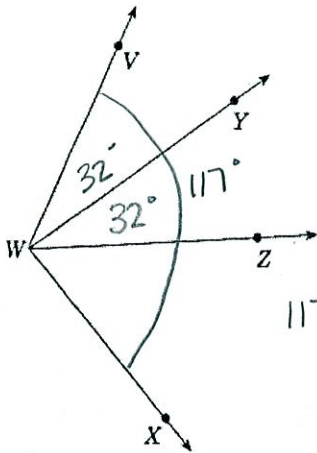
$$+ 26.5$$


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$$106$$



11. In the figure below,  $\overline{WY}$  bisects  $\angle VWZ$ ,  $m\angle VWY = 32$ , and  $m\angle VWX = 117$ .



What is  $m\angle ZWX$ ?

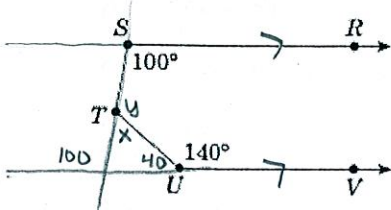
- A 85
- B 53
- C 42.5
- D 26.5

$117 - 64 = 53^\circ$

12. A container in the shape of a rectangular prism has a base that measures 20 centimeters by 30 centimeters and has a height of 15 centimeters. The container is partially filled with water. A student adds more water to the container and notes that the water level rises 2.5 cm. What is the volume of the added water?

- A 1,500  $\text{cm}^3$
  - B 3,600  $\text{cm}^3$
  - C 4,500  $\text{cm}^3$
  - D 9,000  $\text{cm}^3$
- $h = 2.5$   
 $L = 20$   
 $W = 30$   
 $V = (2.5)(20)(30)$   
 $V = 1500$

13. In the figure below,  $\overline{SR} \parallel \overline{UV}$ .



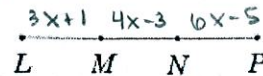
What is  $m\angle STU$ ?

- A 60
- B 90
- C 120
- D 240

$x + 40 = 100$   
 $x = 60$

$y = 180 - 60$   
 $y = 120$

14. Given  $\overline{LP}$ ,  $LM = (3x + 1)$ ,  $MN = (4x - 3)$ ,  $NP = (6x - 5)$ , and  $\overline{LM} \cong \overline{NP}$ .

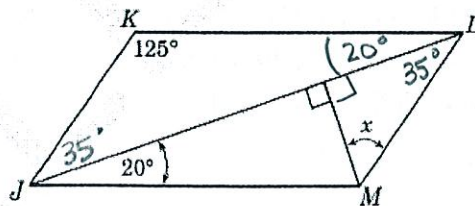


What is the length of  $\overline{MP}$ ?

- A 2
- B 7
- C 12
- D 19

$3x + 1 = 6x - 5$   
 $6 = 3x$   
 $x = 2$   
 $MN = 4(2) - 3 = 5$   
 $NP = 6(2) - 5 = 7$   
 $MP = 5 + 7 = 12$

15. Figure  $JKLM$  is a parallelogram.

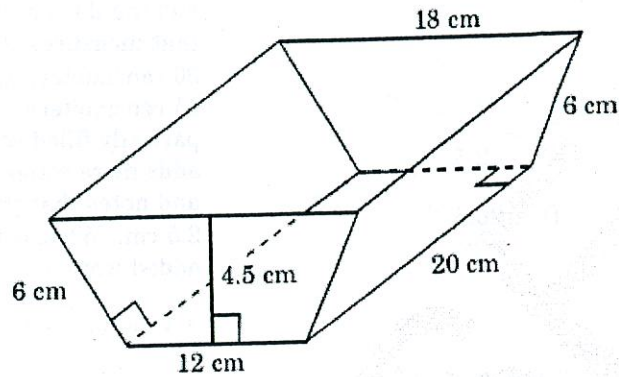


What is the value of  $x$ ?

- A 65°
- B 55°
- C 45°
- D 35°

$180$   
 $- 90$   
 $- 35$   
 $\hline 55^\circ$

16. A plastic tray is shown below, with the dimensions labeled. The tray does not have a cover on top. The bottom and two of the sides are rectangles. The remaining two sides are congruent isosceles trapezoids.



What is the total area of the outer surface of the tray?

- A 495 cm<sup>2</sup>
- B 584 cm<sup>2</sup>
- C 615 cm<sup>2</sup>
- D 975 cm<sup>2</sup>

$$\text{Trapezoid}_1 = \frac{(12+18)(4.5)}{2} = 67.5$$

$$\text{Trapezoid}_2 = 67.5$$

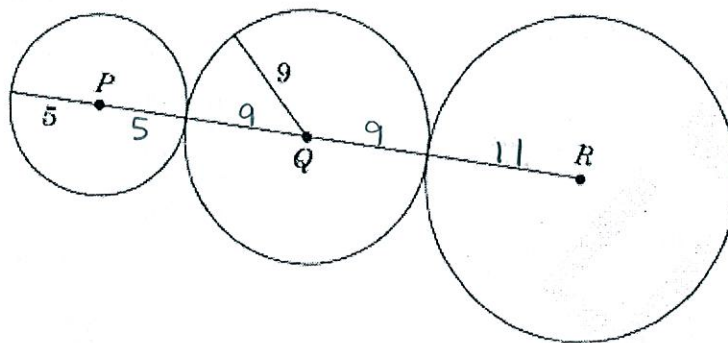
$$\text{Base} = (12 \times 20) = 240$$

$$\text{Side}_1 = (6 \times 20) = 120$$

$$\text{Side}_2 = 120$$

$$\text{Total Area} = 615 \text{ cm}^2$$

17. Circles  $P$ ,  $Q$ , and  $R$  are shown below. The diameter of circle  $R$  is 22.

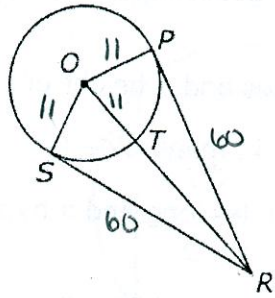


What is the length of  $\overline{PR}$ ?

- A 25
- B 34
- C 39
- D 50

$$5 + 18 + 11 = 34$$

18. In the figure below,  $\overline{PR}$  and  $\overline{SR}$  are tangent to circle  $O$ .



$$11^2 + 60^2 = x^2$$

$$3721 = x^2$$

$$x = 61$$

If  $OT = 11$  cm and  $PR = 60$  cm, what is the length of  $\overline{OR}$ ?

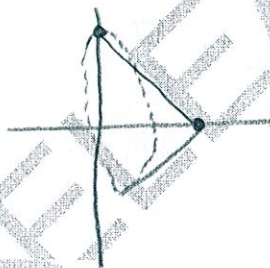
- A 61 cm  
 B 59 cm  
 C 50 cm  
 D 48 cm
19. The endpoints of a diameter of a circle are located at  $(5, 9)$  and  $(11, 17)$ . Which is an equation of the circle?

A  $(x - 5)^2 + (y - 9)^2 = 100$   
 B  $(x - 5)^2 + (y - 9)^2 = 25$   
 C  $(x - 8)^2 + (y - 13)^2 = 100$   
 D  $(x - 8)^2 + (y - 13)^2 = 25$

$x_c = \frac{5+11}{2} = \frac{16}{2} = 8$      $y_c = \frac{9+17}{2} = \frac{26}{2} = 13$   
 center:  $(8, 13)$   
 $(x-8)^2 + (y-13)^2 = r^2$   
 $(11-8)^2 + (17-13)^2 = r^2$   
 $9 + 16 = r^2 = 25$

20. An isosceles right triangle is placed on a coordinate grid. One of its legs is on the  $x$ -axis and the other on the  $y$ -axis. Which describes the shape created when the triangle is rotated about the  $x$ -axis?

- A cone  
 B cylinder  
 C pyramid  
 D sphere



21. A plane intersects a regular triangular pyramid. The plane is parallel to one of the faces of the pyramid. What type of polygon is formed at the intersection?

- A square  
 B right triangle  
 C isosceles trapezoid  
 D isosceles triangle




22. County X has a population density of 250 people per square mile. The total population of the county is 150,000. Which geometric model could be the shape of county X?

$$\frac{150000}{250} = 600$$

A a parallelogram with a base of 25 miles and a height of 25 miles  $(25)(25) = 625$

B a rectangle that is 15 miles long and 45 miles wide  $(15)(45) = 675$

C a right triangle with a leg that is 30 miles long and a hypotenuse that is 50 miles long   $\frac{(30)(40)}{2} = 600$

D a trapezoid with base lengths of 10 miles and 30 miles and a height of 25 miles  $\frac{(10+30)25}{2} = 500$

23. The center of circle W is located at  $(-4, 2)$ . Point  $(1, 2)$  lies on this circle. Which point is also located on circle W?

A  $(-7, -1)$

B  $(-4, 5)$

C  $(-1, -2)$

D  $(0, 7)$

$$(x+4)^2 + (y-2)^2 = r^2$$

$$(1+4)^2 + (2-2)^2 = r^2$$

$$25 = r^2$$

a)  $(-7+4)^2 + (-1-2)^2 = 25$   
 $18 \neq 25$

b)  $(-4+4)^2 + (5-2)^2 = 25$   
 $9 \neq 25$

c)  $(-1+4)^2 + (-2-2)^2 = 25$   
 $25 = 25 \checkmark$

d)  $(0+4)^2 + (7-2)^2 = 25$   
 $41 \neq 25$

plug Ans into this equation or graph on a coordinate plane!

24. The edge of a ruler that Paula used to measure the radius of a circle is divided into tenths of a centimeter. She measured the radius as 3.75 centimeters. With this level of precision, which choice is the **best** way to report the area of the circle?

A  $45.34 \text{ cm}^2$

B  $45.3 \text{ cm}^2$

C  $44.2 \text{ cm}^2$

D  $44.17 \text{ cm}^2$

$$A = \pi r^2$$

$$A = (3.14)(3.75)^2$$

$$A = 44.17$$

25. If the dimensions of one rectangular prism are twice those of a smaller rectangular prism, what is the ratio of their volumes?

A 2 : 1

B 4 : 1

C 6 : 1

D 8 : 1



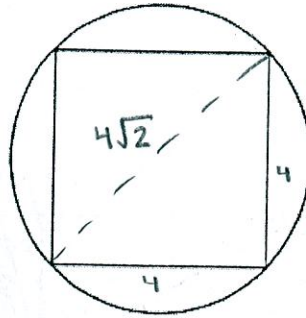
$$V = (1)(1)(1)$$

$$V = 1$$

$$V = (2)(2)(2)$$

$$V = 8$$

6. A circular tablecloth is placed over a square table, as shown below. The table measures 4 feet along each side.



$$D = 4\sqrt{2} = 5.7$$

$$r = 2.8$$

$$A_s = (4)(4) = 16$$

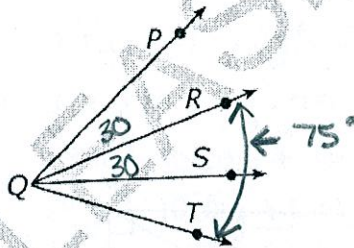
$$A_c = (3.14)(2.8)^2 = 24.62$$

**Approximately** how many square feet of tablecloth hang below the tabletop?

- A 25 ft<sup>2</sup>  
 B 16 ft<sup>2</sup>  
 C 9 ft<sup>2</sup>  
 D 5 ft<sup>2</sup>

$$\begin{array}{r} 24.62 \\ - 16 \\ \hline 8.62 \end{array}$$

27. In the diagram below,  $\angle PQR \cong \angle RQS$ ,  $m\angle PQR = 30$ , and  $m\angle RQT = 75$ .



What is  $m\angle SQT$ ?

- A 30  
 B 45  
 C 60  
 D 75

$$\begin{array}{r} 75 \\ - 30 \\ \hline 45^\circ \end{array}$$

28.  $\overline{RS} \parallel \overline{PQ}$ , and the coordinates are  $R(-4, -6)$ ,  $S(0, -2)$ ,  $P(-4, 0)$ , and  $Q(0, y)$ . What is the value of  $y$ ?

- A 0  
 B 1  
 C 4  
 D 6

I'd graph on a coordinate plane! But since I don't have one....

$$m = \frac{-2 + 6}{0 + 4} = \frac{4}{4} = 1 \leftarrow \text{slope}$$

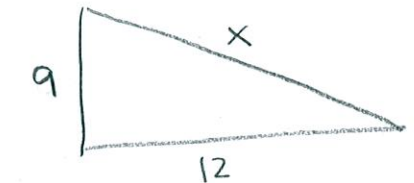
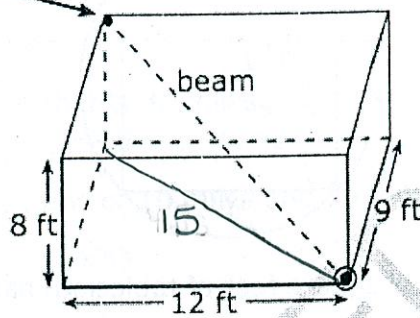
$$\text{slope } (m) = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\frac{1}{1} = \frac{0 - y}{-4 + 0} \quad \frac{1}{1} = \frac{-y}{-4} \quad -y = -4$$

$$y = 4$$

29. An office has the following dimensions: 12 ft long, 9 ft wide, and 8 ft high. The security system will focus an infrared beam from the top, left corner of the ceiling down to the lower right corner of the floor.

security system



$$9^2 + 12^2 = x^2$$

$$x^2 = 225$$

$$x = 15$$

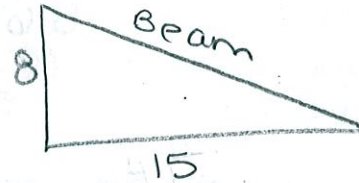
What is the length of the infrared beam?

- A 15 ft
- B 17 ft
- C 20 ft
- D 24 ft

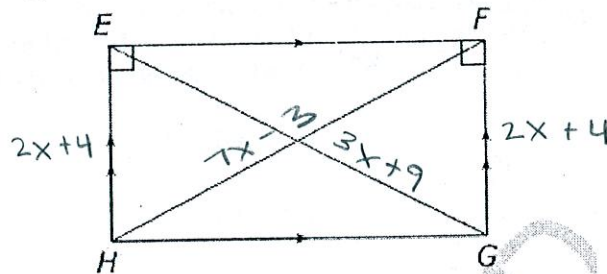
$$8^2 + 15^2 = \text{Beam}^2$$

$$289 = \text{Beam}^2$$

$$\text{Beam} = 17 \text{ ft}$$



30. Given:  $FG = 2x + 4$   
 $EG = 3x + 9$   
 $FH = 7x - 3$



What is the length of  $\overline{EH}$ ?

- A 18
- B 10
- C 9
- D 5

$$7x - 3 = 3x + 9$$

$$4x = 12$$

$$x = 3$$

$$\begin{aligned} EH &= 2(3) + 4 \\ &= 6 + 4 = 10 \end{aligned}$$