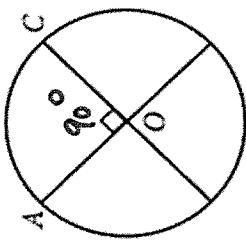


2



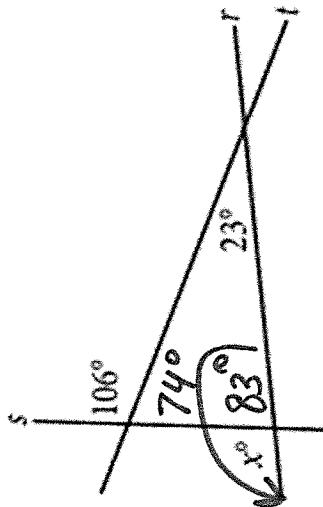
The circle above with center O has a circumference of 36. What is the length of minor arc \widehat{AC} ?

A) 9 B) 12 C) 18 D) 36

$$\frac{90^\circ}{360^\circ} \cdot 36 =$$

20

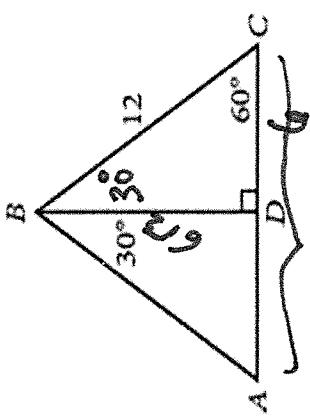
Intersecting lines r , s , and t are shown below.



What is the value of x ?

$$x = 97^\circ$$

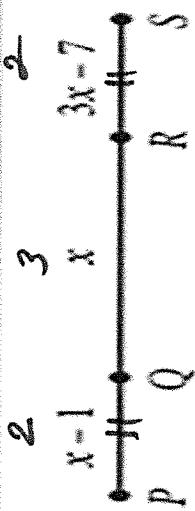
19



In $\triangle ABC$ above, what is the length of \overline{AD} ?

- A) 4
- B) 6
- C) $6\sqrt{2}$
- D) $6\sqrt{3}$

33

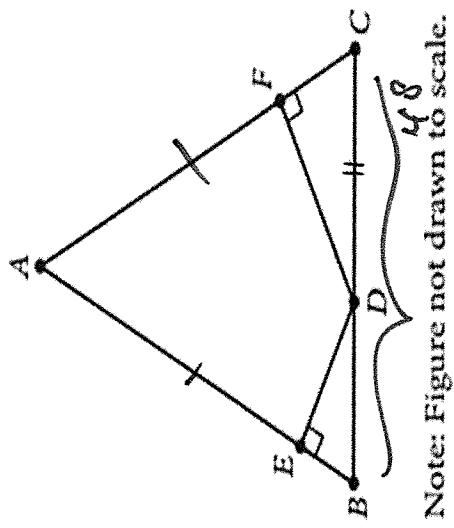


Note: Figure not drawn to scale.

On \overline{PS} above $PQ = RS$. What is the length of \overline{RS} ?

$$\begin{array}{r}
 x - 1 = 3x - 7 \\
 -x \quad -x \\
 \hline
 -1 = 2x - 7 \\
 +7 \quad +7 \\
 \hline
 \frac{2x}{2} = \frac{6}{2} \quad x = 3
 \end{array}$$

$$PS = 2 + 3 + 2 = 7$$

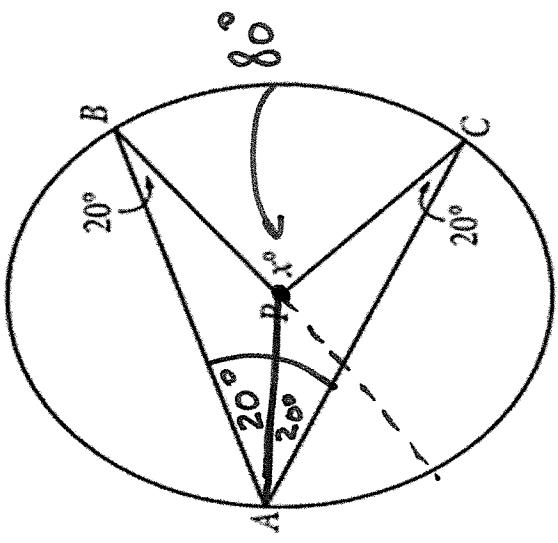


Note: Figure not drawn to scale.

Triangle ABC above is isosceles with $AB = AC$ and $BC = 48$. The ratio of DE to DF is $5 : 7$. What is the length of \overline{DC} ?

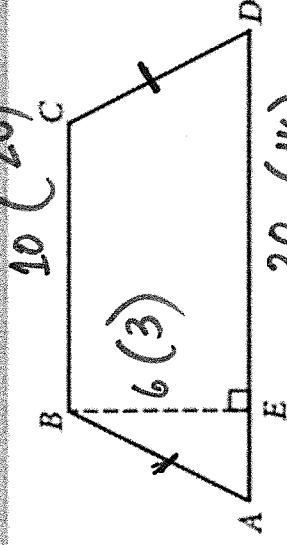
$$\frac{DE}{DF} = \frac{5}{7}$$

- A) 12
- B) 20
- C) 24
- D) 28

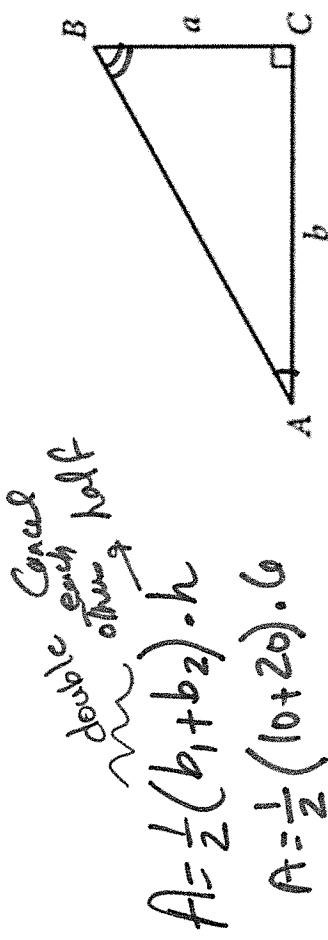


Point P is the center of the circle in the figure above. What is the value of x ?

$$PA = PB = PC$$



26



In quadrilateral $ABCD$ above, \overline{BC} is parallel to \overline{AD} , and $AB = CD$. If BC and AD were each doubled and

BE was reduced by 50 percent, how would the area of $ABCD$ change?

- A) The area of $ABCD$ would be decreased by 50 percent.
- B) The area of $ABCD$ would be increased by 50 percent.
- C) The area of $ABCD$ would not change.
- D) The area of $ABCD$ would be multiplied by 2.

Given the right triangle ABC above, which of the

$$A = \frac{1}{2}(20+40) \cdot 6$$

$$A = \frac{1}{2}(60+20) \cdot 6$$

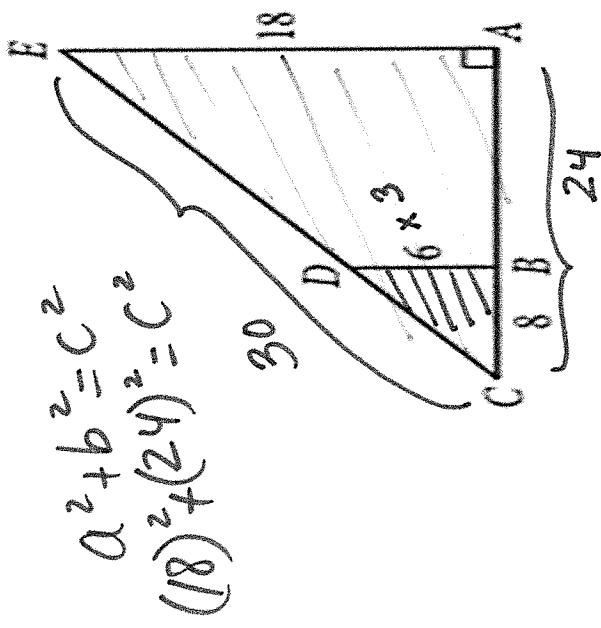
~~A) $\frac{\sin A}{a}$~~ ~~B) $\frac{\sin B}{a}$~~ ~~C) $\frac{\tan A}{a}$~~ ~~D) $\tan B$~~

$$A = \frac{1}{2}(20+40) \cdot 3 \text{ following is equal to } \frac{b}{a} ?$$

$$A = 90^\circ$$

~~A) $\frac{\sin A}{a}$~~ ~~B) $\frac{\sin B}{a}$~~ ~~C) $\frac{\tan A}{a}$~~ ~~D) $\tan B$~~

18



In the figure above, \overline{BD} is parallel to \overline{AE} . What is the length of \overline{CE} ?

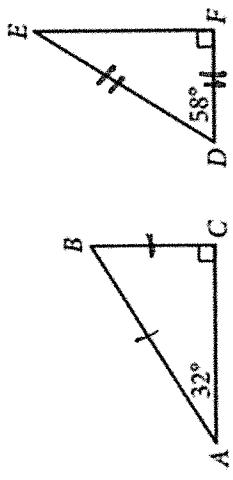
$$CE = 30$$



- 27
- In the xy -plane, the graph of $2x^2 - 6x + 2y^2 + 2y = 45$ is a circle. What is the radius of the circle?

- A) 5
- B) 6.5
- C) $\sqrt{40}$
- D) $\sqrt{50}$

16

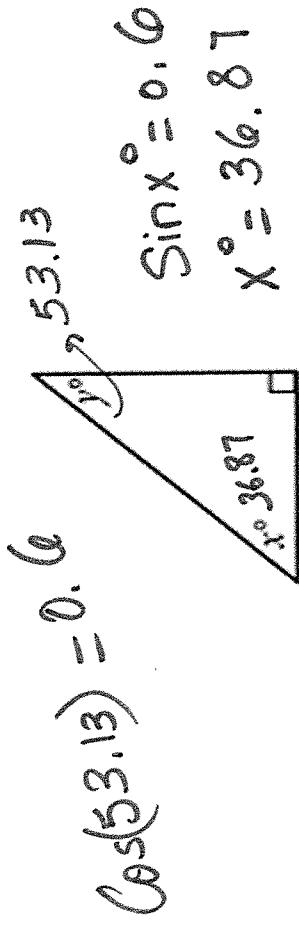


Triangles ABC and DEF are shown above. Which of the following is equal to the ratio $\frac{BC}{AB}$?

- A) $\frac{DE}{DF}$
- B) $\frac{DF}{DE}$
- C) $\frac{EF}{DF}$
- D) $\frac{DF}{DE}$

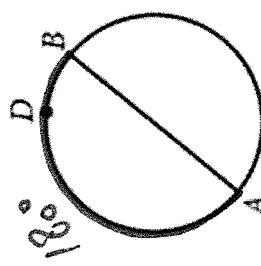
24

IV



In the triangle above, the sine of x° is 0.6. What is the cosine of y° ?

24

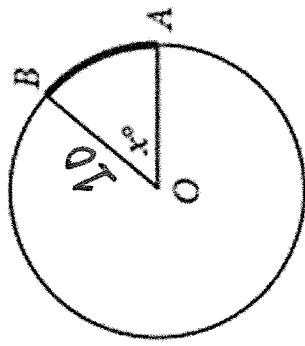


$$\frac{180^\circ}{360^\circ} \cdot 2\pi r = 8\pi$$

$$r = 8$$

In the circle above, segment AB is a diameter. If the length of arc \widehat{ADB} is 8π , what is the length of the radius of the circle?

- A) 2
- B) 4
- C) 8
- D) 16



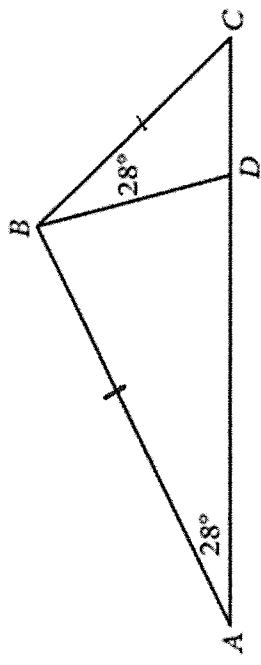
Note: Figure not drawn to scale.

In the figure above, the circle has center O and has radius 10. If the length of arc \widehat{AB} (shown in bold) is between 5 and 6, what is one possible integer value of x ?

$$5 < \frac{x}{360} \cdot 20\pi < 6$$

$$5 < 0.17x < 6$$

$$29.4 < x < 35.29$$



In the figure above, which of the following ratios has the same value as $\frac{AB}{BC}$?

- A) $\frac{BD}{DC}$
- B) $\frac{BC}{AC}$
- C) $\frac{AD}{BD}$
- D) $\frac{DC}{BC}$

15

- A circle is graphed in the xy -plane. If the circle has a radius of 3 and the center of the circle is at $(4, -2)$, which of the following could be an equation of the circle?

A) $(x + 4)^2 + (y - 2)^2 = 3$

24

24

$$V = \frac{4}{3}\pi r^3 \rightarrow \text{Cube}$$

The formula for the volume of a sphere with radius r is shown above. The radius of the planet Jupiter is about 11 times the radius of planet Earth. Assuming that planets are spheres, about how many times larger is the volume of Jupiter than the volume of Earth?

- A) 11
 B) 121
 C) 1,331
 D) 1,775

- 21 A landscaper is designing a rectangular fountain with a 4-foot-wide path around it. The equation $A = 4p + 64$ will relate the area A , in square feet, of the path to the perimeter p , in feet, of the fountain. In the design, how many feet will the perimeter of the fountain increase for each additional square foot of the path's area?

A) $\frac{1}{64}$

B) $\frac{1}{4}$

C) 4

D) 64

$$A = 4p + 64$$

$$4p = A - 64$$

$$p = \frac{1}{4}A - 16$$

$$\text{Volume of Jupiter} = (\pi r)^3 \text{ Earth}$$

$$V = \frac{4}{3}\pi (11r)^3$$

SAT Circles

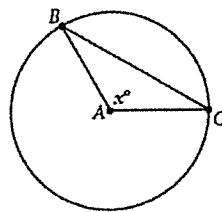
9

$$(x - 6)^2 + (y + 5)^2 = 16$$

In the xy -plane, the graph of the equation above is a circle. Point P is on the circle and has coordinates $(10, -5)$. If \overline{PQ} is a diameter of the circle, what are the coordinates of point Q ?

- A) $(2, -5)$
- B) $(6, -1)$
- C) $(6, -5)$
- D) $(6, -9)$

20



Note: Figure not drawn to scale.

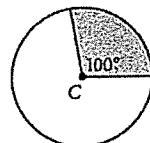
In the circle above, point A is the center and the length of arc \widehat{BC} is $\frac{2}{5}$ of the circumference of the circle. What is the value of x ?

$$\frac{x^\circ}{360^\circ} = \frac{2}{5}$$

$$5x^\circ = 720$$

$$x^\circ = 144^\circ$$

34



Point C is the center of the circle above. What fraction of the area of the circle is the area of the shaded region?

$$\frac{100^\circ}{360^\circ} = \frac{10^\circ}{36^\circ} = \frac{5}{18}$$

Fraction of a Circle

20

Points A and B lie on a circle with radius 1, and arc \widehat{AB} has length $\frac{\pi}{3}$. What fraction of the circumference of the circle is the length of arc \widehat{AB} ?

$$\frac{60^\circ}{360^\circ} = \frac{1}{6}$$

$$\frac{\theta}{360^\circ} \cdot 2\pi = \frac{\pi}{3}$$

$$30^\circ = 180^\circ$$

$$\frac{\theta}{180^\circ} = \frac{1}{3}$$

$$\theta = 60^\circ$$

Radian

$$\left(\frac{5\pi}{4}\right)(51.29)$$

34

In a circle with center O , central angle AOB has a measure of $\frac{5\pi}{4}$ radians. The area of the sector

formed by central angle AOB is what fraction of the area of the circle?

$$\frac{2.85^\circ}{360^\circ} \cdot \pi(r^2)$$

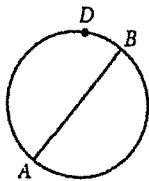
$$\approx \frac{2}{3}$$

27

In the xy -plane, the graph of $2x^2 - 6x + 2y^2 + 2y = 45$ is a circle. What is the radius of the circle?

- A) 5
- B) 6.5
- C) $\sqrt{40}$
- D) $\sqrt{50}$

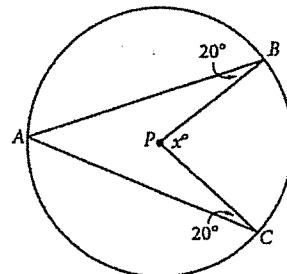
24



In the circle above, segment AB is a diameter. If the length of arc \widehat{ADB} is 8π , what is the length of the radius of the circle?

- A) 2
- B) 4
- C) 8
- D) 16

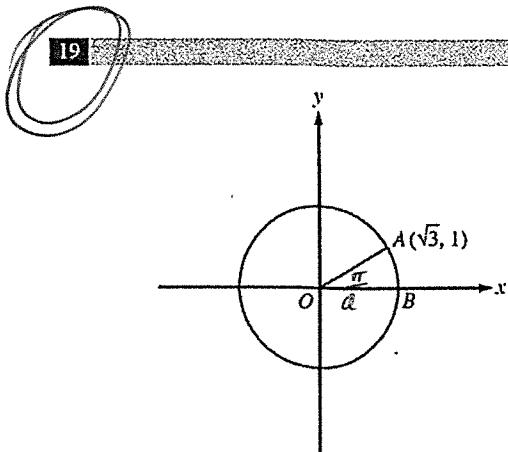
36



Point P is the center of the circle in the figure above. What is the value of x ?

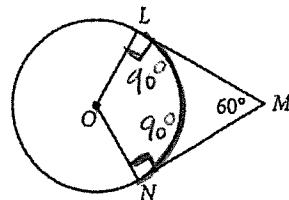
done before

19



In the xy -plane above, O is the center of the circle, and the measure of $\angle AOB$ is $\frac{\pi}{a}$ radians. What is the value of a ?

36

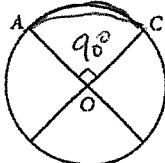


In the figure above, point O is the center of the circle, line segments LM and MN are tangent to the circle at points L and N , respectively, and the segments intersect at point M as shown. If the circumference of the circle is 96, what is the length of minor arc \widehat{LN} ?

$$\frac{120^\circ}{360^\circ} \cdot 96 = \boxed{32}$$

36

2

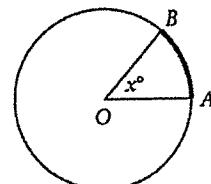


The circle above with center O has a circumference of 36. What is the length of minor arc \widehat{AC} ?

- A) 9
- B) 12
- C) 18
- D) 36

$$\frac{90^\circ}{360^\circ} \cdot 36 =$$

done before



Note: Figure not drawn to scale.

In the figure above, the circle has center O and has radius 10. If the length of arc \widehat{AB} (shown in bold) is between 5 and 6, what is one possible integer value of x ?



Math Test – No Calculator

25 MINUTES, 20 QUESTIONS

Turn to Section 3 of your answer sheet to answer the questions in this section.

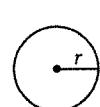
DIRECTIONS

For questions 1–15, solve each problem, choose the best answer from the choices provided, and fill in the corresponding circle on your answer sheet. For questions 16–20, solve the problem and enter your answer in the grid on the answer sheet. Please refer to the directions before question 16 on how to enter your answers in the grid. You may use any available space in your test booklet for scratch work.

NOTES

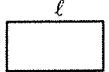
- The use of a calculator is **not permitted**.
- All variables and expressions used represent real numbers unless otherwise indicated.
- Figures provided in this test are drawn to scale unless otherwise indicated.
- All figures lie in a plane unless otherwise indicated.
- Unless otherwise indicated, the domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

REFERENCE

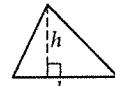


$$A = \pi r^2$$

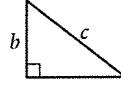
$$C = 2\pi r$$



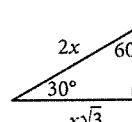
$$A = lw$$



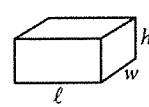
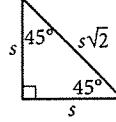
$$A = \frac{1}{2}bh$$



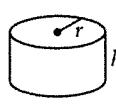
$$c^2 = a^2 + b^2$$



Special Right Triangles



$$V = lwh$$



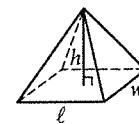
$$V = \pi r^2 h$$



$$V = \frac{4}{3}\pi r^3$$



$$V = \frac{1}{3}\pi r^2 h$$



$$V = \frac{1}{3}lwh$$

The number of degrees of arc in a circle is 360.

The number of radians of arc in a circle is 2π .

The sum of the measures in degrees of the angles of a triangle is 180.