Q1) If the polynomial $p\,(x) = x^3 + ax^2 - 11x - 12$ is exactly divisible by $(x + 1)$, then what is the value of a?

A) −3

B) −1

C) 2

D) 4

Answer:

C

Solution:

The given polynomial is $p(x) = x^3 + ax^2 - 11x - 12$

By Factor theorem, it is known that if $x - a$ is a factor of polynomial $p(x)$, then $p\,(a) = 0$

It is given that $p\,(x) = x^3 + ax^2 - 11x - 12$ is exactly divisible by $(x + 1)$. Therefore, $(x + 1)$ is a factor of $p\,(x)$.

Therefore, we must have $p\,(-1) = 0$

$\therefore p\,(-1) = 0$

$\Rightarrow (-1)^3 + a(-1)^2 - 11(-1) - 12 = 0$

$\Rightarrow -1 + a + 11 - 12 = 0$

$\Rightarrow -13 + a + 11 = 0$

$\Rightarrow a = 13 - 11 = 2$

Thus, the required value of a is 2.

The correct answer is C.

Q2) The area of a triangle whose sides are in the ratio 15:17:22 is $2250\sqrt{2}$ cm^2. If each side is reduced by 30 cm, then what is the perimeter of the new triangle formed?

A) 120 cm

B) 180 cm

C) 270 cm

D) 360 cm

Answer:

B

Solution:

Since the sides of the given triangle are in the ratio 15:17:22, the sides of the triangle are 15*x*, 17*x*, and 22*x* where *x* is some positive real number.

It is known that, area of a triangle = $\sqrt{s(s-a)(s-b)(s-c)}$ where *a*, *b*, and *c* are the sides of the triangle and *s* is the semi-perimeter of the triangle.

$$\therefore s=\frac{a+b+c}{2}=\frac{15x+17x+22x}{2}=27x$$

It is given that area of the triangle = $2250\sqrt{2}$ cm^2

$$\begin{aligned}
&\sqrt{s(s-a)(s-b)(s-c)}=2250\sqrt{2}\ \text{cm}^2\\
&\Rightarrow \sqrt{27x(27x-15x)(27x-17x)(27x-22x)}=2250\sqrt{2}\\
&\Rightarrow \sqrt{27x\times 12x\times 10x\times 5x}=2250\sqrt{2}\\
&\Rightarrow 90\sqrt{2}x^2=2250\sqrt{2}\\
&\Rightarrow x^2=25\\
&\Rightarrow x=5
\end{aligned}$$

∴ *a* = 15*x* = 15 × 5 cm = 75 cm, *b* = 17*x* = 17 × 5 cm = 85 cm

c = 22*x* = 22 × 5 cm = 110 cm

When each side of the triangle is reduced by 30 cm, the sides of the new triangle are

a' = 75 cm − 30 cm = 45 cm

b' = 85 cm − 30 cm = 55 cm

c' = 110 cm − 30 cm = 80 cm

Thus, perimeter of the new triangle formed = a' + b' + c'

= 45 cm + 55 cm + 80 cm = 180 cm

The correct answer is B.

Q3) A circle can be drawn with $\underline{\quad (i) \quad}$ and $\underline{\quad (ii) \quad}$.

Which of the following rows correctly fills the given Euclid's postulate?

- A)

(*i*)	(*ii*)
fixed radius	any centre

- B)

(*i*)	(*ii*)
fixed radius	fixed centre

- C)

(*i*)	(*ii*)
any radius	any centre

- D)

(*i*)	(*ii*)
any radius	fixed centre

View Solution

Answer:

C

Solution:

Euclid's third postulate states that a circle can be drawn with any radius and any centre.

The correct answer is C.

Q4) Which of the following statements represents the **incorrect** Euclid's postulate?

A)A line can be produced indefinitely if it is a terminated line.

B) From the given two points, a straight line can be drawn from one point to the other.

C) All the right angles are equal to one another.

D) All the acute angles are equal to one another.

Answer:

D

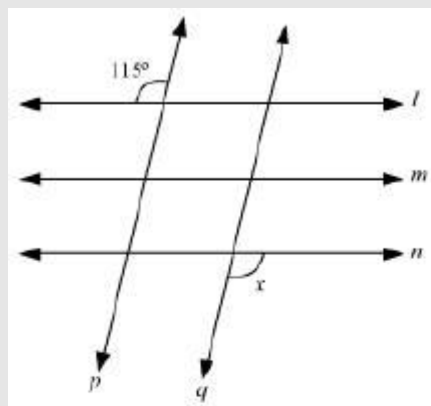
Solution:

Euclid's fourth postulate states that all the **right angles** are equal to one another, not all the acute angles.

Thus, the statement given in the alternative D is incorrect.

The correct answer is D.

Q5) *Use the following information to answer the next question.*

In the given figure, *l* || *m* and *m* || *n*. These lines *l*, *m*, and *n* are cut by two parallel transversals *p* and *q*.	

What is the value of *x* in the given figure?

A) 65°

B) 85°

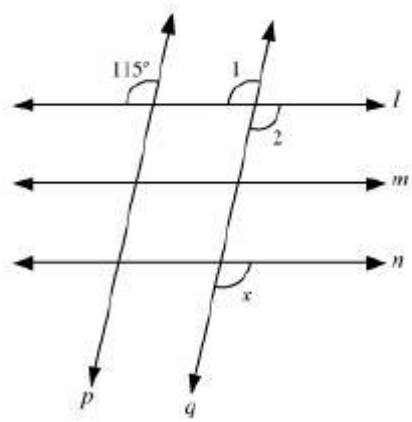
C) 115°

D) 135°

Answer:

C

Solution:



It is given that *p* and *q* are parallel. Here, *l* can be regarded as traversal.

∴ ∠1 = 115° (Corresponding angles)

∠1 = ∠2 (Vertically opposite angles)

∴∠2 = 115°

It is given that *l* || *m* and *m* || *n*.

∴ *l* || *n*

Here, *q* acts as a traversal for lines *l* and *n*.

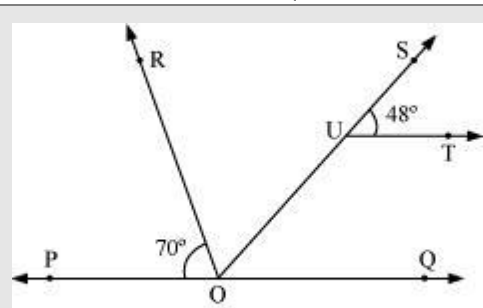
∴ ∠2 = ∠*x* = 115° (Corresponding angles)

⇒ ∠*x* = 115°

Thus, the value of *x* in the given figure is 115°.

The correct answer is C.

Q6) *Use the following information to answer the next question.*

In the given figure, UT||PQ.	

What is the measure of ∠ROS?

A) 48°

B) 62°

C) 118°

D) 132°

Answer:

B

Solution:

It is given that UT||PQ and SO is a transversal.

∴ ∠SUT = ∠SOQ (Corresponding angles)

⇒ ∠SOQ = 48°

It is known that sum of all angles on a straight line is 180°.

∴ ∠POR + ∠ROS + ∠SOQ = 180°

⇒ 70° + ∠ROS + 48° = 180°

⇒ ∠ROS = 180° − 118° = 62°

Thus, the measure of ∠ROS is 62°.

The correct answer is B.

Q7) What is the area of a triangle whose sides are 150 cm, 180 cm, and 220 cm?

A) 12106.25 cm^2

B) 13406.25 cm^2

C) 23424.75 cm^2

D) 24634.75 cm^2

Answer:

B

Solution:

The sides of the triangle are given as 180 cm, 220 cm, and 121 cm.

a = 150 cm, b = 180 cm, and c = 220 cm

It is known that area of a triangle = $\sqrt{s(s-a)(s-b)(s-c)}$ where a, b, and c are the sides of the triangle and s is the semi-perimeter of the triangle.

$$s=\frac{a+b+c}{2}=\left(\frac{150+180+220}{2}\right)\text{ cm}=\left(\frac{550}{2}\right)\text{ cm}=275\text{ cm}$$

Therefore, area of the triangle $=\sqrt{s(s-a)(s-b)(s-c)}$

$$\begin{aligned}&=\sqrt{275\times(275-150)(275-180)(275-220)}\text{ cm}^2\\&=\sqrt{275\times125\times95\times55}\text{ cm}^2\\&=\sqrt{5\times55\times5\times5\times5\times5\times19\times55}\text{ cm}^2\\&=55\times5\times5\times\sqrt{5\times19}\text{ cm}^2\\&=1375\sqrt{95}\text{ cm}^2\\&=1375\times9.75\text{ cm}^2\end{aligned}$$

= 13406.25 cm^2

Thus, the area of the given triangle is 13406.25 cm^2.

The correct answer is B.

Q8) How can the polynomial $64x^3 + y^3 - 8z^3 + 24xyz$ be expressed in the factor form?

A) $(4x + y - 2z)(16x^2 + y^2 + 4z^2 - 4xy + 2yz + 8xz)$

B) $(4x + y - 2z)(16x^2 + y^2 + 4z^2 + 4xy - 2yz - 8xz)$

C) $(4x + y - 2z)(16x^2 + y^2 + 4z^2 - 8xy + 4yz + 16xz)$

D) $(4x + y - 2z)(16x^2 + y^2 + 4z^2 + 8xy - 4yz - 16xz)$

Answer:

A

Solution:

The given polynomial is $64x^3 + y^3 - 8z^3 + 24xyz$.

$64x^3 + y^3 - 8z^3 + 24xyz$

$= (4x)^3 + (y)^3 + (-2z)^3 - 3(4x)(y)(-2z)$, which is of the form $a^3 + b^3 + c^3 - 3abc$, where $a = 4x$, $b = y$, and $c = -2z$.

We know that,

$a^3 + b^3 + c^3 - 3abc = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)$

$\therefore 64x^3 + y^3 - 8z^3 + 24xyz$

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

$= (4x + y - 2z)(16x^2 + y^2 + 4z^2 - 4xy + 2yz + 8xz)$

The correct answer is A.