CLOCKS

LOVELY PROFESSIONAL UNIVERSITY

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CONCEPT BASE

DIAL:

- The face or dial of a clock is a circle whose circumference is divided into 60 equal parts, called minute spaces.
- They are marked by short lines in the face of the clock. However, the end of every fifth minute space is marked longer than the others and the 60 minute spaces are represented as 12 divisions or 12 hour spaces.

They are usually numbered from 1 to 12 as shown in the figure below.

- Hour hand covers an angle of 360° in 12 hours. So, the hour hand in one hour will cover 360 /12 = 30°.
- So for every minute, the hour hand moves through 30 /60 = 0.5 °.

Key Points

- **The hands of a clock will be in straight line but opposite in direction, 22 times in a day.(eg 6 pm)**
- **The hands of a clock coincide(overlap or straight line but in same direction) 22 times in a day.(eg 12 noon)**
- **The hands of a clock are straight (both coincide and opposite) 44 times in a day.**
- **The hands of a clock are at right angles 44 times in a day.(eg 9 pm)**

An accurate clock shows 8 o'clock in the morning. Through how may degrees will the hour hand rotate when the clock shows 2 o'clock in the afternoon?

A. 144º
B. 150º
C. 168º
D. 180º

Answer: Option **D**

Explanation:

Angle traced by the hour hand in 6 hours = 360 / 12 x 6 º = 180º.

Question

The angle between the minute hand and the hour hand of a clock when the time is 4.20, is:

A. 0º
B. 10º
C. 5º
D. 20º

Answer: Option **B**

Explanation:

Angle traced by hour hand in 4 hr 20 min i.e 13/3 hrs = 360/12 x 13/3 º = 130º.

Angle traced by min. hand in 20 min. = 360/60 x 20 º = 120º.

Required angle = (130 - 120)º = 10º.

Question

How many times are the hands of a clock at right angle in a day?

A. 22
B. 24
C. 44
D. 48

Answer: Option **C**

Explanation:

In 12 hours, they are at right angles 22 times.

In 24 hours, they are at right angles 44 times.

Question

How many times in a day, are the hands of a clock in straight line but opposite in direction?

A. 20
B. 22
C. 24
D. 48

Answer: Option **B**

Explanation:

The hands of a clock point in opposite directions (in the same straight line) 11 times in every 12 hours. (Because between 5 and 7 they point in opposite directions at 6 o'clcok only).

So, in a day, the hands point in the opposite directions 22 times.

Question

How many times in a day, hands of a clock are in straight line?

A. 22
B. 24
C. 44
D. 48

Answer : Option C

Question

At 3:40, the hour hand and the minute hand of a clock form an angle of:

A. 120
B. 125
C. 130
D. 135

Answer: Option c

Question

How many times in a day, hands of a clock coincide?

A. 20
B. 21
C. 22
D. 24

Answer: Option **C**

KEY POINTS:

1. In 60 minutes, the minute hand gains 55 minutes on the hour hand

2. The hands of the clock coincide every 65 5/11 minutes and for every hour, both the hands coincide once

3. The hands are in the same straight line when they are coincident or opposite to each other

4. When the two hands are at right angles, they are 15 minute spaces apart

PRACTICE QUESTIONS

1. Find the angle between the hands of a clock when the time is 5:40.

(a) 80^o

(b) 160^o

(c) 70^o

(d) 120^o

Ans: C

2. Find the angle between the minute hand and the hour hand of a clock when the time is 7:20.

(a) 80^o

(b) 90^o

(c) 100^o

(d) 110^o

Ans: C

3. The reflex angle between the hands of a clock at 10:25 is

(a) 180^o

(b) 162.5^o

(c) 165^o

(d) 197.5^o

Ans: D (360 – Angle between hands of a clock at 10:25)

4. Find the reflex angle between the hour hand and the minute hand of a clock when the time is 15:25.

(a) 47.5^{o}

(b) 45.5^{o}

(c) 50^{o}

(d) None of these

Ans: A