

CLOCK

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

- A. 144°
- B. 150°
- C. 168°
- D. 180°

Answer: Option D

Explanation:

$$\text{Angle traced by the hour hand in 6 hours} = \left(\frac{360}{12} \times 6 \right)^\circ = 180^\circ.$$

2. The reflex angle between the hands of a clock at 10.25 is:

- A. 180°
- B. $192\frac{1}{2}^\circ$
- C. 195°
- D. $197\frac{1}{2}^\circ$

Answer: Option D

Explanation:

$$\text{Angle traced by hour hand in } \frac{125}{12} \text{ hrs} = \left(\frac{360}{12} \times \frac{125}{12} \right)^\circ = 312\frac{1}{2}^\circ.$$

$$\text{Angle traced by minute hand in 25 min} = \left(\frac{360}{60} \times 25 \right)^\circ = 150^\circ.$$

$$\therefore \text{Reflex angle} = 360^\circ - \left(312\frac{1}{2}^\circ - 150^\circ \right) = 360^\circ - 162\frac{1}{2}^\circ = 197\frac{1}{2}^\circ.$$

3. A clock is started at noon. By 10 minutes past 5, the hour hand has turned through:

- A. 145°
- B. 150°
- C. 155°
- D. 160°

Answer: Option C

Explanation:

Angle traced by hour hand in 12 hrs = 360° .

Angle traced by hour hand in 5 hrs 10 min. i.e., $\frac{31}{6}$ hrs = $\left(\frac{360}{12} \times \frac{31}{6}\right)^\circ = 155^\circ$.

4. A watch which gains 5 seconds in 3 minutes was set right at 7 a.m. In the afternoon of the same day, when the watch indicated quarter past 4 o'clock, the true time is:

- A. $59\frac{7}{12}$ min. past 3
- B. 4 p.m.
- C. $58\frac{7}{11}$ min. past 3
- D. $2\frac{3}{11}$ min. past 4

Answer: Option B

Explanation:

Time from 7 a.m. to 4.15 p.m. = 9 hrs 15 min. = $\frac{37}{4}$ hrs.

3 min. 5 sec. of this clock = 3 min. of the correct clock.

$\Rightarrow \frac{37}{720}$ hrs of this clock = $\frac{1}{20}$ hrs of the correct clock.

$\Rightarrow \frac{37}{4}$ hrs of this clock = $\left(\frac{1}{20} \times \frac{720}{37} \times \frac{37}{4}\right)$ hrs of the correct clock.

= 9 hrs of the correct clock.

\therefore The correct time is 9 hrs after 7 a.m. i.e., 4 p.m.

5. How much does a watch lose per day, if its hands coincide every 64 minutes?

- A. $32\frac{8}{11}$ min.
- B. $36\frac{5}{11}$ min.
- C. 90 min.
- D. 96 min.

Answer: Option A

Explanation:

55 min. spaces are covered in 60 min.

60 min. spaces are covered in $\left(\frac{60}{55} \times 60\right)_{\text{min.}} = 65\frac{5}{11}$ min.

Loss in 64 min. = $\left(65\frac{5}{11} - 64\right) = \frac{16}{11}$ min.

Loss in 24 hrs = $\left(\frac{16}{11} \times \frac{1}{64} \times 24 \times 60\right)_{\text{min.}} = 32\frac{8}{11}$ min.

6. At what time between 7 and 8 o'clock will the hands of a clock be in the same straight line but, not together?

A. 5 min. past 7

B. $5\frac{2}{11}$ min. past 7

C. $5\frac{3}{11}$ min. past 7

D. $5\frac{5}{11}$ min. past 7

Answer: Option D

Explanation:

When the hands of the clock are in the same straight line but not together, they are 30 minute spaces apart.

At 7 o'clock, they are 25 min. spaces apart.

∴ Minute hand will have to gain only 5 min. spaces.

55 min. spaces are gained in 60 min.

5 min. spaces are gained in $\left(\frac{60}{55} \times 5\right)_{\text{min}} = 5\frac{5}{11}$ min.

∴ Required time = $5\frac{5}{11}$ min. past 7.

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7. At what time between 5.30 and 6 will the hands of a clock be at right angles?

A. $43\frac{5}{11}$ min. past 5

B. $43\frac{7}{11}$ min. past 5

C. 40 min. past 5

D. 45 min. past 5

Answer: Option B

Explanation:

At 5 o'clock, the hands are 25 min. spaces apart.

To be at right angles and that too between 5.30 and 6, the minute hand has to gain $(25 + 15) = 40$ min. spaces.

55 min. spaces are gained in 60 min.

40 min. spaces are gained in $\left(\frac{60}{55} \times 40\right)_{\text{min}} = 43\frac{7}{11}$ min.

\therefore Required time = $43\frac{7}{11}$ min. past 5.

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

- A. 0°
- B. 10°
- C. 5°
- D. 20°

Answer: Option B

Explanation:

Angle traced by hour hand in $\frac{13}{3}$ hrs = $\left(\frac{360}{12} \times \frac{13}{3}\right)^\circ = 130^\circ$.

Angle traced by min. hand in 20 min. = $\left(\frac{360}{60} \times 20\right)^\circ = 120^\circ$.

\therefore Required angle = $(130 - 120)^\circ = 10^\circ$.

9. At what angle the hands of a clock are inclined at 15 minutes past 5?

- A. $58\frac{1}{2}$
- B. 64°
- C. $67\frac{1}{2}$
- D. $72\frac{1}{2}$

Answer: Option C

Explanation:

Angle traced by hour hand in $\frac{21}{4}$ hrs = $\left(\frac{360}{12} \times \frac{21}{4}\right)^\circ = 157\frac{1}{2}$

Angle traced by min. hand in 15 min. = $\left(\frac{360}{60} \times 15\right)^\circ = 90^\circ$.

$$\therefore \text{Required angle} = \left(157\frac{1}{2}\right)^\circ - 90^\circ = 67\frac{1}{2}^\circ$$

10. 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

Explanation:

Angle traced by hour hand in 12 hrs. = 360° .

Angle traced by it in $\frac{11}{3}$ hrs = $\left(\frac{360}{12} \times \frac{11}{3}\right)^\circ = 110^\circ$.

Angle traced by minute hand in 60 min. = 360° .

Angle traced by it in 40 min. = $\left(\frac{360}{60} \times 40\right)^\circ = 240^\circ$.

\therefore Required angle $(240 - 110)^\circ = 130^\circ$.

11. 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.

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

12. The angle between the minute hand and the hour hand of a clock when the time is 8.30, is:

- A. 80°
- B. 75°
- C. 60°

D. 105°

Answer: Option B

Explanation:

Angle traced by hour hand in $\frac{17}{2}$ hrs = $\left(\frac{360}{12} \times \frac{17}{2}\right)^\circ = 255^\circ$.

Angle traced by min. hand in 30 min. = $\left(\frac{360}{60} \times 30\right)^\circ = 180^\circ$.

\therefore Required angle = $(255 - 180)^\circ = 75^\circ$.

13. 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'clock only).

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

14. At what time between 4 and 5 o'clock will the hands of a watch point in opposite directions?

A. 45 min. past 4

B. 40 min. past 4

C. $50\frac{4}{11}$ min. past 4

D. $54\frac{6}{11}$ min. past 4

Answer: Option D

Explanation:

At 4 o'clock, the hands of the watch are 20 min. spaces apart.

To be in opposite directions, they must be 30 min. spaces apart.

\therefore Minute hand will have to gain 50 min. spaces.

55 min. spaces are gained in 60 min.

50 min. spaces are gained in $\left(\frac{60}{55} \times 50\right)$ 6 min.

∴ Required time = $54\frac{6}{11}$ min. past 4.

15. At what time between 9 and 10 o'clock will the hands of a watch be together?

- A. 45 min. past 9
- B. 50 min. past 9
- C. $49\frac{1}{11}$ min. past 9
- D. $48\frac{2}{11}$ min. past 9

Answer: Option C

Explanation:

To be together between 9 and 10 o'clock, the minute hand has to gain 45 min. spaces.

55 min. spaces gained in 60 min.

45 min. spaces are gained in $\left(\frac{60}{55} \times 45\right)$ min or $49\frac{1}{11}$ min.

∴ The hands are together at $49\frac{1}{11}$ min. past 9.

16. At what time, in minutes, between 3 o'clock and 4 o'clock, both the needles will coincide each other?

- A. $5\frac{1}{11}$
- B. $12\frac{4}{11}$
- C. $13\frac{4}{11}$
- D. $16\frac{4}{11}$

Answer: Option D

Explanation:

At 3 o'clock, the minute hand is 15 min. spaces apart from the hour hand.

To be coincident, it must gain 15 min. spaces.

55 min. are gained in 60 min.

15 min. are gained in $\left(\frac{60}{55} \times 15\right) = 16\frac{4}{11}$ min.

55

11

∴ The hands are coincident at $16\frac{4}{11}$ min. past 3.

17. How many times do the hands of a clock coincide in a day?

A. 20

B. 21

C. 22

D. 24

Answer: Option C

Explanation:

The hands of a clock coincide 11 times in every 12 hours (Since between 11 and 1, they coincide only once, i.e., at 12 o'clock).

AM

12:00

1:05

2:11

3:16

4:22

5:27

6:33

7:38

8:44

9:49

10:55

PM

12:00

1:05

2:11

3:16

4:22

5:27

6:33

7:38

8:44

9:49

10:55

The hands overlap about every 65 minutes, not every 60 minutes.

∴ The hands coincide 22 times in a day.

18. How many times in a day, the hands of a clock are straight?

A. 22

B. 24

C. 44

D. 48

Answer: Option C

Explanation:

In 12 hours, the hands coincide or are in opposite direction 22 times.

∴ In 24 hours, the hands coincide or are in opposite direction 44 times a day.

19. A watch which gains uniformly is 2 minutes low at noon on Monday and is 4 min. 48 sec fast at 2 p.m. on the following Monday. When was it correct?

A. 2 p.m. on Tuesday

B. 2 p.m. on Wednesday

C. 3 p.m. on Thursday

D. 1 p.m. on Friday

Answer: Option B

Explanation:

Time from 12 p.m. on Monday to 2 p.m. on the following Monday = 7 days 2 hours = 170 hours.

∴ The watch gains $\left(2 + 4\frac{4}{5}\right)$ min. or $\frac{34}{5}$ min. in 170 hrs.

Now, $\frac{34}{5}$ min. are gained in 170 hrs.

∴ 2 min. are gained in $\left(170 \times \frac{5}{34} \times 2\right)$ hrs = 50 hrs.

∴ Watch is correct 2 days 2 hrs. after 12 p.m. on Monday i.e., it will be correct at 2 p.m. on Wednesday.