Chapter 12: Racing Seconds

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Exercise 12.1 — Let us find out — Yoga Clocks and Time Elapsed (p. 155–156)

Q1 At what time did Raghav start practising Yoga?

SOLUTION

Look at the left clock in the picture.
The long (minute) hand points to 7, so it is 35 minutes past the hour.
The short (hour) hand is just past 5.
So the time is 5:35 a.m.

Answer: 5:35 a.m.

Q2 At what time did he finish?

SOLUTION

Look at the right clock in the picture.
The long (minute) hand points to 11, so it is 55 minutes past the hour.
The short (hour) hand is near 5, almost at 6.
So the time is 5:55 a.m.

Answer: 5:55 a.m.

Q3 How much time did he spend practising Yoga?

SOLUTION

Start time: 5:35 a.m.
End time: 5:55 a.m.
Time spent = 5:55 - 5:35 = 20 minutes.

Answer: 20 minutes

Q4 Find the time elapsed between the given time periods. Share your strategies.
(a) 01:15 p.m. to 01:42 p.m.
(b) 03:18 p.m. to 08:18 p.m.
(c) 09:15 a.m. to 11:30 a.m.

SOLUTION

(a) 01:15 p.m. to 01:42 p.m.:
Minutes from :15 to :42 = 42 - 15 = 27 minutes.

(b) 03:18 p.m. to 08:18 p.m.:
Both times have the same minutes (:18), so count only the hours.
8 - 3 = 5 hours.

(c) 09:15 a.m. to 11:30 a.m.:
From 9:15 to 11:15 = 2 hours.
From 11:15 to 11:30 = 15 more minutes.
Total = 2 hours 15 minutes.

Answer: (a) 27 minutes (b) 5 hours (c) 2 hours 15 minutes

Q5 The table below shows the time taken by 3 children to paint a picture.
Name | Time Taken
Raghav | 1 hour 20 minutes
Rani | 2 hours 10 minutes
Ritu | 1 hour 35 minutes
(a) Who took the longest time?
(b) Who took the least time?

SOLUTION

Convert all times to minutes to compare.
Raghav: 1 hour 20 minutes = 60 + 20 = 80 minutes.
Rani: 2 hours 10 minutes = 120 + 10 = 130 minutes.
Ritu: 1 hour 35 minutes = 60 + 35 = 95 minutes.

Order: Raghav (80) < Ritu (95) < Rani (130).

(a) Rani took the longest time (2 hours 10 minutes = 130 minutes).
(b) Raghav took the least time (1 hour 20 minutes = 80 minutes).

Answer: (a) Rani took the longest time. (b) Raghav took the least time.

Q6 Fill in the blanks by writing the time in the appropriate format.

Time in 12-hour format	Time in 24-hour format
05:30 a.m.	05:30 hours
.....	08:35 hours
11:55 a.m.	..... hours
02:30 p.m.	14:30 hours
05:30 p.m.	..... hours
09:35 p.m.	..... hours

SOLUTION

Rule: For a.m. times (12:00 midnight to 11:59 a.m.), the 24-hour format is the same.
For p.m. times, add 12 to the hour.

08:35 hours => 8:35 a.m. (morning, no change needed) => 08:35 a.m.
11:55 a.m. => 11:55 hours (morning, same).
05:30 p.m. => 5 + 12 = 17 => 17:30 hours.
09:35 p.m. => 9 + 12 = 21 => 21:35 hours.

Answer: 08:35 a.m. | 11:55 hours | 17:30 hours | 21:35 hours

Q7 Match the following.

Time in 12-hour format	Time in 24-hour format
06:30 a.m.	01:30 hours
08:45 p.m.	23:45 hours
11:45 p.m.	06:30 hours
04:30 a.m.	20:45 hours
07:30 p.m.	04:30 hours
01:30 a.m.	19:30 hours

SOLUTION

06:30 a.m. => 06:30 hours (morning, same). Match: 06:30 hours.
08:45 p.m. => 8 + 12 = 20 => 20:45 hours. Match: 20:45 hours.
11:45 p.m. => 11 + 12 = 23 => 23:45 hours. Match: 23:45 hours.
04:30 a.m. => 04:30 hours (morning, same). Match: 04:30 hours.
07:30 p.m. => 7 + 12 = 19 => 19:30 hours. Match: 19:30 hours.
01:30 a.m. => 01:30 hours (morning, same). Match: 01:30 hours.

Answer: 06:30 a.m. → 06:30 hours | 08:45 p.m. → 20:45 hours | 11:45 p.m. → 23:45 hours | 04:30 a.m. → 04:30 hours | 07:30 p.m. → 19:30 hours | 01:30 a.m. → 01:30 hours

Exercise 12.2 — School Race — Seconds and the Race (p. 156–157)

Q1 Akira, Sunita, and Mary are participating in a 200 m walking race. Their stopwatches show:
Place 1: 01:55 (Min:Sec)
Place 2: 01:56
Place 3: 01:57
Identify the child who won the race. How much time did the child take?

SOLUTION

1 min = 60 seconds, so each child took more than 1 minute.
The winner finishes in the LEAST time.
Place 1 shows 01:55 = 1 minute 55 seconds.
Place 2 shows 01:56 = 1 minute 56 seconds.
Place 3 shows 01:57 = 1 minute 57 seconds.

1 min 55 sec < 1 min 56 sec < 1 min 57 sec.
So the child standing on the first-place (centre) podium won.
The winning time is 1 minute 55 seconds.

Answer: The child on the first-place podium won. The winning time is 1 minute 55 seconds.

Exercise 12.3 — Let Us Do — Seconds or Minutes? (p. 157–158)

Q1 Estimate whether you would take seconds or minutes to complete the following activities. Tick the appropriate cell.

Activity	Seconds	Minutes
Blinking of eyes		
Switching on and switching off the lights		
Counting from 1-20		
Filling a glass from the tap		
Melting of an ice-cube		
Making a phone call		
Sitting down on the floor		
Drinking a glass of water		
Snapping fingers		
Washing hands		

SOLUTION

Use your own experience to estimate. Here is a model answer:

Blinking of eyes => Seconds (a blink takes less than 1 second).
Switching on and switching off the lights => Seconds (takes just 2-3 seconds).
Counting from 1-20 => Seconds (you can count to 20 in about 10-15 seconds).
Filling a glass from the tap => Seconds (takes about 10-20 seconds).
Melting of an ice-cube => Minutes (an ice cube takes many minutes to melt).
Making a phone call => Minutes (a phone call usually lasts a few minutes).
Sitting down on the floor => Seconds (takes just 2-3 seconds).
Drinking a glass of water => Seconds (takes about 10-20 seconds).
Snapping fingers => Seconds (a snap takes less than 1 second).
Washing hands => Seconds (takes about 20-30 seconds).

Answer: Seconds: Blinking, Switching lights, Counting 1-20, Filling a glass, Sitting down, Drinking water, Snapping fingers, Washing hands. Minutes: Melting ice-cube, Making a phone call. (Your estimates may vary — discuss with your class.)

Q2 List events other than the ones listed above that you can do or that can happen in less than a minute or in a few seconds.

SOLUTION

This is an open activity — write your own examples.
Model answers (events that happen in a few seconds):
Clapping once, tying a shoelace knot, picking up a pencil, writing your name, jumping once, smiling, opening a door, turning a page of a book.

Answer: Model examples: clapping once, picking up a pencil, writing your name, opening a door, turning a book page. (Any correct short-duration activity is accepted.)

Q3 Estimate and verify how many of these you can do in a minute.

Activity | Estimated Number | Actual Number

Number of balloons blown | |

Number of push-ups | |

Number of breaths | |

Number of hops on one leg | |

SOLUTION

This is a hands-on activity. First estimate, then actually try for one minute and count.

Model estimates for a Class-5 child:

Balloons blown: estimate 1-2, actual may be 1-3.

Push-ups: estimate 10, actual may be 8-15.

Breaths: estimate 15, actual is usually 15-20 breaths per minute.

Hops on one leg: estimate 30, actual may be 20-50.

Try it yourself and fill in your own numbers!

Answer: Hands-on activity — do it yourself and record. Model: breaths ~15-20 per min, hops ~30-50 per min, push-ups ~10-15 per min, balloons ~1-2 per min.

Exercise 12.4 — Let Us Find — Measuring Your Own Time in Seconds (p. 158)

Q1 Find out the number of times you can skip the rope in 10 seconds.

SOLUTION

This is a hands-on activity. Use a stopwatch or count seconds aloud.
Start skipping and have a friend count to 10 seconds.
Count how many times the rope goes round.
A typical Class-5 child can skip the rope about 10-20 times in 10 seconds.
Record your own count.

Answer: Hands-on activity. Model: about 10-20 skips in 10 seconds. Count and record your actual number.

Q2 How long does it take you to write the word FRIEND?

SOLUTION

This is a hands-on activity. Start a timer and write the word FRIEND once.
Stop the timer when you finish.
Most Class-5 children take about 3-8 seconds to write FRIEND.
Record your own time in seconds.

Answer: Hands-on activity. Model: about 3-8 seconds. Measure and record your own time.

Q3 How long does it take you to run 100 m?

SOLUTION

This is a hands-on activity. Mark out 100 metres on your school ground.
Have a friend time you with a stopwatch as you run the full distance.
A typical Class-5 child takes about 20-40 seconds to run 100 m.
Record your own time in seconds.

Answer: Hands-on activity. Model: about 20-40 seconds. Measure and record your own time.

Exercise 12.5 — Let Us Do — Observe the Clocks (Reading Seconds) (p. 159)

Q1 Observe the two clocks shown. Rani took _____ sec. to get out of her bed.

SOLUTION

Look at the thin red seconds hand on each clock.
Left clock (start): the seconds hand points to the 12 (= 0 seconds).
Right clock (end): the seconds hand points to the 6 (= 30 seconds).
Time taken = 30 - 0 = 30 seconds.

Answer: 30 seconds

Q2 Observe the two clocks shown. Raghav took _____ sec. to move from his room to the kitchen.

SOLUTION

Left clock (start): red seconds hand points to the 12 (= 0 seconds).
Right clock (end): red seconds hand points to the 7 (= 35 seconds).
Time taken = 35 - 0 = 35 seconds.

Answer: 35 seconds

Q3 Observe the two clocks shown. Ritu took _____ sec. to pick up a piece of paper from the floor.

SOLUTION

Left clock (start): red seconds hand points to the 9 (= 45 seconds).
Right clock (end): red seconds hand points to the 12 (= 0 seconds), after crossing 60.
Time taken = (60 - 45) + 0 = 15 seconds.

Answer: 15 seconds

Q4 Observe the two clocks shown. Raghu took _____ sec. to wash his spoon and plate.

SOLUTION

Left clock (start): red seconds hand points to the 5 (= 25 seconds).
Right clock (end): red seconds hand also points to the 5 (= 25 seconds).
The seconds hand went all the way round once and came back to the same place.
Time taken = one full round = 60 seconds.

Answer: 60 seconds (one full round of the seconds hand)

Exercise 12.6 — Let Us Do — Draw the Missing Seconds Hand (p. 160)

Q1 Raghu took 20 sec. to read a sentence in his book. The left clock shows the start time (seconds hand at 12). Draw the missing seconds hand on the right clock.

SOLUTION

Start: seconds hand at 12 = 0 seconds.
After 20 seconds: 0 + 20 = 20 seconds.
20 seconds on a clock face = the hand points to the 4 (since each number = 5 sec, and 4 x 5 = 20).
Draw the seconds hand pointing toward the 4 on the right clock.

Answer: Draw the seconds hand pointing to the 4 (= 20 seconds).

Q2 Rani took 30 sec. to color a rectangle. The left clock shows the start (seconds hand at 12). Draw the missing seconds hand on the right clock.

SOLUTION

Start: seconds hand at 12 = 0 seconds.
After 30 seconds: 0 + 30 = 30 seconds.
30 seconds on the clock face: the hand points to the 6 (since 6 x 5 = 30).
Draw the seconds hand pointing toward the 6 on the right clock.

Answer: Draw the seconds hand pointing to the 6 (= 30 seconds).

Q3 Raghav took 60 sec. to move from his home to the garden. The left clock shows the start (seconds hand at 9). Draw the missing seconds hand on the right clock.

SOLUTION

60 seconds = exactly 1 full revolution of the seconds hand.
Whatever position the hand starts at, after 60 seconds it returns to the same position.
From the left clock the seconds hand points to the 9 (= 45 seconds).
After 60 more seconds it comes back to the same place (the 9).
Draw the seconds hand pointing toward the 9, the same as the left clock.

Answer: Draw the seconds hand pointing to the 9 (same position as the start, since 60 sec = one full revolution).

Q4 Ritu took 40 sec. to wash a plate. The left clock shows the start (seconds hand at 11). Draw the missing seconds hand on the right clock.

SOLUTION

Start: seconds hand at 11 = 55 seconds.
After 40 seconds: 55 + 40 = 95 seconds.
95 seconds = 60 + 35 = 1 full revolution + 35 seconds.
35 seconds on the clock face: 35 / 5 = 7, so the hand points to the 7.
Draw the seconds hand pointing toward the 7 on the right clock.

Answer: Draw the seconds hand pointing to the 7 (= 35 seconds, after one full revolution).

Exercise 12.7 — Let Us Do — Conversion of Hours to Minutes (p. 161–163)

Q1 Use the double number line to complete the conversions.

(a) Fill in the blanks on the double number line:

1 hr = 60 min, 2 hr = ___ min, 4 hr = ___ min, 7 hr = ___ min, ___ hr = 480 min, 9 hr = ___ min, ___ hr = 660 min, ___ hr = 720 min

(b) Do the following conversions:

(i) 1 hour 10 minutes = ___ minutes

(ii) 2 hours 45 minutes = ___ minutes

(iii) 3 hours 15 minutes = ___ minutes

(iv) 4 hours 20 minutes = ___ minutes

(v) 75 minutes = ___ hour ___ minutes

(vi) 150 minutes = ___ hours ___ minutes

(vii) 220 minutes = ___ hours ___ minutes

(viii) 390 minutes = ___ hours ___ minutes

(c) Fill in the blanks on the minutes-to-seconds double number line:

1 min = 60 sec, 2 min = 120 sec, 5 min = 300 sec, 10 min = ___ sec, 15 min = ___ sec, 20 min = ___ sec, 25 min = ___ sec

Then convert:

(i) 320 sec = ___ min ___ sec

(ii) 225 sec = ___ min ___ sec

(iii) 700 sec = ___ min ___ sec

(iv) 1,000 sec = ___ min ___ sec

(v) 10 min 13 sec = ___ sec

(vi) 4 min 8 sec = ___ sec

(vii) 15 min 40 sec = ___ sec

SOLUTION

(a) Double number line (hours to minutes), using 1 hr = 60 min:

2 hr = 2 x 60 = 120 min

4 hr = 4 x 60 = 240 min

7 hr = 7 x 60 = 420 min

480 min = 480 / 60 = 8 hr

9 hr = 9 x 60 = 540 min

660 min = 660 / 60 = 11 hr

720 min = 720 / 60 = 12 hr

(b) Conversions:

(i) 1 hr 10 min = 60 + 10 = 70 min

(ii) 2 hr 45 min = 120 + 45 = 165 min

(iii) 3 hr 15 min = 180 + 15 = 195 min

(iv) 4 hr 20 min = 240 + 20 = 260 min

(v) 75 min = 60 + 15 = 1 hr 15 min
(vi) 150 min = 120 + 30 = 2 hr 30 min
(vii) 220 min = 180 + 40 = 3 hr 40 min
(viii) 390 min = 360 + 30 = 6 hr 30 min

(c) Double number line (minutes to seconds), using 1 min = 60 sec:
10 min = 10 x 60 = 600 sec
15 min = 15 x 60 = 900 sec
20 min = 20 x 60 = 1,200 sec
25 min = 25 x 60 = 1,500 sec

Conversions:
(i) 320 sec: 320 / 60 = 5 remainder 20. So 5 min 20 sec.
(ii) 225 sec: 225 / 60 = 3 remainder 45. So 3 min 45 sec.
(iii) 700 sec: 700 / 60 = 11 remainder 40. So 11 min 40 sec.
(iv) 1,000 sec: 1,000 / 60 = 16 remainder 40. So 16 min 40 sec.
(v) 10 min 13 sec = 10 x 60 + 13 = 600 + 13 = 613 sec.
(vi) 4 min 8 sec = 4 x 60 + 8 = 240 + 8 = 248 sec.
(vii) 15 min 40 sec = 15 x 60 + 40 = 900 + 40 = 940 sec.

Answer: (a) 120, 240, 420, 8 hr, 540, 11 hr, 12 hr (b) (i) 70 min (ii) 165 min (iii) 195 min (iv) 260 min (v) 1 hr 15 min (vi) 2 hr 30 min (vii) 3 hr 40 min (viii) 6 hr 30 min (c) Number line: 600, 900, 1200, 1500 sec. Conversions: (i) 5 min 20 sec (ii) 3 min 45 sec (iii) 11 min 40 sec (iv) 16 min 40 sec (v) 613 sec (vi) 248 sec (vii) 940 sec

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Q2 Raghav studies Mathematics, English, Hindi, and The World Around Us subjects. He took 50 minutes to study each of the subjects. Find the total time taken in hours and minutes.

SOLUTION

Number of subjects = 4.
Time per subject = 50 minutes.
Total time = 4 x 50 = 200 minutes.

Convert to hours and minutes:
200 / 60 = 3 remainder 20.
So 200 minutes = 3 hours 20 minutes.

Answer: Total time = 200 minutes = 3 hours 20 minutes.

Q3 Raghu left his house at 08:00 hours and arrived at his Nana ji's house at 09:05 hours. How long did he take to reach his Nana ji's house?

SOLUTION

From 08:00 to 09:00 = 1 hour.
From 09:00 to 09:05 = 5 more minutes.
Total time = 1 hour 5 minutes.

Answer: 1 hour 5 minutes

Q4 Jyoti went to play at 06:15 PM. She came back after 1 hour 45 minutes. At what time did she reach home?

SOLUTION

Start: 06:15 PM.
Add 1 hour: 06:15 + 1:00 = 07:15 PM.
Add 45 minutes: 07:15 + 0:45 = 08:00 PM.
(15 + 45 = 60 minutes = 1 hour, so 7:15 + 45 min = 8:00 PM.)

Answer: 08:00 PM

Q5 Ragini took 1 hour 10 minutes to do her homework. She finished it at 09:40 PM. What time did she start?

SOLUTION

Finished at: 09:40 PM.
Subtract 10 minutes: 09:40 - 0:10 = 09:30 PM.
Subtract 1 hour: 09:30 - 1:00 = 08:30 PM.
She started at 08:30 PM.

Answer: 08:30 PM

Q6 A group of children left for a picnic at 08:30 AM. They returned after 4 hours and 10 minutes. At what time did they return?

SOLUTION

Start: 08:30 AM.
Add 4 hours: 08:30 + 4:00 = 12:30 PM.
Add 10 minutes: 12:30 + 0:10 = 12:40 PM.
They returned at 12:40 PM.

Answer: 12:40 PM

Q7 Raji started her homework at 06:00 PM. She finished her homework in 1 hour 30 minutes. At what time did she finish?

SOLUTION

Start: 06:00 PM.
Add 1 hour 30 minutes: 06:00 + 1:30 = 07:30 PM.
She finished at 07:30 PM.

Answer: 07:30 PM

Q8 Alya goes out to play at 05:30 PM and comes back after 1 hour 10 minutes. At what time does she come back?

SOLUTION

Start: 05:30 PM.
Add 1 hour: 05:30 + 1:00 = 06:30 PM.
Add 10 minutes: 06:30 + 0:10 = 06:40 PM.
She comes back at 06:40 PM.

Answer: 06:40 PM

Q9 If the lunch break of a school starts at 12:30 PM and ends in 35 minutes, what time will lunch end?

SOLUTION

Start: 12:30 PM.
Add 35 minutes: 12:30 + 0:35 = 01:05 PM.
(30 + 35 = 65 minutes past 12, i.e. 1 hour 5 minutes past 12:00 PM = 01:05 PM.)

Answer: 01:05 PM

Q10 It is 08:35 PM right now. What time will it be after 8 hours and 25 minutes?

SOLUTION

Start: 08:35 PM.
Add 8 hours: 08:35 PM + 8 hours = 04:35 AM (next day).
Add 25 minutes: 04:35 AM + 25 min = 05:00 AM.
It will be 05:00 AM the next morning.

Answer: 05:00 AM (next day)