

INVESTIGATION #4

Finding Coincidence

Task #1: Trains:

The train from Perth to Fremantle takes 40 minutes to return to Perth. The train from Perth to Midland takes 45 minutes to return to Perth. If two trains leave Perth station at the same time and do non-stop return trips (one to Fremantle, the other to Midland) how long will pass before they are both at the Perth station together?



How many trips will each train have done at this time?

Task #2: Racing Cars:



this time?

Two cars start together on a racetrack. If Car A laps in 54 seconds and car B laps in 56 seconds how long will it be before both cars are together at the start line again? How many laps will each car have done at

Task #3: Brick Stacks:

Standard Bricks are 230mm long, 74mm high and 108mm wide

Fastwall Bricks are 305mm long, 162mm high and 90 mm wide

If a stack of each bricks is made side by side at what height will the tops of the two stacks be equal (because the bricks are just stacked there is no mortar in between the layers)?



How many bricks will be in each stack at this time?

Task #4:

Investigate similar problems with different values. Investigate what happens when there are three objects involved.

SOLUTIONS TO INVESTIGATION

Task #1:

Perth to Midland: 45 min Perth to Fremantle: 40 min

Perth to Midland: 45, 90, 135, 180, 225, 270, 315, 360, ...

Perth to Fremantle: 40, 80, 120, 160, 200, 240, 280, 320, 360, ...

Common Time: 360 min ($45 = 5 \times 9$, $40 = 5 \times 8$: $5 \times 8 \times 9 = 360$ min)

i.e. 360 minutes with Perth to Freo 9 times and Perth to Midland 8 times

Task #2:

Car A 54 seconds Car B 56 seconds

Car A: 54, 108, 162, ...

Car B: 56, 112, 168, ...

Common Time: 1512 seconds ($54 = 2 \times 27$, $56 = 2 \times 28$: $2 \times 27 \times 28 = 1512$ s)

i.e. 1512 seconds or 25 min 12 s with Car A doing 28 laps and Car B doing 27 laps

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Task #3:

Standard Bricks 74 mm high Fastwall Bricks 162 mm high

Standard: 74, 148, 222, 296, 370, 444, 518, 592, 666, 740, 814, 888, ...

Fastwall: 162, 324, 486, 648, 810, 972, 1134, 1296, 1458, 1620, 1782,

Common height: 5994 mm ($74 = 2 \times 37$, $162 = 2 \times 81$: $2 \times 37 \times 81 = 5994$ mm)

i.e. 5994 mm or 5.994 m high with 37 Fastwall bricks and 81 Standard bricks

ASSESSMENT TASK

1. The train from Perth to Fremantle takes 40 minutes to return to Perth. The train from Perth to Armadale takes 30 minutes to return to Perth. If two trains leave Perth station at the same time and do non-stop return trips (one to Fremantle, the other to Armadale) how long will pass before they are both at the Perth station together?

How many trips will each train have done at this time?

2. Two cars start together on a racetrack. If Car A laps in 54 seconds and car B laps in 48 seconds how long will it be before both cars are together at the start line again. How many laps will each car have done at this time?

3. Standard Bricks are 230 mm long, 74 mm high and 108 mm wide. Fastwall Bricks are 305 mm long, 162 mm high and 90 mm wide.

If the bricks are laid end to end in a line starting at the same point (and with no mortar), when will the ends of the lines of bricks coincide?

How many bricks will be in each line at this point?

4. Two car alarms are set off at the same time. One sounds 10 times per minute and the other sounds 12 times per minute.

After what period of time will they both sound together?

5. There are three different rides at an amusement park. Ride A runs every 20 minutes, Ride B every 25 minutes and Ride C every 35 minutes.

If all three rides have the first ride of the day starting at 6:00 a.m. at what time of the day will all three rides again commence at the same time?

SOLUTIONS TO ASSESSMENT TASK

1. 120 minutes (2 hours) $[3 \times 4 \times \underline{10}]$
2. 432 seconds (7 min 12 s) $[\underline{6} \times 8 \times 9]$
3. 14 030 mm (14.03 m) $[2 \times \underline{5} \times 23 \times 61]$
4. 30 seconds $[5 \times 6]$ [One sounds every 6s, the other every 5s]
5. 5:40 p.m. $[4 \times 5 \times \underline{5} \times 7 = 700 \text{ min} = 11\text{h } 40 \text{ min}]$