The Brigade School-Internal Assessment 2

Total points 4/10

Class:10 | Mathematics | Problems based on quadratic equations

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0 of 0 points

Name of the Student: *

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10 A

Answer the Following Questions 4 of 10 points

Time : 20 minutes Max.Marks: 10

✓ 1) Rohan's mother is 26 years older than him. The product of their ages (in years) 3 years from now will be 231. Find the present age of Rohan. [3] 3/3

Let Rohan's age be x, then his mother's age will be x+26.
Acc. to the question,

(x+3)(x+26+3)=231
(x+3)(x+29)=231
x^2 + 29x + 3x + 87 = 231
x^2 + 32x + 87 - 231 = 0
x^2 + 32x - 144 = 0
x^2 + 36x - 4x - 144 = 0
x(x + 36) - 4(x + 36) = 0
(x - 4)(x + 36) = 0
x-4=0 or x+36=0
x=4 or x=-39

Age cannot be negative, thus Rohan's present age is 4 years.

Individual feedback

How x = 4 or -39?

Let x be the present age of Rohan
Therefore, his mothers present age is (x+26)
According to the question, (x+3)(x+26+3) = 231 ---------- (1m)
(x+3)(x+29) = 231
x^2 + 32 x + 87 = 231
x^2 + 32 x - 144 = 0 ---------- (1m)
(x - 4)(x + 36) = 0
x = 4 or -36
Age cannot be - ve , therefore Rohan's present age = 4 years ----------(1m)

✗ 2) A train travels a distance of 480 km at a uniform speed. If the speed had been 8 km/h less, then it would have taken 3 hours more to cover the same distance. Find the speed of the train. [3] 1/3

Let the speed be x kmph.
The time taken by the train to travel 480 km is 480/x hrs.
The decreased speed is x-8 and the time is 480/x-8.

Acc. to the question,

(480/x)+3 = 480/(x-8)
480/x-8 - 480/x = 3
(480x - 480x + 3840)/x^2 - 8x = 3
3840 = 3x^2 - 24x
3x^2 - 24x - 384 = 0
3x^2 - 48x +24x - 384 = 0
3x(x-16) + 24x(x-16)=0
x=16 kmph

Feedback

Let y be the speed of the train
According to the question
[480/(y - 8)] - [480/y] = 3 ----------(1 m)
[480 y - 480(y - 8)] / y (y - 8) = 3
y^2 - 8 y - 1280 = 0 ----------(1 m)
(y - 40)(y + 32) = 0
therefore y = 40 or - 32
Speed cannot be - ve ,
Therefore speed of the train = 40 km/h ----------(1 m)

✗ 3) In a two digit number, the unit's digit exceeds its ten's digit by 2. The product of the given number and the sum of its digits is equal to 144. Find the number. [4] 0/4

Feedback

Let y be the 10's digit, therefore unit's digit = (y + 2)
According to the question,
[10 y + (y + 2)] x [y + (y +2)] = 144 ----------(1 m)
(11 y + 2) (2 y + 2) =144
22 y^2 + 22 y + 4 y + 4 =144
22 y^2 + 26 y =140
11 y^2 + 13 y - 70 = 0 ----------(1 m)
11 y^2 + 35 y - 22 y - 70 = 0
(y - 2)(11 y + 35)=0 ----------(1 m)
ie, y = 2 or - 35/11
Digit cannot be - ve, therefore the 10's digit = 2 and unit's digit = 2 + 2 = 4
Therefore the two digit number is 24 ----------(1 m)