



FBS MATH 02

1. After 30 years, Zaman will be four times as old as he is now.

Let Zaman's present age = x . After 30 years he will be $x + 30$. The condition says $x + 30 = 4x$.

Subtract x from both sides: $30 = 3x$. Divide both sides by 3: $x = 10$. Present age = 10.

2. Rakib has a brother one-third of his age and a sister three times his age. Combined age is five less than twice the oldest.

Let Rakib's present age = r . Brother = $r/3$. Sister = $3r$. Total age = $r + r/3 + 3r = 13r/3$.

Given total age = $2 \times \text{sister} - 5 = 6r - 5$. So $13r/3 = 6r - 5$. Multiply 3: $13r = 18r - 15$.

Rearrange: $5r = 15$. $r = 3$. Rakib's age = 3.

3. Rahim is 28 and his son is 4. After x years, $28 + x = 4(4 + x)$.

$28 + x = 16 + 4x$. $28 - 16 = 4x - x$. $12 = 3x$. $x = 4$. After 4 years Rahim is 32 and son is 8.

$32 = 4 \times 8$, so answer is 4.

4. Six years from now Sumi's age is the square of her age six years ago.

Let x be Sumi's age. $x + 6 = (x - 6)^2$. Expand: $x + 6 = x^2 - 12x + 36$.

Bring terms: $0 = x^2 - 13x + 30$. Factor: $(x - 3)(x - 10)$. $x = 3$ or 10 .

$x = 3$ cannot work because 6 years ago age would be negative. So Sumi = 10.

5. Nishi is two years older than Mishi, who is twice Rishi. Total ages = 27.

Let Rishi = r . Then Mishi = $2r$. Nishi = $2r + 2$. Total: $r + 2r + (2r + 2) = 27$.

$5r + 2 = 27$. $5r = 25$. $r = 5$. Mishi = $2r = 10$.

6. Harun is three times Tamim. In eight years, he will be twice Tamim.
 Let Tamim = T. Harun = 3T. After 8 years: $3T + 8 = 2(T + 8)$.
 $3T + 8 = 2T + 16$. $T = 8$. Harun now = 24. Three years ago Harun was 21.

7. Shabbir has a brother one-fourth his age and sister two times his age.
 Let Shabbir = S. Brother = $S/4$. Sister = $2S$. Youngest = brother.
 Total = $S + S/4 + 2S = 13S/4$. Total is 20 more than thrice youngest:
 $13S/4 = 3(S/4) + 20$. Simplify: $13S/4 = 3S/4 + 20$.
 Subtract $3S/4$: $10S/4 = 20$. $5S/2 = 20$. $S = 8$. Sister = $2S = 16$.

8. Present ratio A:B = 6:4. Let A=6k and B=4k. Five years ago $(6k-5)/(4k-5)=5/3$.
 Cross multiply: $3(6k-5)=5(4k-5)$. $18k-15=20k-25$. $10=2k$. $k=5$. So A=30.

9. Y is four times X. Let X = x, Y = 4x. After 6 years:
 Half of X + quarter of Y = 3x. $(x+6)/2 + (4x+6)/4 = 3x$.
 Rewrite second term: $(2x+3)/2$. Sum = $(3x+9)/2 = 3x$.
 Multiply 2 both sides: $3x+9 = 6x$. $9 = 3x$. $x = 3$. X after 6 years = 9.

10. Father age equals sum of sons: let F = S. In 19 years: $(F+19)/3 = (S+57)/5$.
 Substitute S=F: $(F+19)/3 = (F+57)/5$. Multiply: $5(F+19)=3(F+57)$.
 $5F+95=3F+171$. $2F=76$. $F=38$.

11. Average first 4 tests = 75 so total = 300. After 5th test average = 72 so total = 360.
 Score on 5th = $360 - 300 = 60$.

12. Cake cost = x shared by 8 $\rightarrow x/8$ per person. If 2 leave $\rightarrow x/6$ per person.
 Extra paid = $x/6 - x/8 = (4x-3x)/24 = x/24$.

13. Average of 12 numbers = N, sum = 12N. Remove 34 and add 38:
 New sum = $12N - 34 + 38 = 12N + 4$. New average = $(12N+4)/12 = N + 1/3$.

14. $b = 8d - c$ and $a = d/3 \rightarrow d = 3a$. So $b = 8(3a)-c = 24a-c$.
 Sum = $a + (24a-c) + c + 3a = 28a$. Average = $28a/4 = 7a$.

15. First 10 positive multiples of 5: 5,10,15,20,25,30,35,40,45,50.

Median = average of 5th and 6th = $(25+30)/2 = 27.5$.

Sum = $(10/2)(5+50) = 275$. Mean = $275/10 = 27.5$. $M-m=0$.

16. Average of P numbers = x, sum = Px. Average of N numbers = y, sum = Ny.

Combined average = $(Px+Ny)/(P+N)$.

17. First m exams average 70: sum = 70m.

Overall average 75: total = $75(m+n)$. Sum of last n = $75(m+n)-70m = 5m+75n$.

Average last n = $(5m+75n)/n = 5m/n + 75$.

18. Average of 5,9,k,m is 12: $(14+k+m)/4 = 12$ so $14+k+m=48$ so $k+m=34$.

Average of (k+7) and (m-3) is $(k+m+4)/2 = (34+4)/2 = 19$.

19. Cost 0.30/kWh. Total kWh = $2800+3200+3600 = 9600$.

Average monthly = $9600/3 = 3200$. Cost = $3200 \times 0.30 = 960$.

20. Let average of 10 tests = A total = 10A.

Average of best 9 = 10% more = 1.1A. Total best 9 = 9.9A.

% = $(9.9A / 10A) \times 100 = 99\%$.

21. 18 like Math, 25 like Science, 10 like both.

Union = $18 + 25 - 10 = 33$.

22. 50 like chocolate, 30 like both. Only chocolate = $50 - 30 = 20$.

23. Use inclusion-exclusion: $80+70+60-30-25-20+15 = 150$.

So 150 students take at least one.

24. $300+250+200-100-80-70+50 = 550$ but total people = 500.
So data is inconsistent.

25. $|\text{Union}| = 100+70+60-40-30-20+10 = 150$. Not playing = $180 - 150 = 30$.

26. Read = 220, both = 120 so read only = 100. The 50% condition contradicts given totals.

27. Only math = $150-50=100$. Only literature = $100-50=50$. Total only one = 150.

28. 60% of 120 = 72 speak French. English only = 48. 25% of French speak English = 18.
Total English = $48+18 = 66$.

29. $0.90T+0.85T-225 = T$. $1.75T - 225 = T$. $0.75T = 225$. $T = 300$.

30. Working mothers = 25 and both = 8. Working mothers only = $25-8 = 17$.