Yocket Prep

FREE DOWNLOADABLE PRACTICE SET

dMAT Mathematical Equations

20 practice questions with answers

20	questions with answers	**1 to 20**	whole-number values for every letter	**75 sec**	suggested time per question

Mathematical Equations is one of the three subtests in the dMAT Core Module. Each question gives a short system of linked equations in which letters stand for whole numbers, and the task is to find the value of one of those letters. The questions start with two equations and build up to four linked equations.

Prepared by the Yocket Prep team

How to use this practice set

Work through the questions in order, since the difficulty builds up step by step. Cover the answers section at the back, try each question on your own, and only then check the answer and the working. Aim for about 75 seconds per question once the easy ones feel comfortable, and avoid a calculator, since the real subtest does not allow one.

Level	Questions	What to expect	How to approach
Easy	1 to 10	Two equations with two letters	Learn the substitution method, placing a known value into the other equation.
Medium	11 to 15	Three equations with three letters	Write one letter in terms of another, then combine the equations.
Hard	16 to 20	Four equations with four letters	Follow the chain of letters and check each step before moving on.

How the questions work

Each system uses letters such as A, B, C and D. Every letter is a whole number from 1 to 20, the equations use only addition, subtraction and multiplication, and each system has exactly one correct solution. Every question has four options, a to d, and only one is correct.

The substitution method in three steps

1	**Start with the simplest equation**	Look for an equation that gives a value directly, such as B = 6, or one that can be rearranged easily, such as C − 4 = 9.
2	**Express the other letters using it**	If B = 6 and A + 2 = B, the second equation can be rewritten as A = B − 2, which gives A = 4.
3	**Substitute into the remaining equation**	Once the letters are linked to the first one, placing them into the last equation reduces the system to one short calculation.

Example. Take B = 5, A = B + 3 and C = 2 × A, and find C. Since B = 5, the second equation gives A = 5 + 3 = 8. Placing A into the third equation gives C = 2 × 8 = 16. Only one unknown is solved at a time.

Tip: solve only the letter the question asks for. Since every letter lies between 1 and 20, an answer outside that range points to an arithmetic error.

Practice questions

Question 1 Easy

A = 6
B = A + 8

What is the value of B?

a. 14	**b.** 2	**c.** 8	**d.** 48

Question 2 Easy

B = 15
A = B - 7

What is the value of A?

a. 7	**b.** 15	**c.** 8	**d.** 22

Question 3 Easy

B = 5
A = 3 × B

What is the value of A?

a. 8	**b.** 12	**c.** 20	**d.** 15

Question 4 Easy

A + B = 14
B = 6

What is the value of A?

a. 6	**b.** 8	**c.** 20	**d.** 84

Question 5 Easy

A - B = 5
B = 9

What is the value of A?

a. 14	**b.** 4	**c.** 9	**d.** 45

Question 6 Easy

A × B = 24
B = 4

What is the value of A?

a. 4	**b.** 20	**c.** 28	**d.** 6

Question 7 Easy

A + B = 18
B = 2 × A

What is the value of B?

a. 6	**b.** 12	**c.** 9	**d.** 16

Question 8 Easy

A + B = 20
A = B + 4

What is the value of A?

a. 12	**b.** 8	**c.** 10	**d.** 16

Question 9 Easy

A × B = 40
B = A - 3

What is the value of B?

a. 3	**b.** 8	**c.** 5	**d.** 13

Question 10 Easy

$A + B = 17$

$A - B = 5$

What is the value of A?

a. 6	**b.** 12	**c.** 22	**d.** 11

Question 11 Medium

$A = 2 \times B$

$C = A + 2$

$B + C = 11$

What is the value of C?

a. 8	**b.** 3	**c.** 6	**d.** 11

Question 12 Medium

$C = A + B$

$A = 3 \times B$

$C = 20$

What is the value of A?

a. 5	**b.** 15	**c.** 10	**d.** 20

Question 13 Medium

$B = 2 \times A$

$A + B + C = 24$

$C = B + 4$

What is the value of C?

a. 4	**b.** 8	**c.** 16	**d.** 12

Question 14 Medium

$C = A \times B$
$A = B + 2$
$C = 15$

What is the value of A?

a. 3	**b.** 8	**c.** 5	**d.** 15

Question 15 Medium

$A - B = 4$
$B + C = 15$
$A = C - 1$

What is the value of C?

a. 10	**b.** 5	**c.** 9	**d.** 14

Question 16 Hard

$B = 2 \times A$
$C = B + 3$
$D = C - A$
$B + D = 15$

What is the value of D?

a. 4	**b.** 8	**c.** 7	**d.** 11

Question 17 Hard

$A + B = 13$
$C = 2 \times A$
$D = C - B$
$A + D = 15$

What is the value of D?

a. 6	**b.** 14	**c.** 15	**d.** 8

Question 18 Hard

$D = A \times B$

$C = D - A$

$A = B + 2$

$C = 10$

What is the value of D?

a. 5	**b.** 15	**c.** 8	**d.** 10

Question 19 Hard

$A = 3 \times B$

$C = A + B$

$D = C - 6$

$B + D = 9$

What is the value of C?

a. 6	**b.** 12	**c.** 9	**d.** 15

Question 20 Hard

$B = A - 2$

$C = A \times B$

$D = C - 2 \times A$

$D = 5$

What is the value of B?

a. 2	**b.** 5	**c.** 3	**d.** 15

Answer key

Question 1 **a** (14)	Question 2 **c** (8)	Question 3 **d** (15)	Question 4 **b** (8)
Question 5 **a** (14)	Question 6 **d** (6)	Question 7 **b** (12)	Question 8 **a** (12)
Question 9 **c** (5)	Question 10 **d** (11)	Question 11 **a** (8)	Question 12 **b** (15)
Question 13 **d** (12)	Question 14 **c** (5)	Question 15 **a** (10)	Question 16 **c** (7)
Question 17 **d** (8)	Question 18 **b** (15)	Question 19 **b** (12)	Question 20 **c** (3)

After finding a value, put it back into every equation to confirm that all of them hold. This one habit catches most mistakes.

Answers and explanations

Question 1 Easy Answer: a (B = 14)

Put A = 6 into the second equation, which gives B = 6 + 8 = 14.

Question 2 Easy Answer: c (A = 8)

Put B = 15 into the second equation, which gives A = 15 - 7 = 8.

Question 3 Easy Answer: d (A = 15)

Put B = 5 into the second equation, which gives A = 3 × 5 = 15.

Question 4 Easy Answer: b (A = 8)

B is given as 6, so A + 6 = 14. Subtracting 6 from both sides gives A = 8.

Question 5 Easy Answer: a (A = 14)

B is given as 9, so A - 9 = 5. Adding 9 to both sides gives A = 14.

Question 6 Easy Answer: d (A = 6)

B is given as 4, so A × 4 = 24. Dividing 24 by 4 gives A = 6.

Question 7 Easy Answer: b (B = 12)

Replace B with 2 × A in the first equation, which gives A + 2 × A = 18, so 3 × A = 18 and A = 6. Then B = 2 × 6 = 12.

Question 8 Easy Answer: a (A = 12)

Replace A with B + 4 in the first equation, which gives 2 × B + 4 = 20, so B = 8. Then A = 8 + 4 = 12.

Question 9 Easy Answer: c (B = 5)

The second equation says A is 3 more than B, so the first equation can be read as (B + 3) × B = 40. Among whole numbers, B = 5 works, because 8 × 5 = 40. So B = 5 and A = 8.

Question 10 Easy Answer: d (A = 11)

Adding the two equations cancels B, which gives 2 × A = 22, so A = 11. Then B = 17 - 11 = 6, and 11 - 6 = 5 confirms the second equation.

Question 11 Medium Answer: a (C = 8)

Write C in terms of B: C = A + 2 = 2 × B + 2. The third equation then becomes B + 2 × B + 2 = 11, so 3 × B = 9 and B = 3. Then A = 6 and C = 6 + 2 = 8.

Question 12 Medium Answer: b (A = 15)

Replace A with 3 × B in the first equation, which gives C = 3 × B + B = 4 × B. Since C = 20, B = 5. Then A = 3 × 5 = 15.

Question 13 Medium **Answer: d (C = 12)**

Write B and C in terms of A: B = 2 × A and C = 2 × A + 4. The second equation becomes A + 2 × A + 2 × A + 4 = 24, so 5 × A = 20 and A = 4. Then B = 8 and C = 8 + 4 = 12.

Question 14 Medium **Answer: c (A = 5)**

Replace A with B + 2 in the first equation, which gives C = (B + 2) × B. Since C = 15, the numbers 3 and 5 fit, because 3 × 5 = 15 and 5 is 2 more than 3. So B = 3 and A = 5.

Question 15 Medium **Answer: a (C = 10)**

From the first equation, A = B + 4. From the second, C = 15 - B. Putting both into the third equation gives B + 4 = 15 - B - 1, so 2 × B = 10 and B = 5. Then A = 9 and C = 15 - 5 = 10.

Question 16 Hard **Answer: c (D = 7)**

Write everything in terms of A: B = 2 × A, C = 2 × A + 3, and D = (2 × A + 3) - A = A + 3. The last equation becomes 2 × A + A + 3 = 15, so 3 × A = 12 and A = 4. Then B = 8, C = 11 and D = 11 - 4 = 7.

Question 17 Hard **Answer: d (D = 8)**

From the first equation, B = 13 - A. Then D = 2 × A - (13 - A) = 3 × A - 13. The last equation becomes A + 3 × A - 13 = 15, so 4 × A = 28 and A = 7. Then B = 6, C = 14 and D = 14 - 6 = 8.

Question 18 Hard **Answer: b (D = 15)**

Replace A with B + 2 and D with (B + 2) × B. Then C = (B + 2) × B - (B + 2) = (B + 2) × (B - 1). Since C = 10, B = 3 works, because 5 × 2 = 10. So B = 3, A = 5, and D = 5 × 3 = 15. As a check, C = 15 - 5 = 10.

Question 19 Hard **Answer: b (C = 12)**

Write C and D in terms of B: C = 3 × B + B = 4 × B, and D = 4 × B - 6. The last equation becomes B + 4 × B - 6 = 9, so 5 × B = 15 and B = 3. Then A = 9, C = 12 and D = 6.

Question 20 Hard **Answer: c (B = 3)**

Since D = 5, the third equation gives C - 2 × A = 5, so C = 2 × A + 5. The second equation says C = A × (A - 2). Trying whole numbers, A = 5 works, because 5 × 3 = 15 and 2 × 5 + 5 = 15. So A = 5, B = 5 - 2 = 3 and C = 15.

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