Non-Calculator

KS4 Mastery: Foundation Booklet

1

BEYOND MATHS

Non-Calculator

KS4 Mastery: Foundation Booklet 1

Question Number	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7
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Week 1

1. Work out $3 \times 2 + 4$

2. Simplify $7y + 8y + 2y$

3. Simplify $\frac{9}{15}$

4. Evaluate $3\boldsymbol{x} + 2\boldsymbol{y}$ if $\boldsymbol{x} = 4$ and $\boldsymbol{y} = 1$

5. Expand and simplify $2(x + 5)$

6. Write 40 as a product of its prime factors.

7. Share £20 in the ratio 1:4

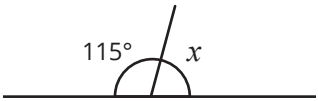
8. Write down the gradient of the line whose equation is $y = 5x + 3$

9. Simplify $x^4 \times x^7$

10. $y = 2x + 1$; what is the value of y when $x = 2$?

11. Find the area of a rectangle whose width is 8cm and whose height is 4cm.

12. Find the missing angle, marked x. Give a reason for your answer.



Week 1

13. Solve $3x = 21$

14. Find the median of the following set of numbers:

    4, 5, 7, 7, 8, 9, 10

15. A regular polygon has an exterior angle of 30°.
    Work out the number of sides this polygon has.

16. Write down the value of sin(0°).

17. 1 cup of tea and 3 slices of cake cost £4.50.

    1 cup of tea of 1 slice of cake cost £1.90.

    Work out the cost of 1 slice of cake.

18. A fair, six-sided dice is thrown. Write down the probability that the dice lands on a number greater than 4. Give your answer as a fraction in its simplest form.

19. A school must provide teachers to pupils in the ratio 1:7 for a school trip. If 8 teachers attend the trip, how many pupils can go?

20. x and y are integers.

    $x > 20$

    $y \leq 40$

    Work out the largest possible value of $y - x$.

Week 2

1. Work out $11 - 2 \times 4$

2. Simplify $4a + 8a - 2a$

3. Simplify $\frac{18}{27}$

4. Evaluate $3x + 2y$ if $x = 3$ and $y = -1$

5. Expand and simplify $3(x - 4)$

6. Write 120 as a product of its prime factors. Give your answer in index form.

7. Share £80 in the ratio 3:5

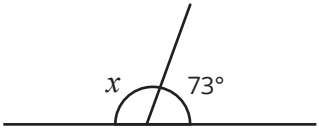
8. Write down the gradient of the line whose equation is $y = 4 - 3x$

9. Simplify $x^8 \times x^{-3}$

10. $y = 4x - 3$; what is the value of y when $x = -5$?

11. Find the perimeter of a rectangle whose width is 8cm and whose height is 4cm.

12. Find the missing angle, marked x. Give a reason for your answer.



Week 2

13. Solve $a - 2 = 10$

14. Find the median of the following set of numbers:

    5, 9, 1, 2, 10, 3, 11

15. A regular polygon has an exterior angle of 60°. Work out the number of sides this polygon has.

16. Write down the value of cos(0°).

17. 1 cup of tea and 3 slices of cake cost £3.80.

    1 cup of tea of 1 slice of cake cost £1.60.

    Work out the cost of 1 cup of tea.

18. A fair, six-sided dice is thrown. Write down the probability that the dice does not land on a multiple of 3. Give your answer as a fraction in its simplest form.

19. A school must provide teachers to pupils in the ratio 1:7 for a school trip. If 35 students attend the trip, how many teachers must go?

20. x and y are positive integers.

    $x > 20$

    $y \leq 40$

    Work out the smallest possible value of $y + x$.

Week 3

1. Work out $7 + 2 \times 5 - 2$

2. Simplify $3x - x + 4x - 2x$

3. Simplify $\frac{42}{56}$

4. Evaluate $5xy$ if $x = -2$ and $y = -1$

5. Expand and simplify $2(x - 9)$

6. Write 180 as a product of its prime factors. Give your answer in index form.

7. Share £45 in the ratio 2:7

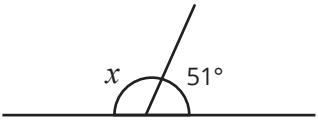
8. Write down the gradient of the line whose equation is $y = \frac{4x + 7}{2}$

9. Simplify $x^{-4} \times x$

10. $y = 2x - 9$; what is the value of y when $x = -8$?

11. Find the perimeter of a rectangle whose width is 3.5cm and whose height is 2cm.

12. Find the missing angle, marked x. Give a reason for your answer.



Week 3

13. Solve $x + 7 = 23$

14. Find the median of the following set of numbers:

    10, 2, -1, 7, 8, 15, 2

15. A regular polygon has an exterior angle of 40°. Work out the number of sides this polygon has.

16. Write down the value of sin(90°).

17. 1 cup of tea and 4 slices of cake cost £9.00.

    1 cup of tea of 1 slice of cake cost £2.70.

    Work out the cost of 1 cup of tea.

18. A fair, six-sided dice is thrown. Write down the probability that the dice lands on a prime number. Give your answer as a fraction in its simplest form.

19. A school must provide teachers to pupils in the ratio 1:9 for a school trip. If 54 students attend the trip, how many teachers must go?

20. x and y are integers.

    $x > 60$

    $y > 35$

    Work out the smallest possible value of $y + x$.

Week 4

1. Work out 2×3^2

2. Simplify $3x^2 + 2x - x^2 + 4x$

3. Simplify $\frac{28x}{35x}$

4. Evaluate $4x^2$ if $x = -2$

5. Expand and simplify $3x(2x + 1)$

6. Write 175 as a product of its prime factors. Give your answer in index form.

7. Share £68 in the ratio 1:10:6

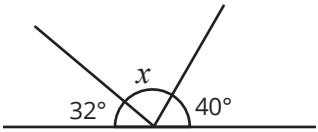
8. Write down the gradient of the line whose equation is $y = 2(4x + 1)$

9. Simplify $2x^7 \times 3x^4$

10. $y = 3x + 15$; what is the value of y when $x = 0.5$?

11. Find the area of a triangle whose width is 6cm and whose perpendicular height is 10cm.

12. Find the missing angle, marked x. Give a reason for your answer.



Week 4

13. Solve $3b + 5 = 17$

14. Find the median of the following set of numbers:

    4, 6, 10, 2, 13, 5

15. A regular polygon has an interior angle of 60°. Work out the number of sides this polygon has.

16. Write down the value of tan(0°).

17. 1 cup of tea and 3 slices of cake cost £3.80.

    1 cup of tea of 1 slice of cake cost £1.60.

    Work out the cost of 3 slices of cake.

18. A bag contains 5 red counters and 3 blue counters. A counter is chosen at random. What is the probability of choosing a blue counter? Give your answer as a fraction in its simplest form.

19. A school must provide teachers to pupils in the ratio 1:7 for a school trip. If 50 students attend the trip, what is the minimum number of teachers that must go?

20. x and y are positive integers.

    $x > 20$

    $y \leq 40$

    Work out the smallest positive value of xy.

Week 5

1. Work out 1 + (2 + 5) × 3

2. Simplify $x^2 + 2x - 3y - x^2 - 4y - 2x$

3. Simplify $\frac{15x}{20x}$

4. Evaluate xy^2 if $x = -1$ and $y = -3$

5. Expand and simplify $5x(x - y)$

6. Write 900 as a product of its prime factors. Give your answer in index form.

7. Share £55 in the ratio 1:3:7

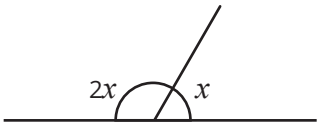
8. Write down the gradient of the line whose equation is $2y = 4x + 1$

9. Simplify $9xy \times 5x$

10. $y = 2x^2 + x$; what is the value of y when $x = -4$?

11. Find the area of a triangle whose width is 4cm and whose perpendicular height is 15cm.

12. Find the missing angle, marked x. Give a reason for your answer.



Week 5

13. Solve $\frac{x}{5} = 15$

14. Find the median of the following set of numbers:

    -3, -1, 0, -2

15. A regular polygon has an interior angle of 140°. Work out the number of sides this polygon has.

16. Write down the value of cos(90°).

17. 1 cup of tea and 3 slices of cake cost £4.90.

    1 cup of tea of 1 slice of cake cost £2.00.

    Work out the cost of 2 cups of tea.

18. A bag contains 15 red counters and 20 blue counters. A counter is chosen at random. What is the probability of choosing a blue counter? Give your answer as a fraction in its simplest form.

19. A school must provide teachers to pupils in the ratio 2:5 for a school trip. If 8 teachers attend, how many students can go on the trip?

20. x and y are integers.

    $x > 20$

    $y \leq 40$

    Work out the smallest possible value of $\frac{x}{y}$.

Week 6

1. Work out $8 - 3 \times 2^2$

2. Simplify $3 \times 2x - 4 \times x$

3. Simplify $\frac{16x}{2}$

4. Evaluate $\frac{y^2}{4}$ if $y = -8$

5. Expand and simplify $(x + 2)(x + 3)$

6. Write 2×90 as a product of its prime factors. Give your answer in index form.

7. Share £25 in the ratio 1:3

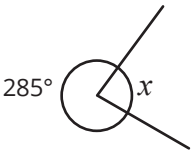
8. Write down the gradient of the line whose equation is $2y = 5 - 8x$

9. Simplify $3x^2y \times 8xy^2$

10. $y = x^2 + 3x + 1$; what is the value of y when $x = 2$?

11. Find the area of a rectangle whose width is $x$cm and whose height is $(x + 5)$cm. Give your answer in expanded form.

12. Find the missing angle, marked x. Give a reason for your answer.



Week 6

13. Solve $2(x + 3) = 8$

14. Find the range of the following set of numbers:

    -3, -1, 0, -2, 7

15. A regular polygon has an interior angle of 135°. Work out the number of sides this polygon has.

16. Write down the value of sin(180°).

17. 2 cups of tea and 3 slices of cake cost £5.30.

    1 cup of tea of 1 slice of cake cost £1.90.

    Work out the cost of 1 cup of tea.

18. A bag contains 5 red counters, 3 green counters and 2 blue counters. A counter is chosen at random. What is the probability of choosing a red or a green counter? Give your answer as a fraction in its simplest form.

19. A school must provide teachers to pupils in the ratio 2:5 for a school trip. If 20 students attend, how many teachers must go on the trip?

20. x and y are integers.

    $x > 4$

    $y < 10$

    Work out the smallest negative value of $x - y$.

Week 7

1. Work out $8 \times 5 \div 2^2$

2. Simplify $8x \times 4x + 2 \times 5x + 3x \times 2x$

3. Simplify $\frac{7x}{28}$

4. Evaluate $\frac{2x^2}{y}$ if $x = 5$ and $y = 4$

5. Expand and simplify $(x + 5)(x + 1)$

6. Write 3×150 as a product of its prime factors. Give your answer in index form.

7. Share £4 in the ratio 2:3:5

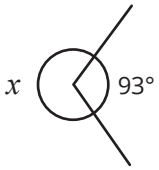
8. Write down the gradient of the line whose equation is $3y = 5 - 15x$

9. Simplify $2xy^2 \times 3x$

10. $y = 2x^2 - x$; what is the value of y when $x = -2$?

11. Find the area of a rectangle whose width is $y$cm and whose height is $(y - 2)$cm. Give your answer in expanded form.

12. Find the missing angle, marked x. Give a reason for your answer.



Week 7

13. Solve $4x - 3 = x + 2$

    Give your answer as a fraction.

14. Find the range of the following set of numbers:

    -4, -10, -3, -8, -7

15. A regular polygon has an interior angle of 144°. Work out the number of sides this polygon has.

16. Write down the value of sin(30°).

17. 2 cups of tea and 3 slices of cake cost £3.80.

    1 cup of tea of 2 slices of cake cost £2.30.

    Work out the cost of 1 slice of cake and 1 cup of tea.

18. A bag contains 5 red counters, 3 green counters and 2 blue counters. A counter is chosen at random. What is the probability of choosing a yellow counter?

19. A school must provide teachers to pupils in the ratio 3:20 for a school trip. If 41 students attend, how many teachers must go on the trip?

20. x and y are integers.

    $x < -4$

    $y > -10$

    Work out the largest negative value of $x - y$.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