

**MHS Entrance Exam
Grade 9**

1. Reference: Level I Algebra 1 Chapter 2 Section 3

What is the value of $\frac{1}{3}(10a + 2b)$ if $a = 6$ and $b = 3$?

2. Reference: Level I Algebra 1 Chapter 4 Section 3

What integer is equal to $5(-8)$?

3. Reference: Level I Algebra 1 Chapter 4 Section 3

What integer can replace the empty box in $-4(2n) - 5(-10n) = \square n$?

4. Reference: Level I Algebra 1 Chapter 4 Section 3

What integer is equal to $(-6.2)(-5)$?

5. Reference: Level I Algebra 1 Chapter 4 Section 3

What integer can replace the empty box in $-4(-2 - 3x) = \square x + 8$?

6. Reference: Level I Algebra 1 Chapter 5 Section 3

What is the value of m if $8m + 1 = 49$?

7. Reference: Level I Algebra 1 Chapter 5 Section 3

What is the value of x if $4x + 3 = 5x - 12$?

8. Reference: Level I Algebra 1 Chapter 7 Section 5

What whole number must replace the box in $(6d + 8)^2 = 36d^2 + \square d + 64$?

9. Reference: Level I Algebra 1 Chapter 7 Section 6

What whole number must replace the box in $\frac{y^{36}}{y^8} = y^{\square}y^{14}$?

10. Reference: Level I Algebra 1 Chapter 7 Section 2

What whole number must replace the box in $(5y + 6) + (4y - 7) = \square y - 1$?

11. Reference: Level I Algebra 1 Chapter 7 Section 3

What whole number must replace the box in $x^9x^{12} = x^{\square}x^6$?

12. Reference: Level I Algebra 1 Chapter 7 Section 3

What whole number must replace the box in $(g^8)^5 = (g^{\square})^4$?

13. Reference: Level I Algebra 1 Chapter 7 Section 4

What whole number must replace the box in $(4x^2 + 3y)(10x^2 - 7y) = 40x^4 + \square x^2y - 21y^2$?

14. Reference: Level I Algebra 1 Chapter 7 Section 6

What is the value of $\frac{90x^{10}}{15x^8}$ when $x = -4$?

Simplify the expression first to make the calculation easier.

15. Reference: Level J Algebra 2 Chapter 3 Section 4

Which of the following are factors of $x^2 - 17x + 60$?

Select all that apply and enter their labels in the same order as they appear (ascending order).
Enter the labels without any spaces or commas.

1. $x - 4$

2. $x - 15$

3. $x + 5$

4. $x - 12$

5. $x - 5$

6. $x + 12$

16. Reference: Level J Algebra 2 Chapter 3 Section 4

On a piece of paper, write the expression $a^2 + 7a - 60$ in the form $(a + r)(a - s)$, $r > 0$ and $s > 0$.
Give the value of r .

17. Reference: Level J Algebra 2 Chapter 3 Section 4

On a piece of paper, write the expression $x^2 - 16x - 105$ in the form $(x + r)(x - s)$, $r > 0$ and $s > 0$.
Give the value of s .

18. Reference: Level I Algebra 1 Chapter 4 Section 3

What integer can replace the empty box in $-5(9 - 4w) + 8w = \square w - 45$?

19. Reference: Level H Chapter 3 Section 6

What whole number is equal to 35% of 300?

20. Reference: Level H Chapter 3 Section 6

If 20% of the money in a cash box is \$30, how much money is in the cash box?

21. Reference: Level H Chapter 3 Section 6

The fraction $\frac{4}{5}$ expressed as a percentage is \square %.

What number replaces \square ?

22. Reference: Level H Chapter 3 Section 6

Express 75% as a fraction in lowest terms.

23. Reference: Level I Algebra 1 Chapter 5 Section 3

What is the value of x if $\frac{5}{6}x + 1 = \frac{51}{6}$?

24. Reference: Level I Algebra 1 Chapter 5 Section 3

What is the value of x if $\frac{2}{5}x = 14$?

25. Reference: Level I Algebra 1 Chapter 5 Section 3

What is the value of x if $1.8x - 9.8 = 4.6$?

26. Reference: Level I Algebra 1 Chapter 4 Section 1

What integer is equal to $35 + (-75)$?

27. Reference: Level I Algebra 1 Chapter 4 Section 1

What integer can replace the empty box in $(-x + 5) + (-2x) = \square x + 5$?

28. Reference: Level I Algebra 1 Chapter 4 Section 2

What integer can replace the empty box in $-(-63 + 10f) = \square f + 63$?

29. Reference: Level I Algebra 1 Chapter 4 Section 2

What integer is equal to $0 - 17$?

30. Reference: Level I Algebra 1 Chapter 5 Section 3

If $x = \frac{\square}{30}$ is the solution to $x + \frac{1}{6} = \frac{3}{5}$, then what whole number must replace the box?

31. Reference: Level I Algebra 1 Chapter 5 Section 3

If $x = \frac{\square}{5}$ is the solution to $x + \frac{2}{5} = 2$, then what whole number must replace the box?

Sample Questions Exam Answer Key

1. Reference: Level I Algebra 1 Chapter 2 Section 3

What is the value of $\frac{1}{3}(10a + 2b)$ if $a = 6$ and $b = 3$?

Sample question answer:

[Section 1]

$$\frac{1}{3}(10a + 2b) = \frac{1}{3}(10(6) + 2(3)) = \frac{1}{3}(60 + 6) = \frac{1}{3}(66) = 22$$

Answer: 22

2. Reference: Level I Algebra 1 Chapter 4 Section 3

What integer is equal to $5(-8)$?

Sample question answer:

[Section 1]

$$5(-8) = -(5 \times 8) = -40$$

Answer: -40

3. Reference: Level I Algebra 1 Chapter 4 Section 3

What integer can replace the empty box in $-4(2n) - 5(-10n) = \square n$?

Sample question answer:

[Section 1]

$$-4(2n) - 5(-10n) = -8n + 50n = 42n$$

Answer: 42

4. Reference: Level I Algebra 1 Chapter 4 Section 3

What integer is equal to $(-6.2)(-5)$?

Sample question answer:

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[Section 1]

$$(-6.2)(-5) = +(6.2 \times 5) = +31 = 31$$

Answer: 31 or +31

5. Reference: Level I Algebra 1 Chapter 4 Section 3

What integer can replace the empty box in $-4(-2 - 3x) = \square x + 8$?

Sample question answer:

[Section 1]

$$-4(-2 - 3x) = 8 + 12x = 12x + 8$$

Answer: 12

6. Reference: Level I Algebra 1 Chapter 5 Section 3

What is the value of m if $8m + 1 = 49$?

Sample question answer:

[Section 1]

$$8m + 1 = 49 \Rightarrow 8m = 48 \Rightarrow m = 6$$

Answer: 6

7. Reference: Level I Algebra 1 Chapter 5 Section 3

What is the value of x if $4x + 3 = 5x - 12$?

Sample question answer:

[Section 1]

$$4x + 3 = 5x - 12 \Rightarrow 5x - 4x = 3 + 12 \Rightarrow x = 15$$

Answer: 15

8. Reference: Level I Algebra 1 Chapter 7 Section 5

What whole number must replace the box in $(6d + 8)^2 = 36d^2 + \square d + 64$?

Sample question answer:

[Section 1]

$$(6d + 8)^2 = 36d^2 + 96d + 64$$

Answer: 96

9. Reference: Level I Algebra 1 Chapter 7 Section 6

What whole number must replace the box in $\frac{y^{36}}{y^8} = y^{\square}y^{14}$?

Sample question answer:**[Section 1]**

$$\frac{y^{36}}{y^8} = y^{14}y^{14}$$

Answer: 14**10. Reference:** Level I Algebra 1 Chapter 7 Section 2

What whole number must replace the box in $(5y + 6) + (4y - 7) = \square y - 1$?

Sample question answer:**[Section 1]**

$$(5y + 6) + (4y - 7) = 9y - 1$$

Answer: 9**11. Reference:** Level I Algebra 1 Chapter 7 Section 3

What whole number must replace the box in $x^9x^{12} = x^{\square}x^6$?

Sample question answer:**[Section 1]**

$$x^9x^{12} = x^{15}x^6$$

Answer: 15**12. Reference:** Level I Algebra 1 Chapter 7 Section 3

What whole number must replace the box in $(g^8)^5 = (g^{\square})^4$?

Sample question answer:**[Section 1]**

$$(g^8)^5 = (g^{10})^4$$

Answer: 10

13. Reference: Level I Algebra 1 Chapter 7 Section 4

What whole number must replace the box in $(4x^2 + 3y)(10x^2 - 7y) = 40x^4 + \square x^2y - 21y^2$?

Sample question answer:**[Section 1]**

$$(4x^2 + 3y)(10x^2 - 7y) = 40x^4 - 28x^2y + 30x^2y - 21y^2 = 40x^4 + 2x^2y - 21y^2$$

Answer: 2**14. Reference:** Level I Algebra 1 Chapter 7 Section 6

What is the value of $\frac{90x^{10}}{15x^8}$ when $x = -4$?

Simplify the expression first to make the calculation easier.

Sample question answer:**[Section 1]**

$$\frac{90x^{10}}{15x^8} = 6x^2$$

$$6 \times (-4)^2 = 6 \times 16 = 96$$

Answer: 96**15. Reference:** Level J Algebra 2 Chapter 3 Section 4

Which of the following are factors of $x^2 - 17x + 60$?

Select all that apply and enter their labels in the same order as they appear (ascending order).

Enter the labels without any spaces or commas.

1. $x - 4$

2. $x - 15$

3. $x + 5$

4. $x - 12$

5. $x - 5$

6. $x + 12$

Sample question answer:

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[Section 1]

$$x^2 - 17x + 60 = (x - m)(x - n), m > 0 \text{ and } n > 0$$

5 and 12 are two factors of 60 and $5 + 12 = 17$, so $x^2 - 17x + 60 = (x - 5)(x - 12)$

Answer: 45

16. Reference: Level J Algebra 2 Chapter 3 Section 4

On a piece of paper, write the expression $a^2 + 7a - 60$ in the form $(a + r)(a - s)$, $r > 0$ and $s > 0$.
Give the value of r .

Sample question answer:

[Section 1]

$$a^2 + 7a - 60 = (a - 5)(a + 12), \text{ thus } r = 12.$$

Answer: 12

17. Reference: Level J Algebra 2 Chapter 3 Section 4

On a piece of paper, write the expression $x^2 - 16x - 105$ in the form $(x + r)(x - s)$, $r > 0$ and $s > 0$.
Give the value of s .

Sample question answer:

[Section 1]

$$x^2 - 16x - 105 = (x + 5)(x - 21), \text{ thus } s = 21.$$

Answer: 21

18. Reference: Level I Algebra 1 Chapter 4 Section 3

What integer can replace the empty box in $-5(9 - 4w) + 8w = \square w - 45$?

Sample question answer:

[Section 1]

$$-5(9 - 4w) + 8w = -45 + 20w + 8w = -45 + 28w = 28w - 45$$

Answer: 28

19. Reference: Level H Chapter 3 Section 6

What whole number is equal to 35% of 300?

Sample question answer:

[Section 1]

$$\frac{35}{100} \times 300 = 105$$

Answer: 105**20. Reference: Level H Chapter 3 Section 6**

If 20% of the money in a cash box is \$30, how much money is in the cash box?

Sample question answer:

[Section 1]

Let k be the amount of money in the cash box.

$$0.2k = 30$$

$$k = 150$$

Answer: 150**21. Reference: Level H Chapter 3 Section 6**The fraction $\frac{4}{5}$ expressed as a percentage is %.What number replaces ?**Sample question answer:**

[Section 1]

$$\frac{4}{5} = \frac{80}{100} = 80\%$$

Answer: 80**22. Reference: Level H Chapter 3 Section 6**

Express 75% as a fraction in lowest terms.

Sample question answer:

[Section 1]

$$\frac{75}{100} = \frac{75 \div 5}{100 \div 5} = \frac{15 \div 5}{20 \div 5} = \frac{3}{4}$$

Answer: $\frac{3}{4}$

23. Reference: Level I Algebra 1 Chapter 5 Section 3

What is the value of x if $\frac{5}{6}x + 1 = \frac{51}{6}$?

Sample question answer:

[Section 1]

$$\frac{5}{6}x + 1 = \frac{51}{6} \Rightarrow \frac{5}{6}x = \frac{45}{6} \Rightarrow 5x = 45 \Rightarrow x = 9$$

Answer: 9

24. Reference: Level I Algebra 1 Chapter 5 Section 3

What is the value of x if $\frac{2}{5}x = 14$?

Sample question answer:

[Section 1]

$$\frac{2}{5}x = 14 \Rightarrow x = \frac{14 \times 5}{2} \Rightarrow x = 35$$

Answer: 35

25. Reference: Level I Algebra 1 Chapter 5 Section 3

What is the value of x if $1.8x - 9.8 = 4.6$?

Sample question answer:

[Section 1]

$$1.8x - 9.8 = 4.6 \Rightarrow 1.8x = 14.4 \Rightarrow x = 8$$

Answer: 8

26. Reference: Level I Algebra 1 Chapter 4 Section 1

What integer is equal to $35 + (-75)$?

Sample question answer:

[Section 1]

$$35 + (-75) = 35 - 75 = -40$$

Answer: -40

27. Reference: Level I Algebra 1 Chapter 4 Section 1

What integer can replace the empty box in $(-x + 5) + (-2x) = \square x + 5$?

Sample question answer:

[Section 1]

$$(-x + 5) + (-2x) = -x + 5 - 2x = -(x + 2x) + 5 = -3x + 5$$

Answer: -3

28. Reference: Level I Algebra 1 Chapter 4 Section 2

What integer can replace the empty box in $-(-63 + 10f) = \square f + 63$?

Sample question answer:

[Section 1]

$$-(-63 + 10f) = +63 - 10f = -10f + 63$$

Answer: -10

29. Reference: Level I Algebra 1 Chapter 4 Section 2

What integer is equal to $0 - 17$?

Sample question answer:

[Section 1]

$$0 - 17 = -17$$

Answer: -17

30. Reference: Level I Algebra 1 Chapter 5 Section 3

If $x = \frac{\square}{30}$ is the solution to $x + \frac{1}{6} = \frac{3}{5}$, then what whole number must replace the box?

Sample question answer:**[Section 1]**

$$x + \frac{1}{6} = \frac{3}{5}$$

$$x = \frac{3}{5} - \frac{1}{6} = \frac{18-5}{30} = \frac{13}{30}$$

31. Reference: Level I Algebra 1 Chapter 5 Section 3

If $x = \frac{\square}{5}$ is the solution to $x + \frac{2}{5} = 2$, then what whole number must replace the box?

Sample question answer:**[Section 1]**

$$x + \frac{2}{5} = 2$$

$$x = 2 - \frac{2}{5} = \frac{10-2}{5} = \frac{8}{5}$$

Answer: 8