MHS Entrance Exam
Grade 11

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1. Reference: Level L Algebra 4 Chapter 2 Section 1

One of the roots of $-6x^2+5x=-11$ is $x=\frac{k}{6}$, where $\frac{k}{6}$ is a fraction in its lowest terms.

What is the value of k?

2. Reference: Level L Algebra 4 Chapter 2 Section 1

The solutions of $4x^2-6x+1=0$ are $x=\frac{3\pm\sqrt{a}}{4}$. What is the value of a?

3. Reference: Level L Algebra 4 Chapter 2 Section 3

What is the remainder when $P(x) = x^4 - 8x^2 + 25$ is divided by $(x - 2)$?

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

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

5. What value must replace the "box" $\square$ if $4a+(1-a)=15$ and $a=\frac{\square}{3}$?

If no such value exists – Solution Set = {} – enter 999 for your answer.

If more than one value exists – Solution Set = **R** – enter 111 for your answer.

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

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

7. Reference: Level L Algebra 4 Chapter 2 Section 1

Consider the equation $5x^2 - 2x - 4 = 0$.
Which of the following is true about this equation?

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. Its discriminant Δ is negative.

2. Its discriminant Δ is positive.

3. It has one repeated root.

4. It has no real roots.

5. It has two real roots.

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 8 Section 3
Which of the following are factors of $36x^2 - 81y^2$?

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. $(6x - 9y)^2$

2. $6x + 9y$

3. $36x - 81y$

4. $36x + 9y$

5. $6x - 9y$

10. Reference: Mathematical Studies I Chapter 4 Section 3

Which of the following are factors of $x^2 + 19x + 84$?

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. $x + 42$

2. $x + 12$

3. $x + 2$

4. $x + 21$

5. $x + 7$

6. $x + 4$

11. Reference: Mathematical Studies I Chapter 4 Section 3

Which of the following are factors of $81x^2 - 1$?

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. $9x + 1$

2. $9x - 1$

3. $81x + 1$

4. $18x + 1$

5. $81x - 1$

6. $18x - 1$

12. Reference: Mathematical Studies I Chapter 4 Section 3

Which of the following are factors of $x^2 + 15x - 100$?

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. $x - 20$

2. $x + 5$

3. $x + 20$

4. $x - 5$

5. $x + 4$

6. $x - 25$

13. Reference: Level J Geometry 1 Chapter 4 Section 2

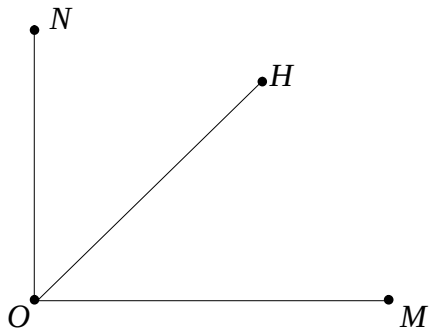
m∠1 = (4*x* + 5)° and m∠2 = (5*x* + 13)°. Find *x* if ∠1 and ∠2 are complementary.

14. Reference: Level J Geometry 1 Chapter 4 Section 2

m∠*SQR* = 15° and m∠*PQR* = (6*x* + 45)°. Find *x* if ∠*PQR* and ∠*SQR* form a linear pair.

15. Reference: Level J Geometry 1 Chapter 4 Section 3

Refer to the figure below to answer the question.



In the above figure, m∠*MON* = 90° and m∠*HOM* = (8*x* + 21)°. Find *x* if $\overline{OH}$ bisects ∠*MON*.

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

What whole number must replace the box in $(-7a-13)-(4a+23)=-11a-\square$?

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

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

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

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

19. Reference: Level K Algebra 3 Chapter 1 Section 3

Suppose that x varies directly as y and $x = 30$ when $y = 36$.
What is the value of y when $x = 35$?

20. Reference: Level K Algebra 3 Chapter 1 Section 4

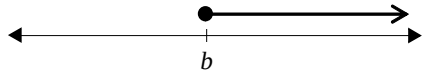
Suppose that y varies inversely as x and $x = 10$ when $y = 28$.
What is the value of y when $x = 7$?

21. Reference: Level K Algebra 3 Chapter 1 Section 2

105% of a number is 42. What is the value of this number?

22. Reference: Level K Algebra 3 Chapter 3 Section 3

On a piece of paper, solve and graph the inequality $-14x \geq -56$.
Pick the label of the choice that shows the correct form of the graph of the inequality and determine the correct value of b.

1.


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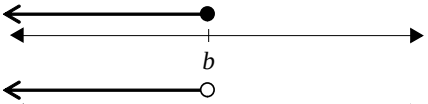

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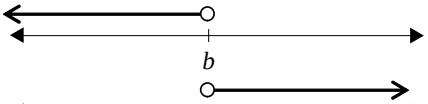

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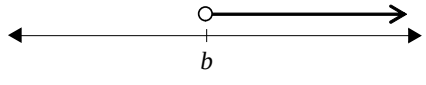


Enter your answer in the form **Label,b**.
That is, if the correct choice is **3** and the value of b is **16**, your answer then would be **3,16**.

23. Reference: Level K Algebra 3 Chapter 5 Section 3

In simplest form, $\frac{\sqrt{12}}{\sqrt{16}}$ can be expressed as $\frac{\sqrt{a}}{b}$ where a and b are whole numbers to be determined. Give only the value of b.

24. Reference: Level K Algebra 3 Chapter 5 Section 4

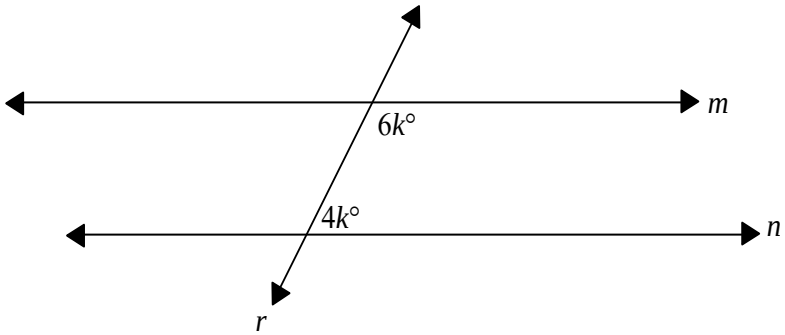
In simplest form, $7\sqrt{125}+9\sqrt{80}-6\sqrt{5}$ can be expressed as $a\sqrt{b}$ where a and b are whole numbers to be determined.
Give only the value of a.

25. Reference: Level K Algebra 3 Chapter 5 Section 4

In simplest form, $\left(\sqrt{7}+\sqrt{3}\right)^2$ can be expressed as $a+b\sqrt{c}$ where a, b, and c are whole numbers to be determined.
What whole number is equal to $a \times b \times c$?

26. Reference: Level J Geometry 1 Chapter 8 Section 5

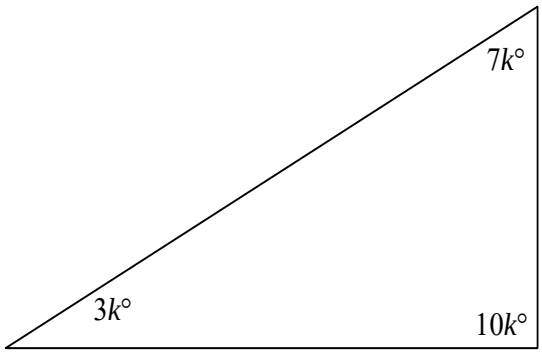
In the figure below, m // n.



What is the value of k?

27. Reference: Level J Geometry 1 Chapter 9 Section 1

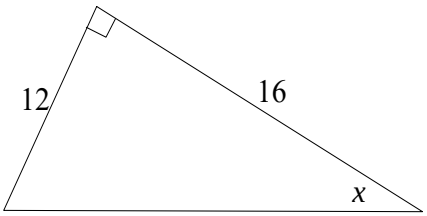
Refer to the figure below to answer the question.



What is the value of k?

28. Reference: Level K Geometry 2 Chapter 5 Section 3

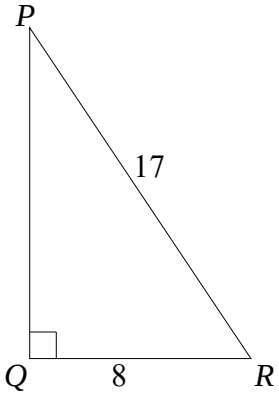
Refer to the figure below to answer the question.



What is the value of $25 \times \cos x$?

29. Reference: Level K Geometry 2 Chapter 5 Section 3

Refer to the figure below to answer the question.



What is the value of $34 \times \sin R$?

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

On a piece of paper, find the greatest common factor of the numerator and the denominator of $\frac{x^2-8x+16}{x^2-12x+32}$. Give its value when $x = 100$.

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

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

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

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

33. Reference: Level J Algebra 2 Chapter 2 Section 5

The slope of the line passing through points $A(1, -5)$ and $D(4, 37)$ is k. What is the value of k? If the slope is undefined, enter 999 for your answer.

34. Reference: Level J Algebra 2 Chapter 2 Section 6

The point of intersection of $y = 14x + 21$ with the y-axis is (a, b). What is the value of b?

35. Reference: Level J Algebra 2 Chapter 2 Section 6

Consider the line with equation $5x - \frac{y}{2} = \frac{1}{3}$.

Which of the following is true about this line?

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. Its y-intercept is 2/3.

2. Its equation in slope y-intercept form is $y = 10x - \frac{2}{3}$.

3. Its y-intercept is –2/3.

4. Its equation in slope y-intercept form is $y = 10x + \frac{2}{3}$.

5. Its slope is −10.

6. Its slope is 10.

36. Reference: Level K Algebra 3 Chapter 1 Section 1

Express the ratio of $6a$ to $\frac{a}{20}$ in simplest form.

37. Reference: Level K Algebra 3 Chapter 4 Section 3

What is the value of x if $\begin{cases} \frac{x-y}{8}=5 \\ x=5y \end{cases}$.

38. Reference: Level J Geometry 1 Chapter 9 Section 1

Refer to the figure below to answer the question.

$5k°$

$(k+6)°$

What is the value of k?

39. 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?

40. 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 L Algebra 4 Chapter 2 Section 1

One of the roots of $-6x^2+5x=-11$ is $x=\frac{k}{6}$, where $\frac{k}{6}$ is a fraction in its lowest terms.
What is the value of *k*?

Sample question answer:
[Section 1]
$-6x^2+5x=-11 \Leftrightarrow 6x^2-5x-11=0$

$$x=\frac{5\pm\sqrt{5^2-4(6)(-11)}}{2(6)}=\frac{5\pm\sqrt{25+264}}{12}=\frac{5\pm\sqrt{289}}{12}=\frac{5\pm17}{12}$$

Thus, $x=-1$ **or** $x=\frac{22}{12}=\frac{11}{6}$**, so** $k=11$**.**

2. Reference: Level L Algebra 4 Chapter 2 Section 1

The solutions of $4x^2-6x+1=0$ are $x=\frac{3\pm\sqrt{a}}{4}$. What is the value of *a*?

Sample question answer:
[Section 1]
$$x=\frac{6\pm\sqrt{6^2-4(4)(1)}}{2(4)}=\frac{2(3)\pm\sqrt{36-16}}{2(4)}=\frac{2(3)\pm2\sqrt{9-4}}{2(4)}$$

$$=\frac{2(3)\pm2\sqrt{5}}{2(4)}=\frac{3\pm\sqrt{5}}{4}\text{, so } a=5$$

3. Reference: Level L Algebra 4 Chapter 2 Section 3

What is the remainder when $P(x) = x^4 - 8x^2 + 25$ is divided by $(x - 2)$?

Sample question answer:
[Section 1]
According to the Remainder Theorem, the remainder when $P(x)$ is divided by $(x - 2)$ is $P(2)$.

$$P(2) = 2^4 - 8 \times 2^2 + 25 = 16 - 32 + 25 = 9$$

Therefore, the remainder is 9.

4. 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

5. What value must replace the "box" $\square$ if $4a + (1 - a) = 15$ and $a = \frac{\square}{3}$?

If no such value exists – Solution Set = {} – enter 999 for your answer.

If more than one value exists – Solution Set = **R** – enter 111 for your answer.

Solution:

$$4a + (1 - a) = 15$$

$$\Leftrightarrow 4a + 1 - a = 15$$

$$\Leftrightarrow (4a - a) + 1 = 15$$

$$\Leftrightarrow 3a + 1 = 15$$

$$\Leftrightarrow 3a + 1 - 1 = 15 - 1$$

$$\Leftrightarrow 3a = 14$$

$$\Leftrightarrow \frac{1}{3} \cdot 3a = \frac{1}{3} \cdot 14$$

$\Leftrightarrow \frac{1}{3}\cdot 3\cdot a = \frac{1}{3}\cdot 14$

$\Leftrightarrow \left(\frac{1}{3}\cdot 3\right)\cdot a = \frac{1}{3}\cdot 14$

$\Leftrightarrow 1\cdot a = \frac{14}{3}$

$\Leftrightarrow a = \frac{14}{3}$

Check: $4\times\frac{14}{3}+\left(1-\frac{14}{3}\right)=15$ **is true, therefore, the solution set for** $4a+(1-a)=15$ **is** $\{\frac{14}{3}\}$.

Answer: 14

6. 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

7. Reference: Level L Algebra 4 Chapter 2 Section 1

Consider the equation $5x^2 - 2x - 4 = 0$.
Which of the following is true about this equation?

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. Its discriminant Δ is negative.

2. Its discriminant Δ is positive.

3. It has one repeated root.

4. It has no real roots.

5. It has two real roots.

Sample question answer:
[Section 1]

$D = 2^2 - 4(5)(-4) = 4 + 80 = 84$, so $x = \dfrac{2 \pm \sqrt{84}}{2(5)}$ – two real roots as $D > 0$.

So the answer is 25.

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 8 Section 3
Which of the following are factors of $36x^2 - 81y^2$?

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. $(6x - 9y)^2$

2. $6x + 9y$

3. $36x - 81y$

4. $36x + 9y$

5. $6x - 9y$

Sample question answer:
[Section 1]
$36x^2 - 81y^2 = (6x - 9y)(6x + 9y)$
Answer: 25

10. Reference: Mathematical Studies I Chapter 4 Section 3

Which of the following are factors of $x^2 + 19x + 84$?

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. $x + 42$

2. $x + 12$

3. $x + 2$

4. $x + 21$

5. $x + 7$

6. $x + 4$

Sample question answer:
[Section 1]
$x^2 + 19x + 84 = (x + m)(x + n)$, **where** $m + n = 19$ **and** $mn = 84$.

7 and 12 are two factors of 84 and 7 + 12 = 19.
Therefore, $x^2 + 19x + 84 = (x + 12)(x + 7)$

Answer: 25

11. Reference: Mathematical Studies I Chapter 4 Section 3

Which of the following are factors of $81x^2 - 1$?

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. $9x + 1$

2. $9x - 1$

3. $81x + 1$

4. $18x + 1$

5. $81x - 1$

6. $18x - 1$

Sample question answer:
[Section 1]
$81x^2 - 1 = (9x - 1)(9x + 1)$

Answer: 12

12. Reference: Mathematical Studies I Chapter 4 Section 3

Which of the following are factors of $x^2 + 15x - 100$?

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. $x - 20$

2. $x + 5$

3. $x + 20$

4. $x - 5$

5. $x + 4$

6. $x - 25$

Sample question answer:
[Section 1]
$x^2 + 15x - 100 = (x + m)(x + n)$, where $m + n = 15$ and $mn = -100$. m and n have opposite signs as their product is negative.

The product of 20 and –5 is –100 and 20 + (–5) = 15.
Therefore, $x^2 + 15x - 100 = (x + 20)(x - 5)$

Answer: 34

13. Reference: Level J Geometry 1 Chapter 4 Section 2

m$\angle 1 = (4x + 5)°$ and m$\angle 2 = (5x + 13)°$. Find x if $\angle 1$ and $\angle 2$ are complementary.

Sample question answer:
[Section 1]
If $\angle 1$ and $\angle 2$ are complementary, then m$\angle 1$ + m$\angle 2 = 90°$
$(4x + 5)° + (5x + 13)° = 90°$
$9x = 72$
$x = 8$.

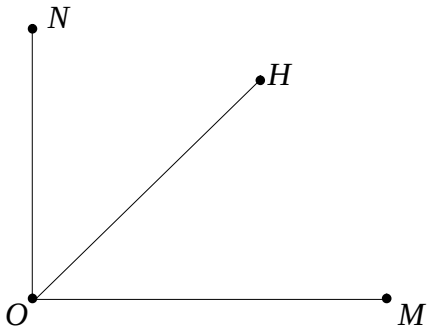
14. Reference: Level J Geometry 1 Chapter 4 Section 2

m$\angle SQR = 15°$ and m$\angle PQR = (6x + 45)°$. Find x if $\angle PQR$ and $\angle SQR$ form a linear pair.

Sample question answer:
[Section 1]
Since $\angle PQR$ and $\angle SQR$ form a linear pair, then $m\angle PQR + m\angle SQR = 180°$.
$15° + (6x + 45)° = 180°$
$6x = 120$
$x = 20$

15. Reference: Level J Geometry 1 Chapter 4 Section 3

Refer to the figure below to answer the question.



In the above figure, $m\angle MON = 90°$ and $m\angle HOM = (8x + 21)°$. Find x if $\overline{OH}$ bisects $\angle MON$.

Sample question answer:
[Section 1]
$\overline{OH}$ bisects $\angle MON$, then $m\angle HOM = \frac{1}{2} m\angle MON = 45°$.

$8x + 21 = 45$
$8x = 24$
$x = 3$

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

What whole number must replace the box in $(-7a - 13) - (4a + 23) = -11a - \square$?

Sample question answer:
[Section 1]
$(-7a - 13) - (4a + 23) = -11a - 36$
Answer: 36

17. 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

18. 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

19. Reference: Level K Algebra 3 Chapter 1 Section 3

Suppose that x varies directly as y and $x = 30$ when $y = 36$.
What is the value of y when $x = 35$?

Sample question answer:
[Section 1]
Since x varies directly as y, then $x = ky$, where k is a constant.
$30 = 36k \Rightarrow k = \frac{30}{36} = \frac{5}{6}$. Therefore, $x = \frac{5}{6}y$.

For $x = 35$, $y = 35 \times \frac{6}{5} = 42$.

Answer: 42

20. Reference: Level K Algebra 3 Chapter 1 Section 4

Suppose that y varies inversely as x and $x = 10$ when $y = 28$.
What is the value of y when $x = 7$?

Sample question answer:

[Section 1]

Since y varies inversely as x, then $y = \frac{k}{x}$, where k is a constant.

$28 = \frac{k}{10} \Rightarrow k = 280$. Therefore, $y = \frac{280}{x}$.

For $x = 7$, $y = \frac{280}{7} = 40$.

Answer: 40

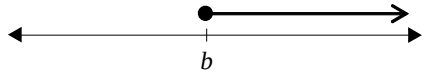
21. Reference: Level K Algebra 3 Chapter 1 Section 2

105% of a number is 42. What is the value of this number?

Sample question answer:
[Section 1]
Let x be this number.
$1.05x = 42 \Rightarrow x = 42 \div 1.05 = 40$
Answer: 40

22. Reference: Level K Algebra 3 Chapter 3 Section 3

On a piece of paper, solve and graph the inequality $-14x \geq -56$.
Pick the label of the choice that shows the correct form of the graph of the inequality and determine the correct value of b.

1.


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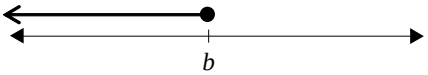

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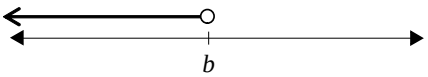

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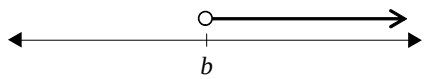


Enter your answer in the form **Label,b**.
That is, if the correct choice is **3** and the value of b is **16**, your answer then would be **3,16**.

Solution: $-14x \geq -56 \Rightarrow x \leq 4$, therefore the value of *b* is 4. Any number less or equal to 4 is a solution of the given inequality. The graph consists of all the points on the number line that are situated to the left of 4. It includes 4 itself.

Answer: 2,4

Sample question answer:
[Section 1]
$-14x \geq -56$, $x \leq 4$.

Answer: 2,4

23. Reference: Level K Algebra 3 Chapter 5 Section 3

In simplest form, $\frac{\sqrt{12}}{\sqrt{16}}$ can be expressed as $\frac{\sqrt{a}}{b}$ where *a* and *b* are whole numbers to be determined. Give only the value of *b*.

Sample question answer:
[Section 1]
$\frac{\sqrt{12}}{\sqrt{16}} = \frac{2\sqrt{3}}{4} = \frac{\sqrt{3}}{2}$.

Therefore, the value of *b* is 2.
Answer: 2

24. Reference: Level K Algebra 3 Chapter 5 Section 4

In simplest form, $7\sqrt{125} + 9\sqrt{80} - 6\sqrt{5}$ can be expressed as $a\sqrt{b}$ where *a* and *b* are whole numbers to be determined.
Give only the value of *a*.

Sample question answer:
[Section 1]
$7\sqrt{125} + 9\sqrt{80} - 6\sqrt{5} = 35\sqrt{5} + 36\sqrt{5} - 6\sqrt{5} = 65\sqrt{5}$.

Therefore, the value of *a* is 65.
Answer: 65

25. Reference: Level K Algebra 3 Chapter 5 Section 4

In simplest form, $\left(\sqrt{7}+\sqrt{3}\right)^2$ can be expressed as $a+b\sqrt{c}$ where *a*, *b*, and *c* are whole numbers to be determined.
What whole number is equal to $a \times b \times c$?

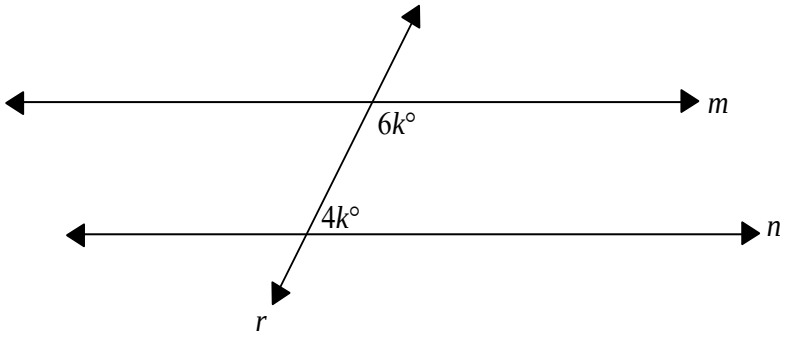
Sample question answer:
[Section 1]
$\left(\sqrt{7}+\sqrt{3}\right)^2 = 7+2\sqrt{21}+3 = 10+2\sqrt{21}$.

The value of $a \times b \times c$ is equal to $10 \times 2 \times 21 = 420$.

Answer: 420

26. Reference: Level J Geometry 1 Chapter 8 Section 5

In the figure below, *m* // *n*.

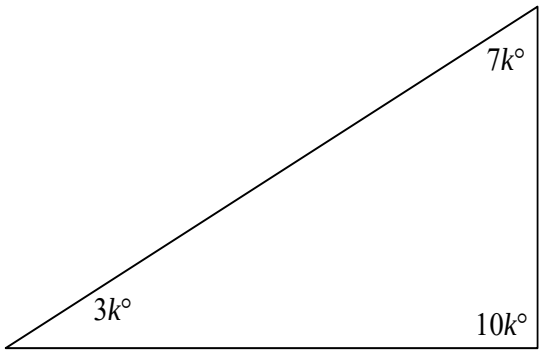


What is the value of *k*?

Sample question answer:
[Section 1]
$4k + 6k = 180$ (co-interior angles are supplementary).
$k = 18$.

27. Reference: Level J Geometry 1 Chapter 9 Section 1

Refer to the figure below to answer the question.

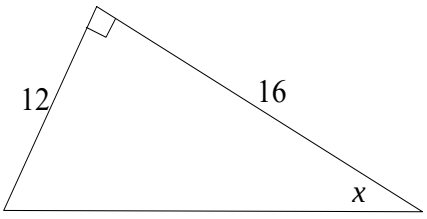


What is the value of k?

Sample question answer:
[Section 1]
$\mathbf{10}k + \mathbf{3}k + \mathbf{7}k = \mathbf{180}$
$\mathbf{20}k = \mathbf{180}$
$k = \mathbf{9}$.

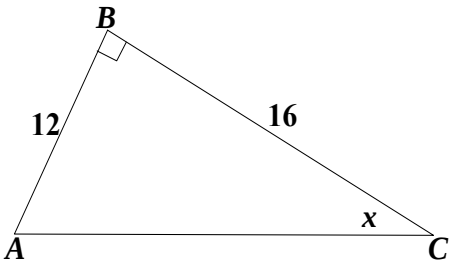
28. Reference: Level K Geometry 2 Chapter 5 Section 3

Refer to the figure below to answer the question.



What is the value of $25 \times \cos x$?

Sample question answer:
[Section 1]



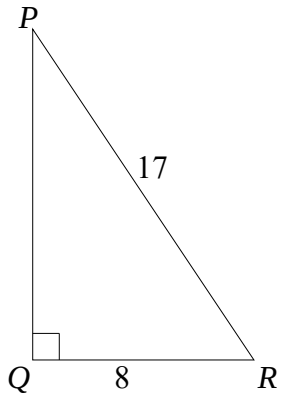
Using the Pythagorean Theorem, $AC = \sqrt{12^2 + 16^2} = \sqrt{400} = 20$

$\cos x = \frac{BC}{AC} = \frac{16}{20} = \frac{4}{5}$. **Then,** $25 \times \cos x = 25 \times \frac{4}{5} = 20$

Answer: 20

29. Reference: Level K Geometry 2 Chapter 5 Section 3

Refer to the figure below to answer the question.



What is the value of 34 × sin *R*?

Sample question answer:
[Section 1]
By Pythagorean Theorem, $PQ^2 + QR^2 = PR^2 \Rightarrow PQ^2 = 17^2 - 8^2 \Rightarrow PQ^2 = 225 \Rightarrow PQ = 15$.
sin $R = \frac{15}{17}$

$34 \times \sin R = 34 \times \frac{15}{17} = 30$

Answer: 30

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

On a piece of paper, find the greatest common factor of the numerator and the denominator of $\frac{x^2 - 8x + 16}{x^2 - 12x + 32}$. Give its value when $x = 100$.

Sample question answer:
[Section 1]
$\frac{x^2 - 8x + 16}{x^2 - 12x + 32} = \frac{(x-4)^2}{(x-4)(x-8)}$, thus the greatest common factor is $(x - 4)$.

Substituting $x = 100$ in $(x - 4)$ gives 96.

Answer: 96

31. 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

32. 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

33. Reference: Level J Algebra 2 Chapter 2 Section 5

The slope of the line passing through points $A(1, -5)$ and $D(4, 37)$ is k. What is the value of k? If the slope is undefined, enter 999 for your answer.

Sample question answer:
[Section 1]
Vertical change $= y_D - y_A = 37 - (-5) = 42$

Horizontal change $= x_D - x_A = 4 - 1 = 3$

The slope is: $\frac{y_2 - y_1}{x_2 - x_1} = \frac{42}{3} = 14$

Answer: 14

34. Reference: Level J Algebra 2 Chapter 2 Section 6

The point of intersection of $y = 14x + 21$ with the y-axis is (a, b). What is the value of b?

Sample question answer:
[Section 1]
Substituting $x = 0$ in the equation of the line gives:
$y = 14(0) + 21 \Rightarrow y = 21$

Answer: 21

35. Reference: Level J Algebra 2 Chapter 2 Section 6

Consider the line with equation $5x - \frac{y}{2} = \frac{1}{3}$.

Which of the following is true about this line?

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. Its y-intercept is 2/3.

2. Its equation in slope y-intercept form is $y = 10x - \frac{2}{3}$.

3. Its y-intercept is –2/3.

4. Its equation in slope y-intercept form is $y = 10x + \frac{2}{3}$.

5. Its slope is –10.

6. Its slope is 10.

Sample question answer:
[Section 1]

$5x - \frac{y}{2} = \frac{1}{3} \Rightarrow \frac{y}{2} = 5x - \frac{1}{3} \Rightarrow y = 10x - \frac{2}{3}$ (2 applies).

If $x = 0$, $y = -\frac{2}{3}$, so the y-intercept is $-\frac{2}{3}$ (3 applies).

The slope of this line is 10 (6 applies).

Answer: 236

36. Reference: Level K Algebra 3 Chapter 1 Section 1

Express the ratio of $6a$ to $\frac{a}{20}$ in simplest form.

Sample question answer:

[Section 1]

$$\mathbf{6a : \frac{a}{20} \text{ is equivalent to } 6a \div \frac{a}{20} = 6a \times \frac{20}{a} = 120.}$$

Answer: 120

37. Reference: Level K Algebra 3 Chapter 4 Section 3

What is the value of x if $\begin{cases} \frac{x-y}{8} = 5 \\ x = 5y \end{cases}$.

Sample question answer:

[Section 1]

$$\begin{cases} \frac{x-y}{8} = 5 \\ x = 5y \end{cases} \Rightarrow \begin{cases} x - y = 40 \\ x = 5y \end{cases} \Rightarrow \begin{cases} 5y - y = 40 \\ x = 5y \end{cases} \Rightarrow \begin{cases} 4y = 40 \\ x = 5y \end{cases} \Rightarrow \begin{cases} y = 10 \\ x = 50 \end{cases}$$

Answer: 50

38. Reference: Level J Geometry 1 Chapter 9 Section 1

Refer to the figure below to answer the question.

$5k°$

$(k + 6)°$

What is the value of k?

Sample question answer:
[Section 1]
$\boldsymbol{k + 6 + 5k = 90}$
$\boldsymbol{6k = 84}$
$\boldsymbol{k = 14.}$

39. 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]

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

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

40. 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]

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

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

Answer: 8