Lesson 1/2

# Exercises

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## [1] Choose the correct answer

**(1) The solution set of the equation: $x^2 - 1 = 0$ in $\mathbb{R}$ is ………**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\emptyset$ | Ⓑ | $1$ | Ⓒ | $\pm 1$ | Ⓓ | $\{1, -1\}$ |

**(2) The solution set of the equation: $x^2 - 6x + 9 = 0$ in $\mathbb{R}$ is ………**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\{-3\}$ | Ⓑ | $\{3\}$ | Ⓒ | $\emptyset$ | Ⓓ | $\{9\}$ |

**(3) The solution set of the equation: $x^2 + 3x = 0$ in $\mathbb{R}^*$ is ………**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\{0, -3\}$ | Ⓑ | $\emptyset$ | Ⓒ | $\{0, 3\}$ | Ⓓ | $\{-3\}$ |

**(4) The necessary condition which makes the equation**

**$ax^2 + bx + c = 0$ quadratic is ……… .**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $a > 0$ | Ⓑ | $a < 0$ | Ⓒ | $a \neq 0$ | Ⓓ | $a \neq 0, b \neq 0$ |

**(5) $x = 3$ is a root of the equation: $x^2 + mx + 3$, then $m =$ ………**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $-1$ | Ⓑ | $-2$ | Ⓒ | $2$ | Ⓓ | $1$ |

(6) If $x = -1$ is one of the roots of the equation:

$x^2 + kx - 6 = 2k + 4$, then $k = \dots\dots\dots$

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $5$ | Ⓑ | $-3$ | Ⓒ | $7$ | Ⓓ | $-6$ |

(7) $x = 4$ is one of the roots of the equation:

$x^2 + mx = 4$, then $\dots\dots\dots$

| | | | |
|---|---|---|---|
| Ⓐ | $m = -3$ | Ⓑ | $m$ is an even number |
| Ⓒ | $(1 - m)$ is a perfect square. | Ⓓ | $(a), (c)$ are both right. |

(8) If $f(x) = x^2 + bx + c$ and $x = 2$ is a root of the equation:

$f(x) = 0$, then $f(2) = \dots\dots\dots$

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $2$ | Ⓑ | $-2$ | Ⓒ | $4$ | Ⓓ | $zero$ |

(9) If the curve of the quadratic function $f$ cuts the $x - axis$ at the two points $(2, 0)$, $(-3, 0)$, then the solution set of $f(x) = 0$ in $\mathbb{R}$ is …

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\{2, 0\}$ | Ⓑ | $\{-3, 0\}$ | Ⓒ | $\{-3, 2\}$ | Ⓓ | $\{(2, -3)\}$ |

(10) In the opposite figure:

The S.S. of the equation $f(x) = 0$ in $\mathbb{R}$ is $\dots\dots\dots$

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\{0, -4\}$ | Ⓑ | $\{(-2, 0)\}$ | Ⓒ | $\emptyset$ | Ⓓ | $\{-2\}$ |

(11) In the opposite figure:

If the volume of the cuboid = 40 $cm^3$, then $x =$ ……… cm.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | 7 | B | 6 | C | 5 | D | 4 |

(12) Which of the following is an imaginary number?

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\pi$ | B | $\sqrt{5}$ | C | $\sqrt{-5}$ | D | $i^2$ |

(13) $i^{24} =$ ……… .

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $-1$ | B | $i^9$ | C | $-i$ | D | $1$ |

(14) The simplest form of the imaginary number $i^{45}$ is ………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $i$ | B | $-1$ | C | $-i$ | D | $1$ |

(15) $i^{-30} =$ ……… .

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $1$ | B | $-1$ | C | $-i$ | D | $i$ |

(16) The simplest form of the expression $i^{-45} =$ ……… .

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $1$ | B | $-1$ | C | $i$ | D | $-i$ |

(17) $\frac{1}{i^{199}} =$ ……… .

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $1$ | B | $-i$ | C | $i$ | D | $-1$ |

(18) $i^{26} + i^{28} = \ldots\ldots\ldots$ .

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $i^{54}$ | B | $-i$ | C | $zero$ | D | $2$ |

(19) $\frac{1}{i^{15}} + i^{21} = \ldots\ldots\ldots$ .

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $zero$ | B | $2i$ | C | $-2i$ | D | $-i$ |

(20) $5i^7 + 4i^{-1} = \ldots\ldots\ldots$ .

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $9i$ | B | $-9i$ | C | $i$ | D | $-i$ |

(21) $1 + i + i^2 + i^3 + i^4 = \ldots\ldots\ldots$ .

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $4i + 1$ | B | $-1$ | C | $1$ | D | $5$ |

(22) If $n \in \mathbb{Z}$, then $i^{8n-3} = \ldots\ldots\ldots$

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $i$ | B | $-i$ | C | $-1$ | D | $1$ |

(23) If $n \in \mathbb{Z}$, then $i^{-8n} = \ldots\ldots\ldots$

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\frac{1}{i}$ | B | $-1$ | C | $1$ | D | $i$ |

(24) $1 + i + i^2 + i^3 + i^4 =$ ......... .

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $4i + 1$ | B | $-1$ | C | $1$ | D | $5$ |

(25) If $n \in \mathbb{Z}$, then $i^{8n-3} =$ .........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $i$ | B | $-i$ | C | $-1$ | D | $1$ |

(26) If $n \in \mathbb{Z}$, then $i^{-8n} =$ ......... .

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\frac{1}{i}$ | B | $-1$ | C | $1$ | D | $i$ |

(27) If $n \in \mathbb{Z}$, then $i^{4n+42} =$ ......... .

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $1$ | B | $-1$ | C | $-i$ | D | $i$ |

(28) The additive inverse of the complex number $(4 - 7i)$ is .........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $4 + 7i$ | B | $-4 + 7i$ | C | $-4 - 7i$ | D | $4 - 7i$ |

(29) The conjugate of the number $(-3i - 4)$ is ......... .

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $3i + 4$ | B | $-3i - 4$ | C | $-3i + 4$ | D | $3i - 4$ |

(30) The conjugate of the number $(i - i^2)$ is ......... .

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $1 - i$ | B | $1 + i$ | C | $-i - 1$ | D | $i - 1$ |

**(31) The conjugate of the number $(-8)$ is ......... .**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $8i$ | B | $-8i$ | C | $-8$ | D | $8$ |

**(32) The conjugate of the number $(2+i)^2$ is ......... .**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $2+i$ | B | $(2+i)^{-1}$ | C | $3+4i$ | D | $3-4i$ |

**(33) $\sqrt{-16}=$ ......... .**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $-4$ | B | $4$ | C | $2i$ | D | $4i$ |

**(34) $\sqrt{2}\times\sqrt{-8}=$ ......... .**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $i$ | B | $-2i$ | C | $4i$ | D | $-4i$ |

**(35) $\sqrt{-18}\times\sqrt{-12}=$ ......... .**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $6\sqrt{6}i$ | B | $6\sqrt{6}$ | C | $-6\sqrt{6}$ | D | $-6\sqrt{6}i$ |

**(36) $(-4i)(-6i)=$ ......... .**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $-10i$ | B | $24i$ | C | $-24i$ | D | $-24$ |

**(37)** $3i(-2i) = \dots\dots\dots$ .

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $6i$ | B | $6$ | C | $-6$ | D | $-6i$ |

**(38)** $(-2i)^3(-3i)^2 = \dots\dots\dots$ .

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $-72i$ | B | $72i$ | C | $72$ | D | $-72$ |

**(39)** If $(2+5i)-(4-2i) = x+yi$, then $x+y = \dots\dots\dots$ .

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $9$ | B | $-1$ | C | $1$ | D | $5$ |

**(40)** $(12-5i^{17})-\left(7-\sqrt{-81}\right) = \dots\dots\dots$ .

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $5-4i$ | B | $-5+4i$ | C | $5+4i$ | D | $-5-4i$ |

**(41)** $(4-3i)(4+3i) = \dots\dots\dots$ .

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $25i$ | B | $14$ | C | $14i$ | D | $25$ |

**(42)** If $(1+i^4)(1-i^7) = x+yi$, then $x+y = \dots\dots\dots$ .

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $4$ | B | $3$ | C | $2$ | D | $1$ |


**(43) If $x, y$ are real numbers and $x + yi = i^{43} + 3\sqrt{-4}$, then $x + y =$**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $3$ | B | $5$ | C | $3+2i$ | D | $5i$ |

**(44) If $x + yi = (2 - 3i)^2$, then $x + y =$ ......... .**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $-5-12i$ | B | $-17$ | C | $17$ | D | $60$ |

**(45) If $12 + 3ai = 4b - 27i$, then $a + b =$ ......... .**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $-9$ | B | $12$ | C | $-6$ | D | $6$ |

**(46) The solution set of the equation: $x^2 + 4 = 0$ in the set of complex numbers is ......... .**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\{2\}$ | B | $\{-2\}$ | C | $\emptyset$ | D | $\{2i, -2i\}$ |

**(47) The solution set of the equation: $9x^2 + 4 = 0$ in the set of complex numbers is ......... .**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\left\{\frac{-2}{3}\right\}$ | B | $\left\{\frac{-2}{3}, \frac{2}{3}\right\}$ | C | $\left\{\frac{2}{3}\right\}$ | D | $\left\{\frac{-2}{3}i, \frac{2}{3}i\right\}$ |

**(48) If $x^2 - 2x + 2 = 0$, then $x =$ ......... .**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $2 \pm 2i$ | B | $2 \pm i$ | C | $1 \pm i$ | D | $1 \pm 2i$ |

(49) All of the following are imaginary numbers except ……… .

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\sqrt{-18}$ | B | $i^{19}$ | C | $(2+2i)^4$ | D | $(1+i)^6$ |

(50) $3 + 3i + 3i^2 + 3i^3 =$ ……… .

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $zero$ | B | 3 | C | 12 | D | $12i$ |

**Essay**

**Find the result of each of the following in the simplest form:**

| | |
|---|---|
| (1) $(1+i)^4$ | (2) $(1-i)^{10}$ |
| (3) $(1+2i^2)(2+3i^5+4i^6)$ | (4) $\frac{26}{3-2i}$ |
| (5) $\frac{3+4i}{5-2i}$ | (6) $\frac{1}{(1+2i)^2}$ |
| (7) $\frac{(3+i)(3-i)}{(3-4i)}$ | |

اجتهد

**Find the value of $x$ and $y$ that satisfy each of the following equations:**

(8) $(2x-3)+(3y+1)i=7+10i$

(9) $(2x-y)+(x-2y)i=5+2i$

(10) $3x+xi-2y+yi=5$

(11) $x^2-y^2+(x+y)i=4i$

(12) $\frac{10}{2+i}=x+yi$

(13) $\frac{(2+i)(2-i)}{3+4i}=x+yi$



# Exercises

## [1] Choose the correct answer

**(1) The two roots of the equation: $x^2 - 5x + 11 = 0$ are…………**

| | | | |
|---|---|---|---|
| A | two complex and non real roots | B | two rational roots |
| C | two different real roots. | D | two equal real roots |

**(2) The two roots of the equation: $x^2 - 11x + 10$ are………**

| | | | |
|---|---|---|---|
| A | two complex and non real roots | B | two different real roots |
| C | two equal real roots | D | Two conjugate complex |

**(3) The two roots of the equation: $49x^2 - 14x + 1 = 0$ are…………..**

| | | | |
|---|---|---|---|
| A | two different real roots | B | two equal real roots |
| C | two complex and non-real roots | D | two non-conjugate complex |

**(4) The two roots of the equation: $6x^2 = 19x - 15$ are……….**

| | | | |
|---|---|---|---|
| A | two non real roots | B | two equal real roots |
| C | two different rational numbers | D | two conjugate imaginary numbers |

**(5) The two roots of the equation: $x(x-2)=5$ are…………..**

| | | | |
|---|---|---|---|
| Ⓐ | two complex and non real roots | Ⓑ | two equal real roots |
| Ⓒ | two different real roots | Ⓓ | 2 and zero |


**(6) The two roots of the equation: $x+\frac{9}{x}=6$ are…………**

| | | | |
|---|---|---|---|
| Ⓐ | two equal real roots | Ⓑ | two complex and non real roots |
| Ⓒ | two different real roots | Ⓓ | two equal imaginary numbers |

**(7) Number of values of real $x$ which satisfy the equation: $2x^2-7x=5$ is**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $zero$ | Ⓑ | 1 | Ⓒ | 2 | Ⓓ | 3 |

**(8) The discriminant of the equation: $(x+2)^2+5=0$ is…………**

| | | | |
|---|---|---|---|
| Ⓐ | perfect square | Ⓑ | more than zero |
| Ⓒ | negative number | Ⓓ | irrational number |

**(9) In the quadratic equation: $b\,x^2+ax=\ c$ the discriminant is...........**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $b^2-4\,ac$ | Ⓑ | $a^2+4\,bc$ | Ⓒ | $b^2+4\,ac$ | Ⓓ | $c^2-4\,ab$ |

(10) If the two roots of the equation: $x^2 - k\,x + 25 = 0$ are equal real roots, then $k$ =……….

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $10$ | B | $-10$ | C | $\pm 10$ | D | $-5$ |

(11) If the two roots of the equation: $18\,x^2 - k\,x + 8 = 0$ are equal real roots, then $k$ =………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $zero$ | B | $\pm 5$ | C | $\pm 18$ | D | $\pm 24$ |

(12) If the two roots of the equation: $3\,x^2 - 6x + k = 0$ are equal real roots, then $k$ =……….

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $2$ | B | $3$ | C | $6$ | D | $9$ |

(13) If the discriminant of the quadratic equation: $2\,x^2 + 5x + 4\,k = 0$ equal zero, then $k$……….

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\pm 14$ | B | $zero$ | C | $\pm\frac{25}{32}$ | D | $\frac{25}{32}$ |

(14) If the roots of the equation: $x^2 + 3\,x - m = 0$ are different real roots, then one of the values of m which satisfy the equation: is $m$ = ……….

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $-2$ | B | $-3$ | C | $-4$ | D | $-5$ |

**(15) If the two roots of the equation: $x^2 - 4x + k = 0$ are real, then $k \in$ .....**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $[4, \infty[$ | B | $]-\infty, 4[$ | C | $]4, \infty[$ | D | $]-\infty, 4]$ |

**(16) If the roots of the equation: $x^2 + 4x + k = 0$ are different real, then....**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $k = 0$ | B | $k < 4$ | C | $k \leq 0$ | D | $k \leq 4$ |

**(17) If the roots of the equation: $k\,x^2 - 8x + 16 = 0$ are two complex and non-real, then……………**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $k > 2$ | B | $k < 2$ | C | $k \in ]1,10[$ | D | $k > 1$ |

**(18) In the equation: $75\,x^2 + 7kx + 3 = 0$ $if$ $k \geq 5$, then the two roots of the equation…………**

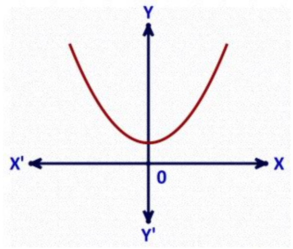
| | | | |
|---|---|---|---|
| A | equal real | B | complex and non-real |
| C | different rational | D | different real |

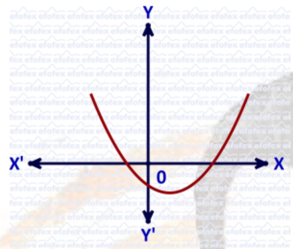
**(19) If the graph of the quadratic function $f$: $f(x)$ does not intersect the X-axis, then which of the following can be the rule of the function?**

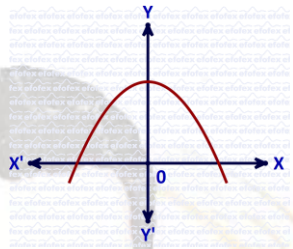
| | | | |
|---|---|---|---|
| A | $2x^2 + 3x - 5$ | B | $-x^2 + 5x + 1$ |
| C | $4x^2 - 20x + 25$ | D | $3x^2 - x + 2$ |

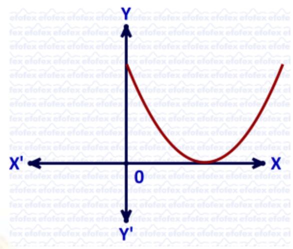
**(20) Each of the following figures represents the curve of the function:**

$f:\ f(x) = ax^2 + bx + c$ **which of these figures does have** $b^2 - 4ac = zero$


Ⓐ


Ⓑ

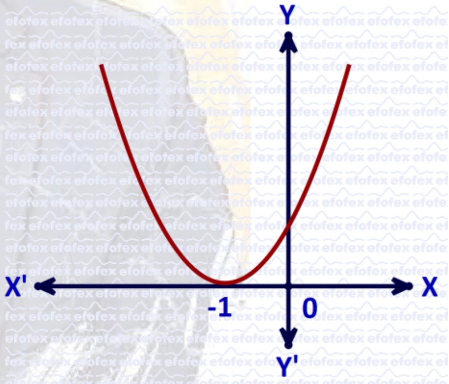

Ⓒ


Ⓓ

**(21) The given figure represents the function**

$f:\ f(x) = ax^2 + bx + c$

**, then** $(b^2 - 4ac) \times f(3) =$ ……………..




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $3$ | Ⓑ | $-1$ | Ⓒ | $-3$ | Ⓓ | $zero$ |

**(22) The roots of the equation:** $x^2 = k - 2$

**has distinct imaginary roots, then……**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $k > 2$ | Ⓑ | $k < 2$ | Ⓒ | $k \geq 2$ | Ⓓ | $k \leq 2$ |

**(23) Which of the following equations does have two complex non real roots?**

| | | | |
|---|---|---|---|
| A | $-5x^2 + 9x - 2 = 0$ | B | $-5x^2 + 9x + 2 = 0$ |
| C | $-5x^2 + 2x - 9 = 0$ | D | $-5x^2 + 2x + 9 = 0$ |

**(24) For the equation: $x^2 - 3x + k = 0$ two unequal roots if $k \neq$......**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | 9 | B | 3 | C | $\frac{9}{4}$ | D | $-3$ |

**(25) The equation: $(x-3)^2 + (x-4)^2 = 0$ has.................**

| | | | |
|---|---|---|---|
| A | two unequal real roots | B | two equal real roots |
| C | two rational roots | D | two non-real complex roots |

**Essay**


**(26) If a and b are rational numbers,**

**prove that the two roots of the equation:**

$ax^2 + bx + b - a = 0$ **are rational.**

# Exercises



## [1] Choose the correct answer:

**(1) The sum of the two roots of the equation: $x^2 + 3x - 10$is……**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $10$ | B | $-10$ | C | $3$ | D | $-3$ |

**(2) The sum of the two roots of the equation: $4x^2 + 4x - 35 = 0$is……**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $-1$ | B | $-4$ | C | $1$ | D | $\frac{-35}{4}$ |

**(3) The sum of the two roots of the equation: $5x^2 - 3 = 0$……**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\frac{3}{5}$ | B | $\frac{-3}{5}$ | C | $zero$ | D | $\frac{5}{53}$ |

**(4) The product of the two roots of the equation: $x^2 - 5x + 6 = 0$……**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $-6$ | B | $5$ | C | $-5$ | D | $6$ |

**(5) The product of the two roots of the equation:**

**$2x^2 - 7x - 6 = 0$ equal……**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $-6$ | B | $\frac{7}{2}$ | C | $3$ | D | $-3$ |

**(6) The product of the two roots of the equation:**

$3 + 2x - \frac{1}{4}x^2 = 0$**equals……**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\frac{-2}{3}$ | B | $12$ | C | $-12$ | D | $\frac{3}{4}$ |

**(7) The product of the two roots of the equation:**

$bx^2 + cx + a = 0$ **equals…….**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\frac{-c}{a}$ | B | $\frac{a}{b}$ | C | $\frac{-c}{b}$ | D | $\frac{a}{c}$ |

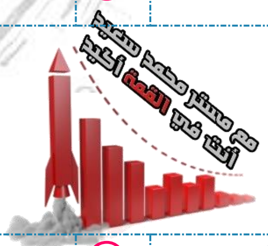
**(8) The product of the two roots of the equation: $3x^2 - 4 = 0$ multiplying by the sum of the two roots of the equation $x^2 - 3x = 0$ is .........**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $12$ | B | $-3$ | C | $-4$ | D | $3$ |

**(9) If the product of the two roots of the equation:**

$(k - 2)x^2 - 6x + 12 = 0$ **is 3, then** $k$ **=……………..**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $zero$ | B | $4$ | C | $6$ | D | $38$ |



**(10) If $M, (5 - M)$ are the two roots of the equation:**

$x^2 - kx + 6 = 0$**, then……..**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $-5$ | B | $5$ | C | $6$ | D | $-8$ |

(11) In the quadratic equation: $ax^2 - bx + c = 0$, if the sum of the two roots equals the product of them, then $b =$.......

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $-a$ | B | $a$ | C | $-c$ | D | $c$ |

(12) If $X = -1$ is one of the two roots of the equation: $x^2 - kx - 6 = 0$, then the sum of the two roots =...............

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $-5$ | B | $6$ | C | $-6$ | D | $5$ |

(13) If $(2 + i)$ is one of the roots of the equation: $x^2 - 4x + c = 0$, then c =...

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $16$ | B | $-16$ | C | $-5$ | D | $5$ |

(14) If L, M are the two roots of the equation: $x^2 - (k+2)x - 3 = 0$

and $L + M = 0$, then k =.............

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $-2$ | B | $-3$ | C | $2$ | D | $3$ |

(15) If $M, \frac{2}{M}$ are the roots of the equation: $a\,x^2 + bx + 12 = 0$, then $a =$...

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $3$ | B | $5$ | C | $6$ | D | $9$ |

(16) If (L+ 1), (M + 1) are the two roots of the equation: $x^2 - 3x + 2 = 0$ and L then $L =$...............

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $zero$ | B | $1$ | C | $2$ | D | $3$ |

(17) If L, M are the two roots of the equation: $x^2 + x + 1 = 0$,

then $L + M + LM =$.........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $zero$ | Ⓑ | $1$ | Ⓒ | $-1$ | Ⓓ | $2$ |

(18) If L, M are the two roots of the equation: $x^2 - 21x + 4 = 0$,

then: $\sqrt{L} + \sqrt{M} =$........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $25$ | Ⓑ | $5$ | Ⓒ | $-5$ | Ⓓ | $\pm 5$ |

(19) If the two roots of the equation: $x^2 + bx + c = 0$

are $L$ and $L$, then $b^2 + 4c =$........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $0$ | Ⓑ | $4L^2$ | Ⓒ | $8L$ | Ⓓ | $8L^2$ |

(20) If $L, L^2$ are the two roots of the equation:

$2x^2 + bx + 54 = 0$, then $b =$...

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $-12$ | Ⓑ | $-24$ | Ⓒ | $6$ | Ⓓ | $9$ |

(21) If one of the roots of the equation: $x^2 - 5x + n = 0$

more than the other root by 1, then $n =$ ...........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $2$ | Ⓑ | $2$ or $3$ | Ⓒ | $6$ | Ⓓ | $8$ |

(22) If one of the roots of the equation: $x^2 - 3x + c = 0$

is twice the other root, then $c =$.............

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $-4$ | Ⓑ | $-2$ | Ⓒ | $2$ | Ⓓ | $4$ |


(23) If one of the two roots of the equation: $x^2 + k\,x - 98 = 0$

is twice the additive inverse of the other root, then $k$ = .........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\pm 14$ | B | $\pm 7$ | C | $\pm 8$ | D | $49$ |

(24) If one of the roots of the equation: $3x^2 + (a+3)\,x + 7 = 0$

is the additive inverse of the other root, then $a$ =..............

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $-3$ | B | $3$ | C | $\frac{1}{3}$ | D | $\frac{-1}{3}$ |

(25) If one of the two roots of the equation: $x^2 - (b-3)\,x + 5 = 0$

is the additive inverse of the other root, then b =..........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $-5$ | B | $-3$ | C | $3$ | D | $5$ |

(26) If one of the two roots of the equation: $x^2 - (b^2 - 2b + 1)\,x - 9 = 0$

is additive inverse of the other, then $b$ =..........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $zero$ | B | $3$ | C | $1$ | D | $-1$ |

(27) If one of the roots of the equation: $(2x + k)^2 - 12\,x = 0$

is the additive inverse of the other root, then $k$ =...........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $3$ | B | $2$ | C | $\frac{1}{2}$ | D | $12$ |

(28) If one of the two roots of the equation: $a\,x^2 - 3x + 2 = 0$

is the multiplicative inverse of the other, then $a$ =…………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\frac{1}{3}$ | B | $\frac{1}{2}$ | C | $2$ | D | $3$ |

(29) If one of the two roots of the equation: $2kx^2 + 7x + 1 + k^2 = 0$

is the multiplicative inverse of the other root, then $k$ =…………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $1$ | B | $\pm 1$ | C | $-1$ | D | $2$ |

(30) If one of the two roots of the equation:

$$2\,k\,x^2 + 3\,x + k^2 + 2\,k - 1 = 0$$

is the multiplicative inverse of the other root , then $k$ =………..

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\pm 1$ | B | $-1$ | C | $2$ | D | $-2$ |

(31) If one of the two roots of the equation: $(k - 3)\,x^2 - 5x + 2\,k = 8$

is the multiplicative inverse of the other root, then the value of $k$ =…

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $5$ | B | $3$ | C | $-5$ | D | $-3$ |

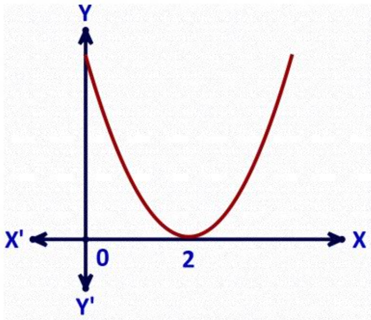
(32) If one of the roots of the equation:

$$3x^2 - (k + 2)x + k^2 + 2\,k = 0$$

is the multiplicative inverse of the other, then k =…………..

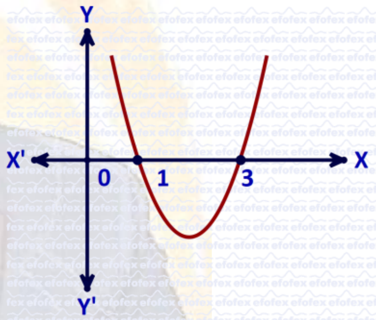
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $-3 \text{ or } 1$ | B | $-3 \text{ or } -1$ | C | $3 \text{ or } -1$ | D | $3 \text{ or } 1$ |

(33) The opposite figure represents the curve of the function $f:\ f(x) = ax^2 + bx + c$ , then $b + c =$…………..



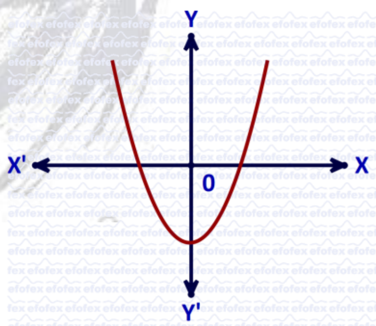

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $zero$ | B | $2$ | C | $4$ | D | $8$ |

(34) The opposite figure represents the curve product of the function $f:\ f(x) = x2 + kx + n$ , then $k + n =$…….




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $1$ | B | $-1$ | C | $7$ | D | $-7$ |

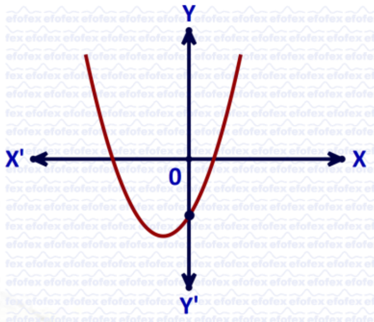
(35) The opposite figure represents the curve of the function $f:\ f(x) = ax^2 + bx + c$ , then which of the following is true?




| | | | |
|---|---|---|---|
| A | $a > 0, c > 0$ | B | $a > 0, c < 0$ |
| C | $a < 0, b > 0$ | D | $a < 0, c < 0$ |

(36) The opposite figure represents the curve of the quadratic function

$f: f(x) = ax^2 + bx + c$ , then……….



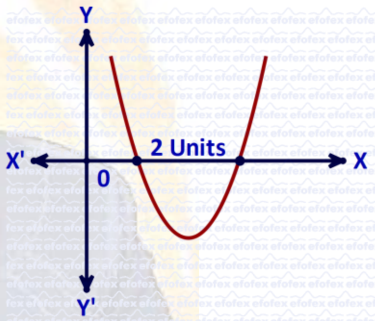

| | |
|---|---|
| A | $ac > 0$ |
| C | $ac < 0$ |
| B | $ac = 0$ |
| D | $ac$ is an imaginary number |

(37) The opposite figure

represents the curve of the function

$f: f(x) = x^2 - 8x + k + 1$

, then $k$ =…………




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $-14$ | B | $14$ | C | $8$ | D | $-8$ |

(38) If $x = -3$ is one of the two roots of the equation:

$2x^2 + kx - 3 = 0$, then the other root equals............

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $2$ | B | $\frac{-3}{2}$ | C | $\frac{1}{2}$ | D | $4$ |

(39) If $x = 3$ is one of the two roots of the equation : $2x^2 - 5x + k = 0$,

then the other root equals…………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $3$ | B | $-\frac{1}{2}$ | C | $\frac{-5}{2}$ | D | $-3$ |

(40) If $x = 2, x = -3$ are the two roots of the equation:

$2x^2 + ax + b = 0$ ,then $a + b =$.............

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $-6$ | B | $-1$ | C | $-10$ | D | $12$ |

(41) If one of the roots of the equation: $ax^2 + bx + c = 0$ is one,

then the other root equal..........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\frac{a}{c}$ | B | $\frac{c}{a}$ | C | $\frac{-b}{a}$ | D | $\frac{-a}{b}$ |

(42) Find the value of a which makes one of the two roots of the equation:

$x^2 - ax + 21 = 0$ exceeds double the other root by one.

(43) If the sum of the two roots of the equation:

$(a + 1)x^2 + (3a - 1)x + a^2 + 1 = 0$

equals the product of its roots, find the value of a «0 or-3»


Lesson 5

# Exercises

## [1] Choose the correct answer:

(1) The quadratic equation whose roots sum equals $-1$and their product equals $-3$ is..

| | | | |
|---|---|---|---|
| Ⓐ | $x^2 - x - 3 = 0$ | Ⓑ | $x^2 + x + 3 = 0$ |
| Ⓒ | $x^2 - x + 3 = 0$ | Ⓓ | $x^2 + x - 3 = 0$ |

(2) The quadratic equation whose roots are $3, -5$ is…………….

| | | | |
|---|---|---|---|
| Ⓐ | $x^2 + 2x - 15 = 0$ | Ⓑ | $x^2 - 2x - 15 = 0$ |
| Ⓒ | $x^2 - 2x + 15 = 0$ | Ⓓ | $x^2 + 2x + 15 = 0$ |

(3) The quadratic equation whose roots are $-2,3$is…………….

| | | | |
|---|---|---|---|
| Ⓐ | $(x + 2)(x + 3) = 0$ | Ⓑ | $x^2 - 4x + 6 = 0$ |
| Ⓒ | $x^2 - x = 6$ | Ⓓ | $4x^2 - 2x + 3 = 0$ |

(4) The quadratic equation whose roots are 8,8 is……………..

| | | | |
|---|---|---|---|
| Ⓐ | $2x = 16$ | Ⓑ | $(x + 8)^2 = 0$ |
| Ⓒ | $x^2 + 16x - 64 = 0$ | Ⓓ | $x^2 - 16x + 64 = 0$ |

(5) If the two roots of a quadratic are $-9$ and $zero$, then this equation is .........

| | | | |
|---|---|---|---|
| A | $x + 9 = 0$ | B | $(x - 9)(x) = 0$ |
| C | $x^2 + 9x = 0$ | D | $x^2 + 9x + 9 = 0$ |

(6) The quadratic equation whose roots are $i$ and $-i$ is............

| | | | |
|---|---|---|---|
| A | $x^2 - 1 = 0$ | B | $(x + 1)^2 = 0$ |
| C | $x^2 + 1 = 0$ | D | $(x - 1)^2 = 0$ |

(7) The quadratic equation whose roots are $-2\text{i}$ and $2\text{i}$ is ...............

| | | | |
|---|---|---|---|
| A | $x^2 = 4i$ | B | $x^2 + 4 = 0$ |
| C | $x^2 - 4 = 0$ | D | $ix^2 + 4 = 0$ |

(8) The quadratic equation whose roots are $\frac{3}{2}\text{i}$ and $\frac{3}{2}\text{i}^3$ is................

| | | | |
|---|---|---|---|
| A | $4x^2 - 9 = 0$ | B | $4x^2 + 9 = 0$ |
| C | $4x^2 - 4 = 0$ | D | $9x^2 + 4 = 0$ |

(9) The quadratic equation whose roots are$(1 - 5\text{i})$ and $(1 + 5\text{i})$ is.............

| | | | |
|---|---|---|---|
| A | $x^2 - 2x + 26 = 0$ | B | $x^2 + 2x - 26 = 0$ |
| C | $x^2 - 2x - 26 = 0$ | D | $x^2 + 2x + 26 = 0$ |

(10) If $L, M$ are two roots of the equation: $x^2 - 4x + 1 = 0$,

then the value of expression: $L^2 - 4L + 1 = \cdots$

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $zero$ | Ⓑ | $-4$ | Ⓒ | $1$ | Ⓓ | $-1$ |

(11) If $L$ is one of the roots of the equation: $3x^2 + 4x - 5 = 0$,

then $3L^2 + 4L + 5 =$………..

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $zero$ | Ⓑ | $10$ | Ⓒ | $-5$ | Ⓓ | $5$ |

(12) If $L$ is one of the roots of the equation:$x^2 + 4x + 7 = 0$, then $(L + 2)^2 =$. ..

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $-11$ | Ⓑ | $11$ | Ⓒ | $3$ | Ⓓ | $-3$ |

(13) If $L, M$ are the two roots of the equation: $x^2 - 7x + 3 = 0$,

then the value of expression: $L^2M + LM^2 = \cdots$

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $7$ | Ⓑ | $3$ | Ⓒ | $10$ | Ⓓ | $21$ |

(14) If $L, M$ are the two roots of the equation: $x^2 - 7x + 3 = 0$, then$L^2 + M^2 = \cdots$

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $7$ | Ⓑ | $43$ | Ⓒ | $58$ | Ⓓ | $79$ |

(15) If $L, M$ are the two roots of the equation:

$x^2 - 8x + c = 0$, and $L^2 + M^2 = 40$, then $c = \cdots$

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | 8 | Ⓑ | 10 | Ⓒ | 12 | Ⓓ | 14 |

(16) If $L, M$ are the two roots of the equation:

$x^2 - 7x + 9 = 0$ where $L > M$, then $L^3 - M^3 = \cdots$

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | 31 | Ⓑ | 63 | Ⓒ | $40\sqrt{13}$ | Ⓓ | $9\sqrt{7}$ |

(17) If $L, M$ are the two roots of the equation:

$x^2 - 5x + 7 = 0$ , then $L(M + 1) + M = \cdots$

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | 2 | Ⓑ | $-2$ | Ⓒ | 12 | Ⓓ | 7 |

(18) If $L, M$ are the two roots of the equation:

$3x^2 - 8x + 2 = 0$, then $\frac{1}{L} + \frac{1}{M} = \cdots$

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\frac{4}{3}$ | Ⓑ | 4 | Ⓒ | $\frac{-4}{3}$ | Ⓓ | $\frac{2}{3}$ |

(19) If $L, M$ are the two roots of the equation: $x^2 - 7x + 3 = 0$,

then the equation whose two roots are $(L + M)$ and $LM$ is ...........

| | | | |
|---|---|---|---|
| Ⓐ | $x^2 - 10x + 21 = 0$ | Ⓑ | $x^2 + 10x + 21 = 0$ |
| Ⓒ | $x^2 - 21x + 10 = 0$ | Ⓓ | $x^2 - 21x - 10 = 0$ |

(20) If $L, M$ are the two roots of the equation: $x^2 - 5x + 3 = 0$,

then the equation whose two roots are $2L, 2M$ is ...........

| | | | |
|---|---|---|---|
| Ⓐ | $2x^2 - 10x + 6 = 0$ | Ⓑ | $x^2 - 10x + 12 = 0$ |
| Ⓒ | $2x^2 - 10x - 6 = 0$ | Ⓓ | $x^2 + 10x + 12 = 0$ |

(21) If $L, M$ are the two roots of the equation: $2x^2 - 3x - 6 = 0$,

then the equation whose two roots are $\frac{L}{4}$ $and$ $\frac{M}{4}$ is ...........

| | | | |
|---|---|---|---|
| Ⓐ | $x^2 - 3x - 6 = 0$ | Ⓑ | $4x^2 - 6x - 3 = 0$ |
| Ⓒ | $16x^2 + 6x - 3 = 0$ | Ⓓ | $16x^2 - 6x - 3 = 0$ |

(22) If $L, M$ are the two roots of the equation: $x^2 - 5x + 7 = 0$,

then the equation whose two roots are $L^2$ $and$ $M^2$ is ...........

| | | | |
|---|---|---|---|
| Ⓐ | $x^2 + 11x + 49 = 0$ | Ⓑ | $x^2 - 11x + 49 = 0$ |
| Ⓒ | $x^2 - 49x + 11 = 0$ | Ⓓ | $x^2 + 11x - 49 = 0$ |

(23) If $L, M$ are the two roots of the equation: $x^2 + 5x + 6 = 0$,

then the equation whose two roots are $(L - M)$ *and* $(M - L)$ is ……

| | | | |
|---|---|---|---|
| A | $x^2 + x + 1 = 0$ | B | $x^2 + 1 = 0$ |
| C | $x^2 - x + 1 = 0$ | D | $x^2 - 1 = 0$ |

(24) The quadratic equation in which each of its two roots more

than the two roots of the equation: $x^2 - 3x + 2 = 0$ by 2 is…………

| | | | |
|---|---|---|---|
| A | $x^2 - 3x + 2 = 0$ | B | $x^2 + 7x + 12 = 0$ |
| C | $x^2 - 7x + 12 = 0$ | D | $x^2 - 7x - 12 = 0$ |

(25) If $\frac{2}{L}, \frac{2}{M}$ are the roots of the equation: $4x^2 + 3x = 2$,

then the equation whose two roots are $L$ and $M$ is……

| | | | |
|---|---|---|---|
| A | $3x^2 - 8x + 3 = 0$ | B | $x^2 - 3x + 8 = 0$ |
| C | $x^2 - 3x - 8 = 0$ | D | $3x^2 + 8x - 3 = 0$ |

(26) If $L, L^2$ are the roots of the equation: $2x^2 + bx + 54 = 0$,

then $-3L^2 + L = \cdots$

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $-12$ | B | $-24$ | C | $27$ | D | $36$ |

(27) If $L, M$ are the roots of the equation: $2x^2 + 3x - 1 = 0$,

then $4L^2 + 6l = \cdots$

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | 0 | B | 1 | C | 2 | D | 3 |

(28) If the opposite figure

represents a graph of a quadratic function in one variable,

then the rule of the function can be written as.........

| | |
|---|---|
| A | $f(x) = -x^2 - 2x + 3$ |
| C | $f(x) = -x^2 + 2x - 3$ |
| B | $f(x) = x^2 + 2x + 3$ |
| D | $f(x) = -x^2 + 2x - 3$ |

(29) The quadratic equation whose terms coefficients are real numbers

and one of its roots is $(3 - \mathrm{i})$ is...............

| | | | |
|---|---|---|---|
| A | $x^2 - 6x - 10 = 0$ | B | $2x^2 + 6x + 10 = 0$ |
| C | $x^2 - 6x + 10 = 0$ | D | $x^2 + 6x + 10 = 0$ |

(30) The quadratic equation whose roots are: $2 - \sqrt{3}, 2 + \sqrt{3}$ is.................

| | | | |
|---|---|---|---|
| A | $x^2 + 2x + 3 = 0$ | B | $x^2 - 4x + 1 = 0$ |
| C | $x^2 - 4x + 7 = 0$ | D | $x^2 + 4x + 1 = 0$ |

(31) If $L, M$ are the roots of the equation: $x^2 + 4x + 5 = 0$,

then the equation whose roots are $(4L + 5)$ and $(4M + 5)$ is……………..

| | | | |
|---|---|---|---|
| Ⓐ | $x^2 + 16x + 25 = 0$ | Ⓑ | $x^2 + 6x + 25 = 0$ |
| Ⓒ | $x^2 - 16x + 25 = 0$ | Ⓓ | $x^2 - 6x + 25 = 0$ |

(32) If $L, M$ are the roots of the equation: $x^2 + bx + c = 0$,

then the equation whose roots $\frac{1}{L}, \frac{1}{M}$ is……….

| | | | |
|---|---|---|---|
| Ⓐ | $x^2 + b\,x + c = 0$ | Ⓑ | $x^2 + c\,x + b = 0$ |
| Ⓒ | $c\,x^2 + b\,x + 1 = 0$ | Ⓓ | $c\,x^2 + x + b = 0$ |

(33) If $L + 1, M + 1$ are the roots of the equation $x^2 + 4x + 2 = 0$,

then the equation whose roots are $L, M$ is ……………

| | | | |
|---|---|---|---|
| Ⓐ | $x^2 + 5\,x + 3 = 0$ | Ⓑ | $x^2 + 5\,x + 5 = 0$ |
| Ⓒ | $x^2 + 4\,x + 3 = 0$ | Ⓓ | $x^2 + 6x + 7 = 0$ |

(34) The absolute value of the difference between the two roots

of the equation: $x^2 - 4x + 2 = 0$ equals……

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | 2 | Ⓑ | $\sqrt{2}$ | Ⓒ | 8 | Ⓓ | $\sqrt{8}$ |

**(35)** If $L$ and $M$ are the two roots of the equation: $\boldsymbol{x^2 - 3x - 4 = 0}$**,**

then find the equation whose roots are: $\frac{1}{L}$ and $\frac{1}{M}$

**(36)** Find the quadratic equation in which each of the two roots exceeds one

of the two roots of the equation: $x^2 - 7x - 9 = 0$

**(37)** Form the quadratic equation in which each of its two roots equals half

of its corresponding root of the equation: $4x^2 - 12x + 7 = 0$

**(38)** If $L$ and $M$ are the two roots of the equation: $2x^2 - 3x - 1 = 0,$

Then form the quadratic equations whose two roots are: $\frac{L}{M}, \frac{M}{L}$

**(39)** If $L$ and $M$ are the two roots of the equation: $x^2 - 2x - 4 = 0,$

find the equation whose roots are $\frac{1}{L^2}$ and $\frac{1}{M^2}$


**(40)** If $L$ and $M$ are the two roots of the equation: $x^2 - 3x - 5 = 0$,

find the equation whose roots are: $L^2M$ and $M^2L$

**(41)** If $\frac{1}{L}$ and $\frac{1}{M}$ are the two roots of the equation:

$x^2 - 3x + 1 = 0$, from the equation whose roots are:

$LM - 7, L + M + 3$

**(42)** If $L$ and $M$ are the two roots of the equation: $4x^2 - 6x + a = 0$

and $L^2 + M^2 = 7LM$, find the value of $a$


# Exercises

## [1] Choose the correct answer:

(1) The function: $f: f(x) = -4$ is negative in the interval............

| | | | |
|---|---|---|---|
| A | $]-\infty, 4[$ *only* | B | $]-4,4[$ *only* |
| C | $]-\infty, \infty[$ | D | $]-2,2[$ *only* |

(2) The function $f: f(x) = 5x - 3$ is positive at..........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $x > \frac{3}{5}$ | B | $x < \frac{3}{5}$ | C | $x > \frac{1}{3}$ | D | $x < \frac{-5}{3}$ |

(3) If $f(x) = 2x - 4$, then $f$ is negative at $x \in$............

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $[2, \infty[$ | B | $]-\infty, 2[$ | C | $]2, \infty[$ | D | $]-\infty, 2]$ |

(4) The sign of the function: $f: f(x) = 6 - 2x$ is non positive at..........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $x > 3$ | B | $x \leq 3$ | C | $x < 3$ | D | $x \geq 3$ |

(5) The function $f: f(x) = 3 - \frac{1}{2}x$ is non negative at $x \in$.............

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $]-\infty, 6]$ | B | $]-\infty, 6[$ | C | $[6, \infty[$ | D | $]6, \infty[$ |

(6) If the function $f: f(x) = x + 2$ where $x \in ]-4,3[$, then $f(x)$ is positive at $x \in$...

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $]-\infty, -2[$ | B | $]-2, \infty[$ | C | $]-4, -2[$ | D | $]-2,3[$ |

(7) If the function $f: f(x) = x + 3, x \in ]-5,6[$

, then $f(x)$ is negative at $x \in$………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $]-5,-3[$ | B | $]-\infty,-3[$ | C | $]-3,\infty[$ | D | $]-3,6[$ |

(8) The function $f: f(x) = c$ has a sign……….always.

| | | | |
|---|---|---|---|
| A | positive | B | negative |
| C | Like the sign of $x$ | D | Like the sign of $c$ |

(9) The sign of the function $f: f(x) = ax + b$ on $\mathbb{R}$ is the same as the sign of $b$ if…

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $a = b$ | B | $a = 0$ | C | $a > 0$ | D | $a < 0$ |

(10) If $f(x) = 3x$, then the sign of the function $f$ is negative in the interval…..

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $]-\infty,3[$ | B | $]3,\infty[$ | C | $]-\infty,0[$ | D | $]-3,\infty[$ |

(11) the function $f: f(x) = x^2 - 9$ is negative at $x \in$…………….

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\mathbb{R} - [-3,3]$ | B | $]-3,3[$ | C | $]-\infty,-9[$ | D | $]-\infty,-3[$ |

(12) The function $f: f(x) = x^2 + 1$ is positive at $x \in$…………..

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $]0,\infty[$ *only* | B | $]1,\infty[$*only* | C | $]-\infty,1[$*only* | D | $\mathbb{R}$ |

(13) The function $f: f(x) = x^2 - 6x + 9$ is positive in the interval…………..

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $]0,\infty[$ | B | $]-\infty,3]$ | C | $\mathbb{R} - \{3\}$ | D | $\mathbb{R} - \{0\}$ |

(14) The interval in which the function $f: f(x) = x^2 - 5x + 6$ is positive is……

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $[2,3]$ | B | $\mathbb{R} - \{2,3\}$ | C | $\mathbb{R} - [2,3]$ | D | $\mathbb{R} - ]2,3[$ |

(15) If $f(x)$ is positive at $x \in ]-2,5[$, then $f(x) =$………

| | | | |
|---|---|---|---|
| A | $x^2 - 3x - 10$ | B | $10 - 3x - x^2$ |
| C | $x^2 + 3x - 10$ | D | $10 + 3x - x^2$ |

(15) If $f(x) = x^2 + bx + c$ is negative at $x \in ]2,3[$, then the product of the two roots of the equation: $x^2 + bx + c = 0$ equal………………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $-6$ | B | $6$ | C | $b$ | D | $-c$ |

(16) The sign of the two functions $f: f(x) = (x-1)(x+2)$ and $g: g(x) = -x^2 + 9$ are both positive at $x \in$……….

| | | | |
|---|---|---|---|
| A | $]1,3[ \cup ]-3,-2[$ | B | $]-2,0[$ |
| C | $]3,\infty[ \cup ]-\infty,-3[$ | D | $]-3,3[$ |

(17) The sign of the two functions $f$ and $g$ where $f(x) = x - 2, g(x) = 4x^2$ are both negative in the interval………

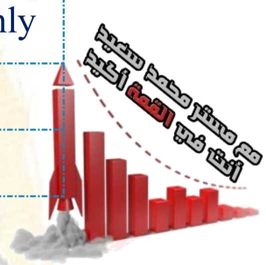
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $]2,\infty[$ | B | $]-\infty,-2[$ | C | $]-2,2[$ | D | $]-\infty,-2]$ |

(18) If the function $f: f(x) = ax^2 + bx + c$ and $a < 0$ and the two roots of $f(x) = 0$ are $2, -5$, then the function $f$ is positive in…………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\{-5,2\}$ | B | $\mathbb{R}-]-5,2[$ | C | $]-5,2[$ | D | $]-\infty,-5[$ |

(19) When investigate the sign of the function $f$ it's sufficient that you know………

| | |
|---|---|
| A | the curve of the function f is parallel to $X-axis$ only |
| B | the curve of the function f lies completely below $X-axis$ only |
| C | (a) and (b) together |
| D | nothing of the previous. |



(20) Which of the following functions is positive for all values of $x \in \mathbb{R}$?

| | | | |
|---|---|---|---|
| A | $f: f(x) = x^2 + 4$ | B | $f: f(x) = 3$ |
| C | $f: f(x) = (x-1)^2 + 9$ | D | All the previous. |

(21) The function $f: f(x) = 12 + 4x - x^2$ is not negative in the interval……

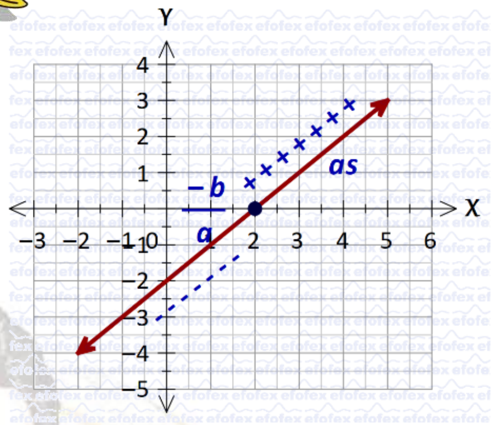
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $]-2,6[$ | B | $[-2,6]$ | C | $\mathbb{R}-]-2,6[$ | D | $]-\infty,\infty[$ |

(22) The function $f: f(x) = -(x-1)(x+2)$ is positive in the interval………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $]1,2[$ | B | $[-1,2]$ | C | $]-2,1[$ | D | $]-\infty,\infty[$ |

(23) The opposite figure represents

a first-degree function of $x$



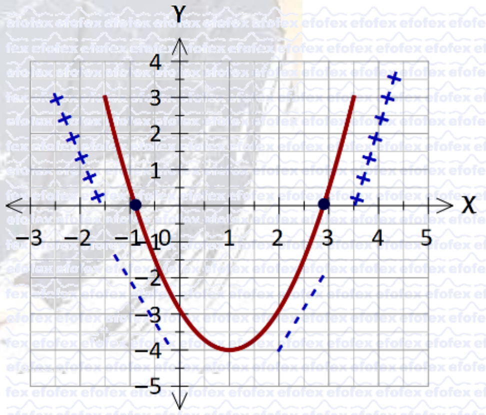

First: The function is positive in the interval……

| | | | |
|---|---|---|---|
| A | $[2,\infty[$ | B | $]1,\infty[$ |
| C | $]-\infty,2[$ | D | $]2,\infty[$ |

Second: The function is negative in the interval…………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $]-\infty,2]$ | B | $]-2,2]$ | C | $]-\infty,2[$ | D | $]2,\infty[$ |

(24) The opposite figure represents a second-degree function $f$ of $x$




First: $f(x)=0$ at $x\in$…………

| | | | |
|---|---|---|---|
| A | $\mathbb{R}$ | B | $\mathbb{N}$ |
| C | $[-1,3]$ | D | $\{3,-1\}$ |

Second: $f(x)>0$ at $x\in$…………

| | | | |
|---|---|---|---|
| A | $]-1,3[$ | B | $]-1,3]$ |
| C | $\mathbb{R}-]-1,3]$ | D | $\mathbb{R}$ |

Third: $f(x)<0$ at $x\in$…………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $]-1,3[$ | B | $]-1,3]$ | C | $\mathbb{R}-]-1,3]$ | D | $\mathbb{R}$ |

(25) The sign of function $f: f(x) = (x-3)^2$ is non-negative on……….

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\{3\}only$ | B | $]3,\infty[\ only$ | C | $\mathbb{R}$ | D | $\emptyset$ |

(26) If $f(x) = ax^2 + bx + c, a > 0$ and the roots of the equation

$f(x) = 0$are $-2,1$, then the function $f$ is non-positive at $x \in$…………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\{-2,1\}$ | B | $]-2,1[$ | C | $[-2,1]$ | D | $\mathbb{R} - [-2,1]$ |

(27) The function $f: f(x) = a^2x^2 + c$ where $a \neq 0, c > 0$

has a sign……always.

| | | | |
|---|---|---|---|
| A | Negative | B | Positive |
| C | Like the sign of $x$ | D | Like the sign of $a$ |

(28) The function $f: f(x) = x^2 - 6x + 9$ is negative on………….

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\{3\}$ | B | $\mathbb{R} - \{3\}$ | C | $]3,\infty[$ | D | $\emptyset$ |

(29) All functions defined by the following rules are positive on $\mathbb{R}$ except……

| | | | |
|---|---|---|---|
| A | $f(x) = 3$ | B | $f(x) = x + 3$ |
| C | $f(x) = x^2 - 3x + 3$ | D | $f(x) = x^2 + x + 3$ |

(30) If the minimum value of a quadratic function $y = f(x)$ is 3,

then the function is negative at $x \in$…………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\mathbb{R}$ | B | $\emptyset$ | C | $\{3\}$ | D | $]3,\infty[$ |

Lesson 7

# Exercises

## [1] Choose the correct answer:

(1) The solution set of the inequality: $(x-2)(x-5)<0$ in $\mathbb{R}$ is ...........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\{2,5\}$ | Ⓑ | $]2,5[$ | Ⓒ | $[2,5]$ | Ⓓ | $\mathbb{R}-[2,5]$ |

(2) The solution set of the inequality: $x^2+3x-4\geq 0$ in $\mathbb{R}$ is .......

| | | | |
|---|---|---|---|
| Ⓐ | $\{-4,1\}$ | Ⓑ | $[-4,1]$ |
| Ⓒ | $\mathbb{R}-]-4,1[$ | Ⓓ | $\mathbb{R}-[-4,1]$ |

(3) The solution set of the inequality: $7+x^2-4x<0$ in $\mathbb{R}$ is .........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $]-4,7[$ | Ⓑ | $\mathbb{R}-[-4,7]$ | Ⓒ | $\mathbb{R}$ | Ⓓ | $\emptyset$ |

(4) The solution set of the inequality: $2x+x^2+5>0$ in $\mathbb{R}$ is .........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\mathbb{R}-[-2,3]$ | Ⓑ | $[-2,3]$ | Ⓒ | $\mathbb{R}$ | Ⓓ | $\emptyset$ |

(5) The solution set of the inequality: $x^2+9>6x$ in $\mathbb{R}$ is .........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $]-3,3[$ | Ⓑ | $\mathbb{R}$ | Ⓒ | $\mathbb{R}-[-3,3]$ | Ⓓ | $\mathbb{R}-\{3\}$ |

(6) The solution set of the inequality: $4x - x^2 - 4 < 0$ in $\mathbb{R}$ is ………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\mathbb{R}$ | Ⓑ | $\mathbb{R}^+$ | Ⓒ | $\mathbb{R}^-$ | Ⓓ | $\mathbb{R} - \{2\}$ |

(7) The S.S. of the inequality $(x-1)^2 \leq 0$ in $\mathbb{R}$ is ………..

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\mathbb{R}$ | Ⓑ | $\emptyset$ | Ⓒ | $\{1\}$ | Ⓓ | $\mathbb{R} - \{1\}$ |

(8) The solution set of the inequality: $-x(x+2) \geq 0$ in $\mathbb{R}$ is ……….

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\{0, -2\}$ | Ⓑ | $[-2, 0]$ | Ⓒ | $]-2, 0[$ | Ⓓ | $[-2, 2]$ |

(9) The solution set of the inequality: $x(x-1) > 0$ in $\mathbb{R}$ is ………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\{0, 1\}$ | Ⓑ | $]0, 1[$ | Ⓒ | $[0, 1]$ | Ⓓ | $\mathbb{R} - [0, 1]$ |

(10) The solution set of the inequality: $x(x-2) < 0$ is ………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\{0, 2\}$ | Ⓑ | $]-2, 2[$ | Ⓒ | $]0, 2[$ | Ⓓ | $]1, 2[$ |

(11) The solution set of the inequality: $x^2 < 3x$ is ………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\mathbb{R} - [0, 3]$ | Ⓑ | $[0, 3]$ | Ⓒ | $]0, 3[$ | Ⓓ | $\mathbb{R} - ]0, 3[$ |

(12) The solution set of the inequality: $x^2 + 49 < 0$ in $\mathbb{R}$ is .........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\emptyset$ | B | $\mathbb{R}$ | C | $[-7\,,7]$ | D | $\mathbb{R} - [-7\,,7]$ |

(13) The solution set of the inequality: $x^2 + 1 \le 0$ in $\mathbb{R}$ is .........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\emptyset$ | B | $\mathbb{R}$ | C | $[-1\,,1]$ | D | $\mathbb{R} - ]-1\,,1[$ |

(14) The solution set of the inequality: $x^2 + 9 > 0$ in $\mathbb{R}$ is .........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\emptyset$ | B | $\mathbb{R}$ | C | $]-3\,,3[$ | D | $\mathbb{R} - [-3\,,3]$ |

(15) If $f(x) = x^2 - 6x + 9$, then the solution set of the inequality

$f(x) \le 0$ in $\mathbb{R}$ is .........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\mathbb{R}$ | B | $\{3\}$ | C | $\mathbb{R} - ]-3\,,3[$ | D | $[-3\,,3]$ |

(16) The solution set of the inequality: $x^2 \le 9$ in $\mathbb{R}^+$ is .........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $[-3\,,3]$ | B | $\mathbb{R} - ]-3\,,3[$ | C | $]0\,,3]$ | D | $\emptyset$ |

(17) The solution set of the inequality: $x^2 > 16$ in the interval $[-4\,,4]$ is ....

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $[-4\,,4]$ | B | $\mathbb{R} - [-4\,,4]$ | C | $\emptyset$ | D | $\{-4\,,4\}$ |

(18) Which of the following answers does not belong to the solution set of

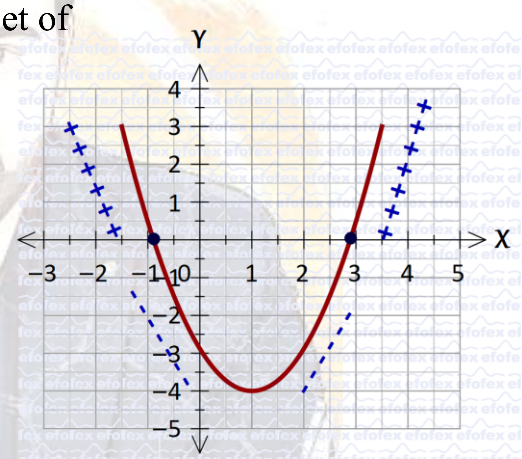
the inequality $3x - 5 \geq 4x - 3$ ?

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $-1$ | B | $-2$ | C | $-3$ | D | $-5$ |

(19) If the opposite figure represents the function

$f : f(x) = x^2 - 2x - 3$, then the solution set of

the inequality $x^2 - 2x - 3 \geq 0$ in $\mathbb{R}$ is ….




| | |
|---|---|
| A | $]-1 , 3[$ |
| C | $]-\infty , 2[$ |
| B | $]3 , \infty[$ |
| D | $]-\infty , -1] \cup [3 , \infty[$ |

## Lesson 1

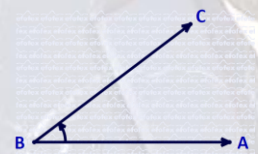
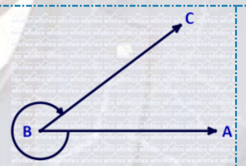
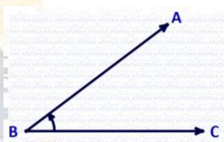
## Exercises

**Choose the correct answer from those given answer:**

1. The ordered pair $(\overrightarrow{OB}, \overrightarrow{OC})$represents the directed angle……….

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\angle OBC$ | Ⓑ | $\angle BOC$ | Ⓒ | $\angle BCO$ | Ⓓ | $\angle OCB$ |

2. Which of the angles is not the directed $\angle ABC$?

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $(\overrightarrow{BA}, \overrightarrow{BC})$ | Ⓑ |   | Ⓒ |   | Ⓓ |   |

3. If $\theta$ is the smallest positive measure of a directed angle, then its negative measure is

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $-\theta$ | Ⓑ | $\theta - 180°$ | Ⓒ | $\theta - 360°$ | Ⓓ | $360° - \theta$ |

4. If $\theta_1$ is the positive measure of a directed angle and $\theta_2$ is the negative measure of the same directed angle, then $\theta_1 - \theta_2 = \cdots$ °

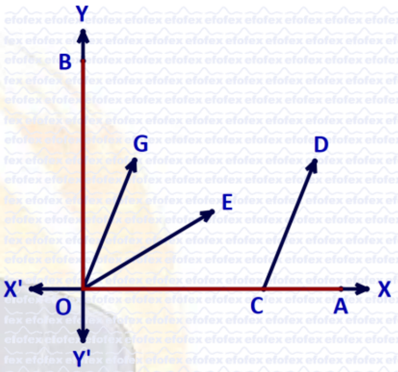
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $zero$ | Ⓑ | $\pm 360$ | Ⓒ | $360$ | Ⓓ | $-360$ |

⑤ If $\theta$ is the directed angle, then the sum of its positive and negative measure ……………..(where $\theta$ is not zero angle)

| | | | |
|---|---|---|---|
| Ⓐ | *equal* $360°$ | Ⓑ | *more than* $360°$ |
| Ⓒ | $\in]-360°, 360°[$ | Ⓓ | $\in]0, 360°[$ |

⑥ In the opposite figure:

Which one of the following ordered pairs expresses a directed angle in its standard position ?




| | | | |
|---|---|---|---|
| Ⓐ | $(\overrightarrow{CA}, \overrightarrow{CD})$ | Ⓑ | $(\overrightarrow{OE}, \overrightarrow{OA})$ |
| Ⓒ | $(\overrightarrow{OB}, \overrightarrow{OG})$ | Ⓓ | $(\overrightarrow{OA}, \overrightarrow{OB})$ |

⑦ If the directed angle is in standard position, which of the following is correct?

① its vertex is the origin.

② its initial side coincides the positive X-axis.

③ its measure is positive

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | 1 *only* | Ⓑ | 1,2 *only* | Ⓒ | 1,3 *only* | Ⓓ | All the previous |

⑧ It is said that the directed angles in the standard positions are equivalent if they have the same……………..

| | | | |
|---|---|---|---|
| Ⓐ | initial side. | Ⓑ | terminal side. |
| Ⓒ | Vertex | Ⓓ | rotation direction. |

⑨ If is the directed angle measure in standard position in $n \in \mathbb{Z}$, then the angles whose measures $(0 \pm n \times 360°)$ are called……………..

| | | | |
|---|---|---|---|
| Ⓐ | equivalent. | Ⓑ | quadrantal. |
| Ⓒ | Supplementary | Ⓓ | adjacent |

⑩ If $A$ and $B$ are the measures of two equivalent angles, then $-A$ and $-B$are

| | | | |
|---|---|---|---|
| Ⓐ | supplementary. | Ⓑ | equivalent. |
| Ⓒ | Complementary | Ⓓ | Of sum-360°. |

⑪ The quadrantal angle measure is multiple of ..........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | 360° | Ⓑ | 180° | Ⓒ | 90° | Ⓓ | 60° |

⑫ The angle whose measure is 60° in the standard position is equivalent to the angle of measure ……....

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | 360° | Ⓑ | 180° | Ⓒ | 90° | Ⓓ | 420° |

⑬ The angle of measure $585°$ is equivalent to the angle in the standard position of measure……………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $45°$ | Ⓑ | $135°$ | Ⓒ | $225°$ | Ⓓ | $315°$ |

⑭ The angle whose measure is $950°$ is equivalent to the angle in the standard position of measure …………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $130°$ | Ⓑ | $-130°$ | Ⓒ | $235°$ | Ⓓ | $-230°$ |

⑮ All the following angles are equivalent to $75°$ in the standard position except ..

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $-285°$ | Ⓑ | $-645°$ | Ⓒ | $285°$ | Ⓓ | $435°$ |

⑯ The quadrant in which the angle of measure $1670°$ lies is the..........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | first | Ⓑ | second | Ⓒ | third | Ⓓ | fourth |

⑰ The angle whose measure is $(-135°)$ lies in the ……………quadrant.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | first | Ⓑ | second | Ⓒ | third | Ⓓ | fourth |

⑱ The angle whose measure is $(-850°)$ lies in the ……………quadrant.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | first | Ⓑ | second | Ⓒ | third | Ⓓ | fourth |

(19) All the following are measures of angles lying in the second quadrant except.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| (A) | $-240°$ | (B) | $100°$ | (C) | $-120°$ | (D) | $860°$ |

(20) The angle measure $45° + (4n + 1) \times 90°$ lies in the …. Quadrant $(n \in \mathbb{Z})$

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| (A) | first | (B) | second | (C) | third | (D) | fourth |

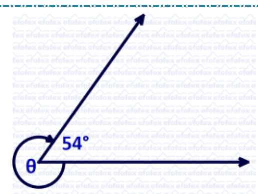
(21) If the terminal side of angle of measure $60°$ in standard position rotates two and quarter revolutions anticlockwise then the terminal side represents the angle of measure…………..

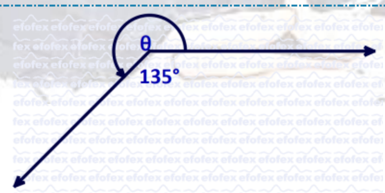
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| (A) | $60°$ | (B) | $120°$ | (C) | $150°$ | (D) | $240°$ |

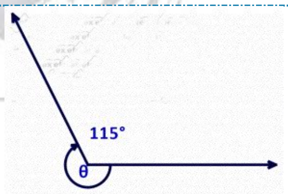
(22) If the terminal side of an angle of measure $30°$ in standard position rotates three and half revolutions clockwise, then the terminal side will be in the …..quadrant.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| (A) | first | (B) | second | (C) | third | (D) | fourth |

(23) Find the measure of the directed angle $\theta$ in each of the following:



Lesson 2

# Exercises

## radian measure

### Choose the correct answer

1) The angle of measure $\frac{25\,\pi}{9}$ lies in the …………… quadrant.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | first | B | second | C | third | D | fourth |

2) The angle of measure $\frac{31\,\pi}{6}$ lies in the …………… quadrant

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | first | B | second | C | third | D | fourth |

3) The angle of measure $\frac{9\,\pi}{4}$ lies in the …………… quadrant

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | first | B | second | C | third | D | fourth |

4) The angle of measure $\frac{-\pi}{4}$ lies in the …………… quadrant

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | first | B | second | C | third | D | fourth |

5) The angle of measure $\frac{-9\pi}{4}$ lies in the …………… quadrant

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | first | B | second | C | third | D | fourth |

6) If the degree measure of an angle is $43°12^{\backslash}$, then its radian measure is ……

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $0.24^{rad}$ | B | $0.24\pi$ | C | $0.28^{rad}$ | D | $0.28\pi$ |

7) the degree measure of an angle of measure $\frac{8\pi}{3}$ is……….

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | 540° | B | 820° | C | 150° | D | 480° |

8. The sum of the measures of the angles of the quadrilateral in radian equals..

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $2\pi$ | B | $\pi$ | C | $\frac{3\pi}{2}$ | D | $3\pi$ |

9. If the sum of measures of the interior angles of a regular polygon equals $180°\ (n-2)$ where n is the number of its sides, then the measure of the interior angle in radian of a regular pentagon equals…………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\frac{\pi}{3}$ | B | $\frac{7\pi}{2}$ | C | $\frac{3\pi}{5}$ | D | $\frac{2\pi}{3}$ |

10. In a circle of diameter length 12 $cm$., the length of the arc subtended by a central angle of measure 60° equals...............cm.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $5\pi$ | B | $4\pi$ | C | $3\pi$ | D | $2\pi$ |

11. The length of the arc subtended by a central angle of measure 135° in a circle of radius length 8 $cm$. equal…………… $cm$.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | 6 | B | $6\pi$ | C | 1080 | D | $12\pi$ |

12. The measure of the central angle in a circle of radius length15 $cm$. and opposite to an arc of length $5\pi\ cm$ . equals ............

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | 30° | B | 60° | C | 90° | D | 180° |

⑬ The measure of the central angle in a circle of radius length 12 $cm$. and opposite to an arc of length $2\pi$ $cm$. equal..........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $2\pi$ | Ⓑ | $\frac{\pi}{6}$ | Ⓒ | $\frac{\pi}{3}$ | Ⓓ | $\frac{\pi}{2}$ |

⑭ The measure of the central angle subtended by an arc of length equal the diameter length of the circle. approximately to the nearest degree equal..........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $113°$ | Ⓑ | $115°$ | Ⓒ | $120°$ | Ⓓ | $180°$ |

⑮ If the measure of one of the angles of a triangle is $75°$ and the measure of another angle is $\frac{\pi}{3}$, then the radian measure of the third angle equals ……….

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\frac{\pi}{3}$ | Ⓑ | $\frac{\pi}{4}$ | Ⓒ | $\frac{\pi}{6}$ | Ⓓ | $\frac{5\pi}{12}$ |

⑯ The string length of a simple pendulum is 14 $cm$. swings in an angle of measure $\frac{1}{10}\pi$ , then its arc length≃……… $cm$.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | 4.6 | Ⓑ | 4.4 | Ⓒ | 4.2 | Ⓓ | 4.8 |

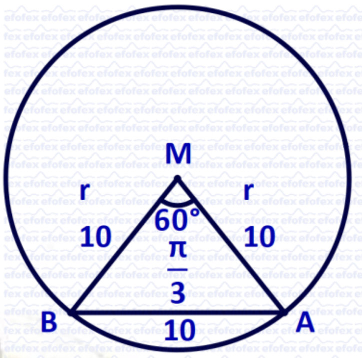
⑰ $ABCD$ is a cyclic quadrilateral, $m\angle A) = 60°$, then $m(\angle C) =$……….

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\frac{\pi}{3}$ | Ⓑ | $\frac{\pi}{6}$ | Ⓒ | $\frac{2\pi}{3}$ | Ⓓ | $\frac{5\pi}{6}$ |

⑱ In the opposite figure:

To find the length of $\widehat{AB}$

it is sufficient to get..........

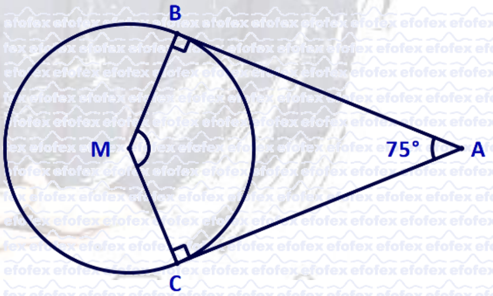



| | |
|---|---|
| Ⓐ | $\Delta\ AMB$ is an equilateral triangle of perimeter 30 $cm$. only. |
| Ⓑ | the circle circumference $= 10\pi\ cm$ only |
| Ⓒ | (a), (b) together. |
| Ⓓ | nothing of the previous |

⑲ The radian measure of a regular heptagon exterior angle equals…………..

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\frac{1}{7}\pi$ | Ⓑ | $\frac{2}{7}\pi$ | Ⓒ | $\frac{3}{7}\pi$ | Ⓓ | $\frac{4}{7}\pi$ |

⑳ In the opposite figure:




If $\overline{AB}$, $\overline{AC}$ are two tangents

to the circle $M$ and $m\ (\angle A) = \frac{5}{12}\ \pi$

and the circle circumference $= 96\ cm$.

then the smaller arc length $\widehat{BC}$ =…………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | 20 | Ⓑ | $\frac{28}{\pi}$ | Ⓒ | 28 | Ⓓ | $20\pi$ |

(21) The angle whose measure $30° + 180° (2n + 1)$ where $n \in \mathbb{Z}$ its radian measure is equivalent to ..........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\frac{\pi}{6}$ | Ⓑ | $\pi$ | Ⓒ | $\frac{7}{6}\pi$ | Ⓓ | $\frac{5}{3}\pi$ |

(22) If the length of an arc in a circle equals $\frac{3}{8}$ of of its i circumference, then the measure of the central angle subtending this arc in degrees equals .........

| | | | |
|---|---|---|---|
| Ⓐ | $30°$ | Ⓑ | $67° 30^{\backslash}$ |
| Ⓒ | $135°$ | Ⓓ | $43°$ approximately |

(23) In the circle whose radius length is the unit length, the measure of the central angle in radian is……….

| | | | |
|---|---|---|---|
| Ⓐ | $\frac{1}{4}$ its arc length | Ⓑ | $\frac{1}{2}$ its arc length |
| Ⓒ | The length of the arc | Ⓓ | Double its arc length |

(24) The radian measure and the degree measure of the central angle that subtends an arc of length 3 cm. in a cricle of area $16\,\pi\, cm^2$ =…………..

| | | | |
|---|---|---|---|
| Ⓐ | $(1^{rad}, 180°)$ | Ⓑ | $(1.5^{rad}, 86°)$ |
| Ⓒ | $(1.75^{rad}, 90°)$ | Ⓓ | $(0.75^{rad}, 42° 58^{\backslash})$ |

25 The angle of measure $1^{rad}$ is called………. angle.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | quadrantal | B | obtuse | C | central | D | radian |

26 In a triangle, the measure of one of its angles is 60°, and the measure of another angle is $\frac{\pi}{4}$ Find the radian measure and the degree measure of the third angle.

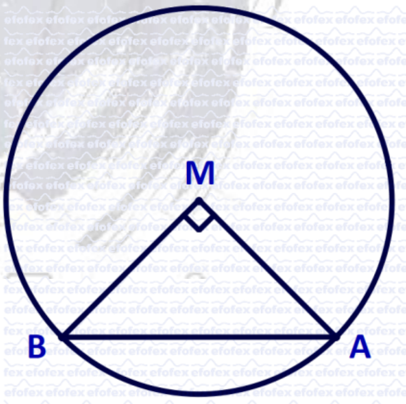
$$" \frac{5}{12}\pi, 75°"$$

27 Two angles, the sum of their measures equals 70º, and the difference between them equals $\frac{\pi}{5}$, find the measure of each angle in degrees and in radian.

$$53°, 17°, \frac{53}{180}\pi, \frac{17}{180}\pi$$

28 In the opposite figure:

If the area of the right-angled triangle $MAB$ at $M$ equals 32 $cm^2$ , find the perimeter of the shaded area to the nearest hundredth.



Lesson 3

# Exercises

## Trigonometric function

أبطال مستر محمد سعيد

### Choose the correct answer

① If $\theta$ is the measure of an angle in the standard position, its terminal side intersects the unit circle at the point$\left(\frac{\sqrt{3}}{2},\frac{1}{2}\right)$ , then $\sin\theta =$............

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\frac{1}{2}$ | B | $\frac{\sqrt{3}}{2}$ | C | $\frac{1}{\sqrt{3}}$ | D | $\frac{2}{\sqrt{3}}$ |

② If the terminal side of the angle whose measure $\theta$ drawn in the standard position intersect the unit circle at the point $B\left(\frac{-3}{5},\frac{4}{5}\right)$, *then* $\cot\theta =$...........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\frac{5}{4}$ | B | $\frac{-5}{3}$ | C | $\frac{-4}{3}$ | D | $-0.75$ |

③ If $\theta$is a directed angle in the standard position its terminal side intersect the unit circle at $\left(\frac{-5}{13},\frac{12}{13}\right)$,then $\cos\theta - \sin\theta =$.........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\frac{17}{13}$ | B | $\frac{7}{13}$ | C | $\frac{-7}{13}$ | D | $\frac{-17}{13}$ |

④ A directed angle in the standard position its terminal side passes through the point (3,4), then its initial side intersect the unit circle at the point..........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | (3,0) | B | (1,0) | C | (0.6,0.8) | D | $\left(\frac{4}{3},\frac{5}{3}\right)$ |

(5) If $\tan\theta = \frac{1}{2}$ where $\theta$ is an acute angle in standard position, then its terminal side intersects the unit circle at the point …………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $(2,1)$ | Ⓑ | $(1,2)$ | Ⓒ | $\left(\frac{1}{\sqrt{5}}, \frac{2}{\sqrt{5}}\right)$ | Ⓓ | $\left(\frac{2}{\sqrt{5}}, \frac{1}{\sqrt{5}}\right)$ |

(6) If $\sin\theta = \frac{1}{\sqrt{2}}$, where 0 is the measure of a positive acute angle, then the measure of angle $\theta$=..................

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $30°$ | Ⓑ | $60°$ | Ⓒ | $45°$ | Ⓓ | $90°$ |

(7) If $\sin\theta = -1, \cos\theta = 0$, then the measure of angle $\theta =$…………....

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\frac{\pi}{2}$ | Ⓑ | $\pi$ | Ⓒ | $\frac{3\pi}{2}$ | Ⓓ | $2\pi$ |

(8) If $\csc\theta = 2$, where $\theta$ is a positive acute angle, then the measure of angle $\theta =$…

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $15°$ | Ⓑ | $30°$ | Ⓒ | $45°$ | Ⓓ | $60°$ |

(9) If $\tan\theta = 1$, where $\theta$ is a positive acute angle, then the measure of angle $\theta =$…

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $60°$ | Ⓑ | $30°$ | Ⓒ | $45°$ | Ⓓ | $90°$ |

⑩ If $\cos\theta = \frac{1}{2}, \sin\theta = \frac{-\sqrt{3}}{2}$,then $\tan\theta =$...........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\frac{\sqrt{3}}{2}$ | Ⓑ | $\frac{-1}{2}$ | Ⓒ | $\frac{-1}{\sqrt{3}}$ | Ⓓ | $-\sqrt{3}$ |

⑪ If the terminal side of a directed angle in the standard position intersect the unit circle at the point$\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$, then the measure of this angle =..........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $150°$ | Ⓑ | $30°$ | Ⓒ | $60°$ | Ⓓ | $210°$ |

⑫ If $\cos\theta = \frac{\sqrt{3}}{2}$ , where $\theta$is a positive acute angle , then $\sin\theta =$........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\frac{1}{2}$ | Ⓑ | $\frac{1}{\sqrt{3}}$ | Ⓒ | $\frac{2}{\sqrt{3}}$ | Ⓓ | $\frac{\sqrt{3}}{2}$ |

⑬ If $\cos\theta > 0, \sin\theta < 0$, then $\theta$ lies in the ...........quadrant.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | first | Ⓑ | second | Ⓒ | third | Ⓓ | fourth |

⑭ If $\sin\theta = \frac{-1}{2}, \sec\theta = \frac{-2}{\sqrt{3}}$, then $\theta$ lies in the ...........quadrant.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | first | Ⓑ | second | Ⓒ | third | Ⓓ | fourth |

⑮ If $\sin\theta = \frac{-1}{2}$, $\cos\theta = \frac{\sqrt{3}}{2}$, then the angle whose measure $\theta$ lies in the … quadrant.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | first | Ⓑ | second | Ⓒ | third | Ⓓ | fourth |

⑯ If θ is measure of an angle lies in the third quadrant, which of the following is always true?

| | | | |
|---|---|---|---|
| Ⓐ | $\sin\theta\cos\theta < 0$ | Ⓑ | $\sec\theta\csc\theta < 0$ |
| Ⓒ | $\tan\theta\cot\theta < 0$ | Ⓓ | $\sin\theta\tan\theta < 0$ |

⑰ $2\sin 45° =$……………..

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\sin 90°$ | Ⓑ | $\frac{\sqrt{2}}{2}$ | Ⓒ | $\sqrt{2}$ | Ⓓ | $2$ |

⑱ $\cot^2 30° - \sec^2 60° + \csc^2 45° =$…………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $1$ | Ⓑ | $0$ | Ⓒ | $-1$ | Ⓓ | |

⑲ $\sin\left(-\frac{12}{5}\pi\right) =$…………..

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\sin\frac{12}{5}$ | Ⓑ | $\sin 72°$ | Ⓒ | $\sin 288°$ | Ⓓ | $\sin\frac{1}{5}\pi$ |

(20) $\cos^2\frac{\pi}{4}-\sin^2\frac{\pi}{4}=$..........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\cos^2\pi$ | Ⓑ | $\sin^2\frac{\pi}{2}$ | Ⓒ | $\cos\pi$ | Ⓓ | $\cos\frac{\pi}{2}$ |

(21) $\sin 30° + \cos 60° - \cot 225° =$..........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | 2 | Ⓑ | zero | Ⓒ | $\sqrt{3}-\sqrt{2}$ | Ⓓ | 1 |

(22) $\frac{\tan^2 60° - \tan^2 45°}{\sec^2 30° - \csc^2 45°} =$.............

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | zero | Ⓑ | 3 | Ⓒ | $-2$ | Ⓓ | $-3$ |

(23) If $ABCD$ is a square, then $\sin^2(\angle ACD)+\sin^2(\angle ABD)+\tan(\angle ADB)=$...

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\frac{3}{2}$ | Ⓑ | 3 | Ⓒ | 2 | Ⓓ | $1+\sqrt{2}$ |

(24) $ABC$ is an isosceles triangle in which $m(\angle A)=120°$, then $\sin B+\cos^2 C=$...

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $1+\sqrt{3}$ | Ⓑ | $1\frac{1}{2}$ | Ⓒ | $1\frac{2}{3}$ | Ⓓ | $1\frac{1}{4}$ |

(25) If $ABC$ is a right- angled triangle at $B, m(\angle A)=2m(\angle C)$

, then $secA+\csc C=$......

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | 2 | Ⓑ | 4 | Ⓒ | 6 | Ⓓ | |

(26) If $\theta \in ]0, \frac{\pi}{2}[$ , $\cos\theta = \frac{3}{5}$, *then* $\csc\theta\sin\theta - \tan\theta\csc\theta =$............

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $zero$ | Ⓑ | $1$ | Ⓒ | $\frac{-3}{2}$ | Ⓓ | $\frac{-2}{3}$ |

(27) If $\sin\theta = \frac{-24}{25}$, $\theta \in ]\frac{3\pi}{2}, 2\pi[$, then $\frac{\sin\theta + \cos\theta}{\sin\theta} =$.............

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\frac{17}{24}$ | Ⓑ | $\frac{-17}{24}$ | Ⓒ | $\frac{24}{17}$ | Ⓓ | $\frac{-24}{17}$ |

(28) If $x \in [0°, 90°]$ and $\cos x = \frac{\sin 60°}{\sin 90°} - \frac{\sin 0°}{\sin 45°}$, then $x$=..........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $30°$ | Ⓑ | $60°$ | Ⓒ | $0°$ | Ⓓ | $90°$ |

(29) If $\theta \in ]\frac{\pi}{2}, \pi[$, $\sin\theta = \frac{12}{13}$,then $\sqrt{\csc\theta\sin\theta - \tan\theta\cot\theta + \cos^2\theta} =$ ......

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $zero$ | Ⓑ | $\frac{5}{13}$ | Ⓒ | $\frac{4}{3}$ | Ⓓ | $\frac{15}{26}$ |

(30) If the terminal side of an angle in standard position intersects the unit circle of point A which lies in the fourth quadrant where the X-coordinate of A equals $\frac{5}{13}$ then $A =$............

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\left(\frac{5}{13}, \frac{-12}{13}\right)$ | Ⓑ | $\left(\frac{5}{13}, \frac{1}{13}\right)$ | Ⓒ | $\left(\frac{5}{13}, \frac{12}{13}\right)$ | Ⓓ | $\left(\frac{5}{13}, \frac{-8}{13}\right)$ |

(31) If 0 is a measure of an angle in standard position and its terminal side intersects the unit circle at the point $\left(\frac{1}{2}, y\right)$ where $y > 0$, then $\sin\theta =$.........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\frac{1}{2}$ | B | $\sqrt{3}$ | C | $\frac{1}{\sqrt{3}}$ | D | $\frac{\sqrt{3}}{2}$ |

(32) If the terminal side of a directed angle in the standard position intersect the unit circle at $(-x, x)$ where $x < 0$ then the sine of this angle = ...........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\frac{1}{2}$ | B | $\frac{1}{\sqrt{2}}$ | C | $\frac{\sqrt{3}}{2}$ | D | $\frac{-1}{\sqrt{2}}$ |

(33) The terminal side of angle of measure $30°$ in its standard position intersects the circle whose centre is the origin and its radius length is $6\ cm$. at the point ...

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $(3,6)$ | B | $\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$ | C | $(3, 3\sqrt{3})$ | D | $(3\sqrt{3}, 3)$ |

(34) The sine of a directed angle $\theta$ in the standard position its terminal side intersect the unit circle at the point $(1,0)$ equal the cosine of a directed angle $x$ in the standard position and its terminal side intersect the unit circle at the point...

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$ | B | $(-1,0)$ | C | $(0,-1)$ | D | $\left(x, \frac{-1}{\sqrt{2}}\right)$ |

(35) sine of the quadrantal angle………..

| | | | |
|---|---|---|---|
| (A) | *equal zero* | (B) | $\in ]-1,1[$ |
| (C) | $\in \{0,1,-1\}$ | (D) | *more than or equal zero* |

(36) All the following trigonometric ratios are for the same angle $\theta$ and lies in the third quadrant except ..........

| | | | |
|---|---|---|---|
| (A) | $\sin\theta = \frac{-3}{\sqrt{10}}$ | (B) | $\sec\theta = -\sqrt{10}$ |
| (C) | $\cot\theta = \frac{1}{3}$ | (D) | $\csc\theta = 3$ |

(37) If $\sin x + \cos y = 2, x, y \in [0°, 360°[$, then $x + y =$………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| (A) | $2$ | (B) | $1$ | (C) | $90°$ | (D) | $180°$ |

(38) If $\theta = \frac{\pi}{4}(8n+2), n \in \mathbb{Z}$, then $\cos\theta =$…………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| (A) | $1$ | (B) | $-1$ | (C) | *zero* | (D) | $\frac{1}{\sqrt{2}}$ |

(39) If the equation of a straight line : $y = \frac{3}{4}x + 1$ and it makes with the positive direction of the $x-axis$ an angle of measure $\theta$, then $\sin\theta =$……….

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| (A) | $\frac{3}{4}$ | (B) | $\frac{3}{5}$ | (C) | $\frac{4}{5}$ | (D) | $\frac{4}{3}$ |

(40) Find all trigonometric ratios for the angle AOB whose measure is $\theta$ in each of the following cases:

$$\theta \in ]\frac{\pi}{2}, \pi[, \tan\theta = -\frac{3}{4}$$

(41) $\theta \in ]\pi, \frac{3\pi}{2}[, csc\theta = -\frac{25}{7}$


(42) the terminal side of the angle $\theta$in the standard position intersects the unit circle at the point $(2a, 3a)$,where $0 < \theta < \frac{\pi}{2}$ find the value of $a$, then find the value of : $\sec^2\theta - \tan^2\theta$ $\quad$ $\tan^2\theta = \frac{4}{9}$

$\frac{13}{9} - \frac{4}{9} = 1$

## Lesson 4 Exercises

**Choose the correct answer**

① $\tan 42° =$…………..

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\cot 42°$ | Ⓑ | $\tan 48°$ | Ⓒ | $\cot 48°$ | Ⓓ | $\csc 48°$ |

② $\cot(90° + \theta) =$…………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\tan(90° - \theta)$ | Ⓑ | $-\tan\theta$ | Ⓒ | $\tan(90° + \theta)$ | Ⓓ | $\tan(270° + \theta)$ |

③ $\frac{\sec 105°}{\csc 15°} =$…………..

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\frac{\sin 105°}{\cos 15°}$ | Ⓑ | $\tan 135°$ | Ⓒ | $\cot 15°$ | Ⓓ | $\cos 90°$ |

④ $\tan(180° - \theta) =$…………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\tan\theta$ | Ⓑ | $-\tan\theta$ | Ⓒ | $\cot\theta$ | Ⓓ | $-\cos\theta$ |

⑤ $\sec(90° + \theta) =$……………

| | | | |
|---|---|---|---|
| Ⓐ | $\csc(180° - \theta)$ | Ⓑ | $\csc(180° + \theta)$ |
| Ⓒ | $\csc(270° - \theta)$ | Ⓓ | $\csc(270° + \theta)$ |

⑥ $\cos(270° - \theta) =$................

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\sin\theta$ | Ⓑ | $\cos\theta$ | Ⓒ | $-\sin\theta$ | Ⓓ | $-\cos\theta$ |

⑦ If $\sin\theta = \frac{3}{5}$, then $\cos(270° - \theta) =$.........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\frac{3}{5}$ | Ⓑ | $\frac{-3}{5}$ | Ⓒ | $\frac{4}{5}$ | Ⓓ | $\frac{-4}{5}$ |

⑧ $\cos(90° - \theta) \times \csc\theta =$...........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $zero$ | Ⓑ | $1$ | Ⓒ | $-1$ | Ⓓ | $\frac{-4}{5}$ |

⑨ If $\frac{\sin 50°}{\cos 40°} + \frac{\sin 70°}{\sin 110°} = k$, then $k =$............

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $1$ | Ⓑ | $2$ | Ⓒ | $3$ | Ⓓ | $zero$ |

⑩ The simplist from of the expression: $\tan(90° - \theta) + \tan(90° + \theta)$ is ......

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $2\cot\theta$ | Ⓑ | $2\tan\theta$ | Ⓒ | $zero$ | Ⓓ | $\tan\theta + \cot\theta$ |

⑪ $\tan(45° + x) =$................

| | | | |
|---|---|---|---|
| Ⓐ | $\tan x$ | Ⓑ | $-\tan x$ |
| Ⓒ | $\tan(45° - x)$ | Ⓓ | $\cot(45° - x)$ |


⑫ $\dfrac{\sin(30°+x)}{\cos(60°-x)} =$ ..................

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $1$ | Ⓑ | $-1$ | Ⓒ | *zero* | Ⓓ | $\tan x$ |

⑬ $\dfrac{\tan(45°+x)}{\cot(45°-x)} =$ ..................

| | | | |
|---|---|---|---|
| Ⓐ | $-1$ | Ⓑ | $1$ |
| Ⓒ | $\tan(90° + x)$ | Ⓓ | $\cot(90° + x)$ |

⑭ $\sin(90° - \theta)\sec(360° - \theta) - \cos(270° + \theta)\csc(180° + \theta) =$ ..........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $-2$ | Ⓑ | $-1$ | Ⓒ | $1$ | Ⓓ | $2$ |

⑮ If $A + B = 90°, \tan A = \frac{1}{3}$, *then* $\tan B =$ ...............

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\frac{1}{3}$ | Ⓑ | $\frac{2}{3}$ | Ⓒ | $1$ | Ⓓ | $3$ |

⑯ If $x + y = \frac{\pi}{2}$, *then* $\dfrac{\sin x - \sin y}{\cos x - \cos y} =$ ..............

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $-1$ | Ⓑ | *zero* | Ⓒ | $1$ | Ⓓ | $2$ |

(17) $\cos\theta + \cos(180° - \theta) = \ldots\ldots\ldots\ldots$

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | *zero* | Ⓑ | 1 | Ⓒ | $2\cos\theta$ | Ⓓ | $\cos\theta$ |

(18) $\sin\theta + \cos(270° + \theta) = \ldots\ldots\ldots\ldots$

| | | | |
|---|---|---|---|
| Ⓐ | *zero* | Ⓑ | 1 |
| Ⓒ | $2\sin\theta$ | Ⓓ | $\sin\theta\cos\theta$ |

(19) The simplist form of the expression:

$\sin(180° - \theta) + \cos(-60°) + \cos(90° + \theta) + \sin(-150°) = \ldots\ldots\ldots\ldots$

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | *zero* | Ⓑ | 1 | Ⓒ | $-1$ | Ⓓ | $2\sin\theta$ |

(20) If $\sin\theta = -\frac{1}{2}$, $\theta$ is the smallest positive measure, then $\theta = \ldots\ldots\ldots\ldots°$

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | 30 | Ⓑ | 150 | Ⓒ | 210 | Ⓓ | 330 |

(21) If $\sqrt{3}\csc\theta = -2$ where $\theta$ is the smallest positive angle, then $\theta = \ldots\ldots\ldots$

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | 60° | Ⓑ | 120° | Ⓒ | 300° | Ⓓ | 240° |


(22) If $\cos\theta = \frac{-1}{2}$, $\theta$ is measure of the smallest positive angle, then $\theta =$………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $60°$ | Ⓑ | $120°$ | Ⓒ | $240°$ | Ⓓ | $300°$ |

(23) If $\cos(270° - \theta) = \frac{1}{2}$ where $\theta$ is the measure of the smallest positive angle , then $\theta =$………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $30°$ | Ⓑ | $150°$ | Ⓒ | $210°$ | Ⓓ | $330°$ |

(24) If $\cos(90° + \theta) = \frac{\sqrt{3}}{2}$ where $\theta$ is the smallest positive angle, then $\theta =$…….

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $150°$ | Ⓑ | $240°$ | Ⓒ | $210°$ | Ⓓ | $330°$ |

(25) If $\tan\theta = \tan(90 - \theta)$ where $\theta$is an acute angle, then $\theta =$……………°

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | 15 | Ⓑ | 30 | Ⓒ | 45 | Ⓓ | 60 |

(26) If $2\cos\theta + \sqrt{3} = 0$ where $180° < \theta < 270°$, then $\theta =$…………..

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $150°$ | Ⓑ | $240°$ | Ⓒ | $210°$ | Ⓓ | $300°$ |

(27) If $5\sin x = 3$,then $\sec(270° + x) =$…………..

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\frac{5}{3}$ | Ⓑ | $\frac{-5}{4}$ | Ⓒ | $\frac{-5}{3}$ | Ⓓ | $\frac{5}{4}$ |



(28) If $\sin\theta = -\frac{1}{2}, \tan\theta > 0, then\ \theta =$.........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $30°$ | B | $150°$ | C | $210°$ | D | $330°$ |

(29) If $\tan\theta = \frac{-5}{12}$, $\cos\theta < 0$, then $\csc\theta =$............

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\frac{5}{13}$ | B | $\frac{-5}{13}$ | C | $\frac{13}{5}$ | D | |

(30) If $2\sin(90° - \theta) = 1$,where $0 < \theta < \frac{\pi}{2}$, then $\theta =$..............

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $90°$ | B | $60°$ | C | $30°$ | D | $45°$ |

(31) If $5\cos(90° - \theta) = 4, 0° < \theta < 90°$, then $\sin\theta =$...............

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\frac{5}{4}$ | B | $\frac{-3}{5}$ | C | $\frac{4}{5}$ | D | $\frac{3}{5}$ |

(32) If $\sin\theta = -0.8$ where $180° < \theta < 270°$, then $3\cot(270 - \theta) =$..........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $-3$ | B | $3$ | C | $-4$ | D | $4$ |

(33) If $24\tan\theta + 7 = 0, 90° < \theta < 270°$, then $\sec(1080° + \theta) =$............

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\frac{24}{7}$ | B | $\frac{-24}{7}$ | C | $\frac{25}{24}$ | D | $\frac{-25}{24}$ |

(34) If $13\sin(90^\circ-\theta)=5$, then $\cos\theta=$……….

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\frac{12}{13}$ | B | $\frac{-12}{13}$ | C | $\frac{5}{13}$ | D | $\frac{-5}{13}$ |

(35) If $\cot(90^\circ+\theta)+1=0$ where $0^\circ<\theta<90^\circ$,then $\cos 4\,\theta=$…………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\frac{1}{2}$ | B | $1$ | C | $zero$ | D | $-1$ |

(36) If $\cos(90^\circ+\theta)+\sin(90^\circ-2\theta)=0$, where $\theta\in]0,\frac{\pi}{4}[$, then $\sin 2\theta=$…

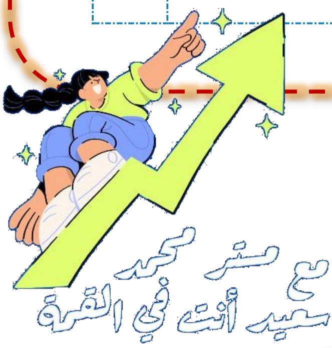
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\frac{1}{2}$ | B | $1$ | C | $zero$ | D | $\frac{\sqrt{3}}{2}$ |

(37) If $\cot(90^\circ+\theta)+\tan(90^\circ-2\theta)=0$, where $\theta\in]0,\frac{\pi}{4}[$, then $\tan 2\theta=$…...

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\frac{1}{\sqrt{3}}$ | B | $1$ | C | $zero$ | D | $\sqrt{3}$ |

(38) If $\tan B=\frac{3}{4}$ where $\pi<B<\frac{3\pi}{2}$, then $\cos(360^\circ-B)-\cos(90^\circ-B)=$….

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\frac{-7}{5}$ | B | $\frac{-3}{5}$ | C | $\frac{-4}{5}$ | D | $\frac{-1}{5}$ |




(39) If $13\sin\theta - 5 = 0$, where $\theta \in ]\frac{\pi}{2}, \pi[$, then the value of

$\sin(270° - \theta) \times \sec(90 + \theta) =$………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\frac{-12}{5}$ | Ⓑ | $\frac{12}{5}$ | Ⓒ | $\frac{5}{12}$ | Ⓓ | $\frac{-5}{12}$ |

(40) If the terminal side of an angle whose measure is $\theta$ in standard position intersects the Coso Sino unit circle at the point $\left(\frac{-\sqrt{3}}{2}, y\right)$ where $y \in \mathbb{R}^+$ then $\theta =$…

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | 30° | Ⓑ | 150° | Ⓒ | 210° | Ⓓ | 330° |

(41) If $\left(x, \frac{1}{2}\right)$ is the intersection point of the terminal side of a directed angle in the standard position with the unit circle where $90° < \theta < 180°$, then $\sin(90° - \theta)\tan\theta =$…………..

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\frac{1}{2}$ | Ⓑ | $\frac{-1}{2}$ | Ⓒ | $\frac{1}{3}$ | Ⓓ | $-3$ |

(42) If $\theta$ is the measure of an angle in standard position and its terminal side intersects the unit circle at $(x, -x)$ where $x > 0$, then$\theta =$………°

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | 45 | Ⓑ | 135 | Ⓒ | 225 | Ⓓ | 315 |

(43) If the terminal side of an angle whose measure is $\theta$ in its standard position intersects the unit circle at the point $\left(\frac{-3}{5}, \frac{4}{5}\right)$, then $\csc\left(\frac{3\pi}{2} - \theta\right) =$.........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\frac{5}{3}$ | B | $\frac{-5}{3}$ | C | $\frac{5}{4}$ | D | $\frac{-5}{3}$ |

(44) If the terminal side of the directed angle $(90° - \theta)$ in the standard position intersect the unit circle at the point $(\frac{-4}{5}, \frac{3}{5})$, then $\sin\theta =$…………..

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\frac{-4}{5}$ | B | $\frac{4}{5}$ | C | $\frac{-3}{5}$ | D | $\frac{3}{5}$ |

(45) If $\sin \propto = \cos\beta$, then $\csc(\propto + \beta) =$.........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | 1 | B | $-1$ | C | $\frac{1}{\sqrt{3}}$ | D | Undefined |

(46) If $\sin \propto = \cos\beta$, then $\cot(\propto + \beta) =$...........

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | 1 | B | $-1$ | C | *zero* | D | Undefined |

(47) If $\sin\theta = \cos 2\theta, \theta \in ]0, \frac{\pi}{2}[$, then $\sin 3\theta =$…………..

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | $\frac{1}{2}$ | B | 1 | C | *zero* | D | $\frac{\sqrt{3}}{2}$ |

(48) If $\sin 2\theta = \cos 4\theta$ where $\theta$ is a positive acute angle

, then $\tan(90° - 3\theta) = \dots\dots\dots\dots\dots\dots$

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $-1$ | Ⓑ | $\frac{1}{\sqrt{3}}$ | Ⓒ | $1$ | Ⓓ | $\sqrt{3}$ |

(49) If $\sin(\theta + 13°) = \cos(\theta + 17°)$ where $\theta$ is a positive acute angle, then $\tan\theta = \dots$

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\sqrt{3}$ | Ⓑ | $\frac{1}{2}$ | Ⓒ | $\frac{1}{\sqrt{3}}$ | Ⓓ | $\frac{\sqrt{3}}{2}$ |

(50) If $\cos\frac{20+\theta}{2} = \sin\frac{40+\theta}{2}, 0° < \theta < 90°$, then $\theta = \dots\dots\dots\dots$

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $20°$ | Ⓑ | $30°$ | Ⓒ | $45°$ | Ⓓ | $60°$ |

(51) The general solution of the equation $\tan 2\theta = \cot\theta$ is $\dots\dots\dots$

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\frac{\pi}{2} + \pi n$ | Ⓑ | $\frac{\pi}{6} + \frac{\pi}{3}n$ | Ⓒ | $\frac{\pi}{6} + 2\pi n$ | Ⓓ | $\frac{\pi}{6} + \pi n$ |

(52) For every $n \in \mathbb{Z}$, the general solution of the equation: $\tan 2\theta = \cot 4\theta$ is …

| | | | |
|---|---|---|---|
| Ⓐ | $15° + 360°\, n$ | Ⓑ | $90° + 180°\, n$ |
| Ⓒ | $15° + 30° n$ | Ⓓ | $30° + 180°\, n$ |

(53) For every $n \in \mathbb{Z}$, the general solution of the equation:$\csc\theta = \sec(30° + \theta)$ is….

| | | | |
|---|---|---|---|
| Ⓐ | $60° + 180°\, n$ | Ⓑ | $30° + 360°\, n$ |
| Ⓒ | $60° + 360° n$ | Ⓓ | $30° + 180°\, n$ |

(54) If $XYZL$ is a cyclic quadrilateral, $\cos x = \frac{1}{2}$ then $\sin(270° - Z) =$………

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\frac{\sqrt{3}}{2}$ | Ⓑ | $-\frac{\sqrt{3}}{2}$ | Ⓒ | $\frac{1}{2}$ | Ⓓ | $-\frac{1}{2}$ |

(55) In a right-angled triangle and one of its angles is $x^{\circ}$, if $\sin x = \frac{4}{5}$,

then $\cos(90 - x°) =$……………..

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ⓐ | $\frac{3}{5}$ | Ⓑ | $\frac{-3}{5}$ | Ⓒ | $\frac{-4}{5}$ | Ⓓ | $\frac{4}{5}$ |

(56) If is the measure of a positive acute angle in the standard position and its terminal side intersects the unit circle at the point $B\ (x, \frac{3}{5})$, , find the value of:

$\sin(90° - \theta) + \tan(90° - \theta)\cos(90° + \theta)$ $(+, +)$

(57) Find one of the values of $\theta$, where $0° < \theta < 90°$, which satisfies each of the following : $\sin(3\theta + 15°) = \cos(2\theta - 5°)$.

(58) Find the general solution for each of the following equations : $\cos 5\theta = \sin \theta$

(59) Find all values of $\theta$, where $\theta \in ]0, \frac{\pi}{2}[$ which satisfies each of the following equations: $2\cos\left(\frac{\pi}{2} - \theta\right) = 1$

(60) Find the S.S. of each of the following equations knowing that $\theta \in ]0.2\pi[$:

| | |
|---|---|
| $\sec\theta - \sqrt{2} = 0$ | $\sqrt{3}\csc\theta = -2$ |

(61) Find the S.S. of each of the following equations knowing that $\theta \in ]0.2\pi[$:


$$\sin^2\theta = \frac{1}{4}$$

$$\sin\theta = \sqrt{\frac{1}{4}} = \pm\frac{1}{\sqrt{2}} \qquad \theta = 45$$

(62) If $15\tan\theta + 8 = 0, 90° < \theta < 180°$, find the values of the trigonometric functions of the angle $\theta$, then find the value of each of

$2\sin\theta\cos\theta, \sec(1080° + \theta)$

(63) If $B\ (-5k, 12\ k)$ is the point of intersection of the terminal side of the directed angle on measure $\theta$ in its standard position with the unit circle $180° < 0 < 270°$

, find the value of: $csc\ (90° - \theta)\ sin\ (90° + \theta) + 12\ tan\ (270° + \theta)$ $\begin{matrix} third \\ (-,-) \end{matrix}$

(64) If $\sin\alpha = \frac{3}{5}$ where $\alpha \in ]\frac{\pi}{2}, \pi[$, $13\cos\beta - 5 = 0$ where $\beta \in ]\frac{3\pi}{2}, 2\pi[$,

Find the value of: $\cos\alpha\cos\beta + \sin\alpha\sin\beta$.

$= \frac{4}{5} \times \frac{5}{13} + \frac{3}{5} \times \frac{-12}{13} =$ ✔

Lesson 1

# Exercises

ارفع راسنا

## Choose the correct answer from those given:

**(1)** If $K$ is the scale factor of similarity of polygon $M_1$ to polygon $M_2$ and $0 < K < 1$ , then the polygon $M_1$ is ............... to polygon $M_2$

(a) congruent to (b) enlargement (c) minimization (d) of double area

**(2)** If $k$ is the scale factor of similarity of polygon $M_1$ to polygon $M_2$ and the polygon $M_1$ is minimization to polygon $M_2$, then $K$ may be equal.

(a) 1 (b) $\frac{3}{5}$ (c) $\frac{3}{2}$ (d) zero

**(3)** If $K_1$ is the scale factor of similarity of polygon $M_1$ to polygon $M_2$ and $K_2$ is the scale factor of similarity of polygon $M_2$ to polygon $M_3$, then the scale factor of similarity of polygon $M_1$ to polygon $M_3$ is ...

(a) $K_1 + K_2$ (b) $K_1\ K_2$ (c) $\frac{K_1}{K_2}$ (d) $\frac{K_2}{K_1}$

**(4)** The two similar polygons are congruent if the scale factor $K$ satisfies....

(a) $K = \frac{1}{2}$ (b) $K = 1$ (c) $K > 1$ (d) $0 < K < 1$

**(5)** If $\Delta\,ABC \sim \Delta\,DEF, BC = 3EF$, then the scale factor of similarity of the two triangles = .....................

**(a)** $\frac{2}{3}$ **(b)** $\frac{1}{2}$ **(c)** $1$ **(d)** $3$

**(6)** The scale factor of similarity between the square $ABCD$ and the square $XYZL$ equals each of the following except ..............

**(a)** $AC: XZ$ **(b)** $AB: YZ$ **(c)** $(AB)^2 : (XY)^2$ **(d)** $BC: YZ$

**(7)** If the rhombus $ABCD$ similar to the rhombus $XYZL$ , $m(\angle A) = 60°$ and the scale factor of similarity = $\frac{1}{2}$ , then $m(\angle Z) =$ ...................

**(a)** $30°$ **(b)** $120°$ **(c)** $60°$ **(d)** $150°$

**(8)** To make two polygons $M_1$ and $M_2$ similar, it is sufficient to have.......

**(a)** their corresponding angles are equal in measures only.

**(b)** their corresponding sides are in proportion only.

**(c)** $(a)$ and $(b)$ together.

**(d)** nothing of the previous.

**(9)** To make two rhombuses $ABCD, XYZL$ similar it is sufficient to have..........

(a) $m(\angle A) = 60°$ , $m(\angle Y) = 120°$ only.

(b) the perimeter of rhombus $ABCD = 2$ the perimeter of the rhombus $XYZL$ only.

(c) $(a)$ and $(b)$ together.

(d) nothing of the previous.

---

**(10)** Which of the following statements is not true ?

(a) each two squares are similar.

(b) each two equilateral triangles are similar.

(c) each two rhombuses are similar.

(d) each two regular polygons with the same number of sides are similar.

---

**(11)** The true statement from the following is .............

(a) all the isosceles triangles are similar.

(b) all the right-angled triangles are similar.

(c) all the squares uses are similar.

(d) all the regular polygons are similar.

**(12) Which of the following statements is true ?**

(a) all the regular polygons are similar.

(b) all the squares are congruent.

(c) all the equilateral triangles are similar.

(d) all the rhombuses are similar.

**(13) Two similar polygons, the ratio between the lengths of two corresponding sides is $3:4$ , if the perimeter of the smaller is $15\ cm$, then the perimeter of the bigger is ............... $cm$.**

(a) $20$ (b) $\frac{80}{3}$ (c) $27$ (d) $\frac{95}{4}$

**(14) Two similar rectangles, the dimensions of the first are $12\ cm, 8\ cm$ and the perimeter of the second equals $60\ cm$, then the length of the second rectangle $=$ .............. cm.**

(a) $12$ (b) $18$ (c) $24$ (d) $16$

**(15) If $\Delta\, ABC \sim \Delta\, DEF$ , $AB = 3\ cm.$ , $DE = 6\ cm.$, $EF = 8\ cm.$, then $BC =$.......... $cm$.**

(a) $4$ (b) $3$ (c) $2$ (d) $15$

**(16)** **The perimeter of one triangle of two similar triangles is** $74\ cm$. **and the side lengths of the second are** $4.5\ cm.$ , $6\ cm.$, $8\ cm.$, **then the length of the greatest side in the first triangle equals** ............$cm$.

**(a)** 4 **(b)** 64 **(c)** 32 **(d)** 16

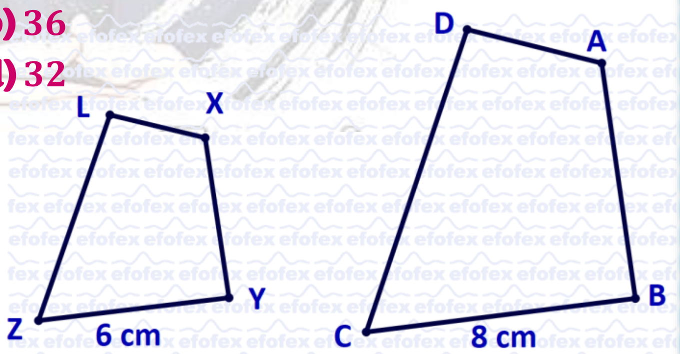
**(17)** **If polygon** $ABCD \sim$ **polygon** $XYZL$**, then** $\frac{AB}{BC}$ = ............

**(a)** $\frac{YZ}{XL}$ **(b)** $\frac{AD}{XL}$ **(c)** $\frac{XL}{AD}$ **(d)** $\frac{XY}{YZ}$

**(18)** **In the opposite figure:**

**If the polygon** $ABCD \sim$ **the polygon** $XYZL$
**and the perimeter of polygon** $ABCD = 48\ cm$.
**,then the perimeter of polygon** $XYZL =$ ............ **cm.**

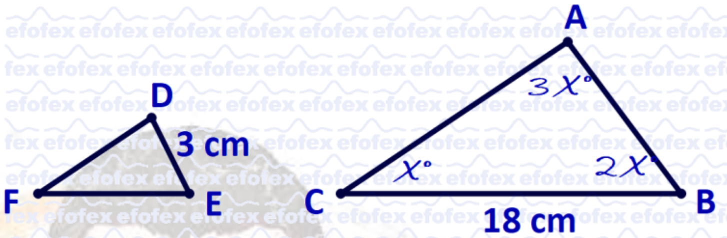
**(a)** 48 **(b)** 36
**(c)** 64 **(d)** 32



**(19) In the opposite figure:**

If $\Delta\, ABC \sim \Delta\, DEF$,

then the length of $\overline{FE} =$ ................. cm.




**(a)** 3 **(b)** 4 **(c)** 6 **(d)** 8

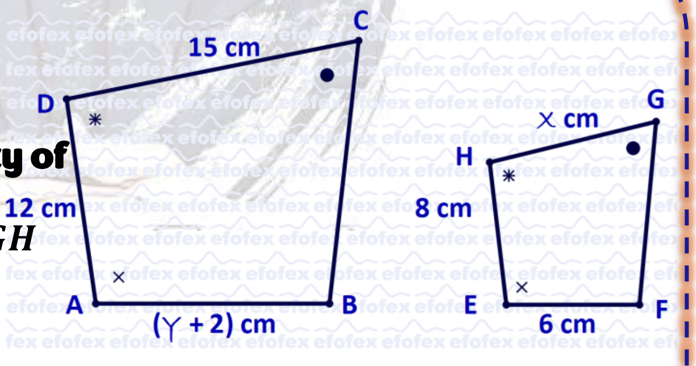
**Example 5** **Essay**

**1) In the opposite figure:**

Polygon $ABCD \sim$ polygon $EFGH$

**(1) Find:** The scale factor of similarity of polygon $ABCD$ to polygon $EFGH$

**(2) Find** the values of: $x$ and $y$

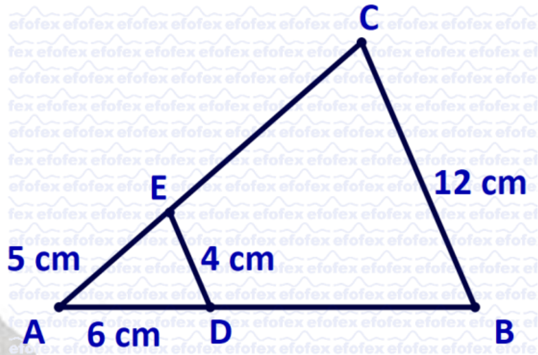


**2) In the opposite figure:**

$\Delta\, ADE \sim \Delta\, ABC$

**(1) Prove that** : $\overline{DE} // \overline{BC}$**, and from the lengths shown on the figure**

**(2) Find the length of each of :** $\overline{BD}$ **and** $\overline{CE}$



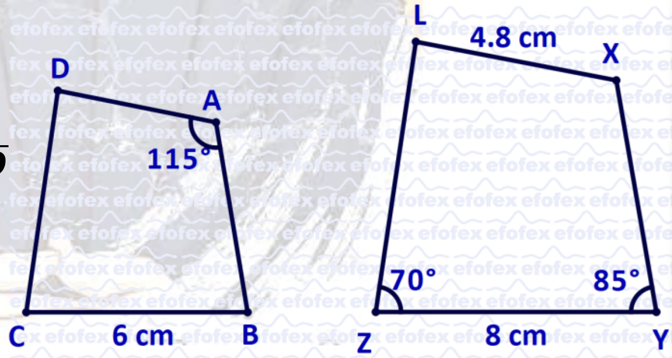

**3) Two similar rectangles, the dimensions of the first are** $8\ cm$ **and** $12\ cm$**, and the perimeter of the second is** $200\ cm$**.**

**Find the length of the second rectangle and its area.**

**4) In the opposite figure:**

**Polygon** $ABCD \sim$ **polygon** $XYZL$

**(1) Calculate :** $m(\angle XLZ)$ **, length of** $\overline{AD}$




**(2) If the perimeter of the polygon** $ABCD = 19.5\ cm$**.**

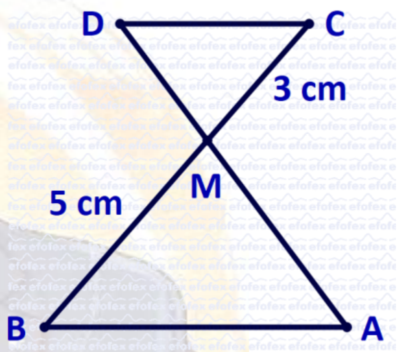
**Find: The perimeter of the polygon** $XYZL$

**5)** **If polygon** $ABCD \sim$ **polygon** $XYZL$**, complete:**

**(1)** $\frac{AB}{BC} = \frac{\cdots\cdots\cdots}{YZ}$ **(2)** $AB \times ZL = XY \times$ ……………….

**(3)** $\frac{BC+YZ}{YZ} = \frac{\cdots\cdots\cdot+LX}{LX}$ **(4)** $\frac{\text{perimeter of polygon ……}}{\text{perimeter of polygon …….}} = \frac{XY}{AB}$

**6)** **In the opposite figure:**



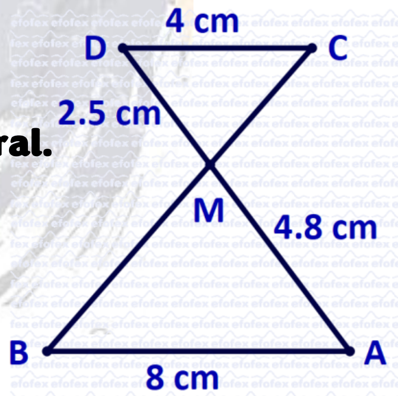

$\Delta\, MAB \sim \Delta\, MDC$

**Prove that:** $\overline{AB} // \overline{CD}$

**and if** $MC = 3\ cm$ , $MB = 5\ cm$ , $AD = 6\ cm.$

**Find:** **The length of** $\overline{AM}$

**7)** **In the opposite figure :**




$\Delta\, MAB \sim \Delta\, MCD$

**Prove that:** **The figure** $ABDC$ **is a cyclic quadrilateral.**

**And if** $AB = 8\ cm.$ , $CD = 4\ cm.$ , $MA = 4.8\ cm.$

, $MD = 2.5\ cm.$

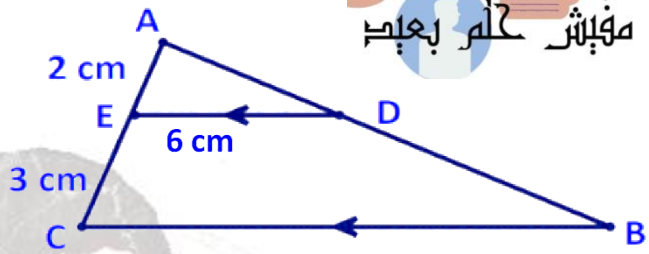
**Find :** **The length of** $\overline{BC}$

Lesson 2

# Exercises

مع محمد سعيد
مفيش حلم بعيد

**(1) In the opposite figure:**




**If** $\overline{ED} // \overline{BC}$ , $AE = 2\ cm$.

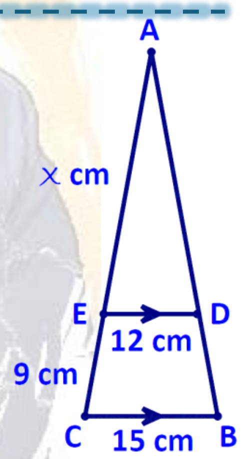
, $EC = 3\ cm$ , $ED = 6\ cm$.

, **then** $BC =$ ............ $cm$.

**(a)** 9 **(b)** 15

**(c)** 12 **(d)** 10

**(2) In the opposite figure:**

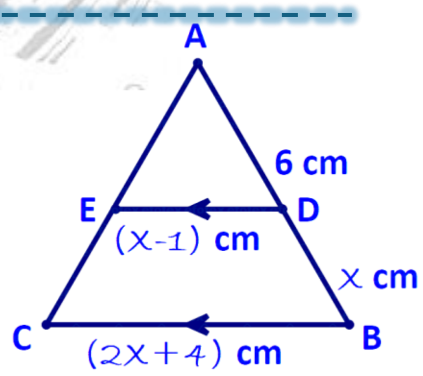



$x =$ ................ $cm$.

**(a)** 12 **(b)** 24

**(c)** 36 **(d)** 48

**(3) In the opposite figure:**

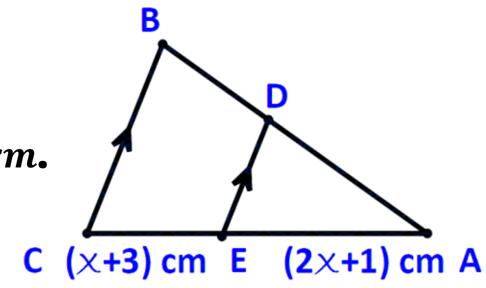



**If** $\overline{DE} // \overline{BC}$ , **then** $x =$ ................

**(a)** 10 **(b)** 30

**(c)** 3 **(d)** 24

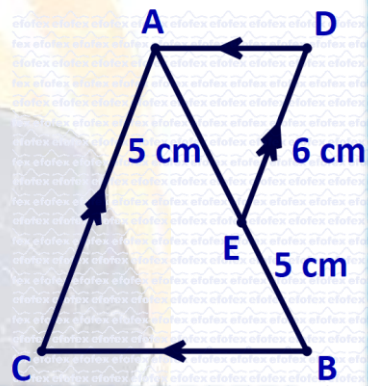
## (4) In the opposite figure:




If $AD : AB = 3 : 5$ , $\overline{DE} // \overline{BC}$, then $x =$ ............. $cm.$

(a) 5
(b) 3
(c) 4
(d) 7

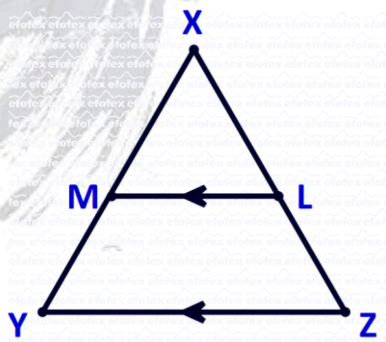
## (5) In the opposite figure:




$AC =$........... $cm.$

(a) 6
(b) 9
(c) 12
(d) 15

## (6) In the opposite figure:




If $\overline{LM} // \overline{YZ}$ , $\frac{LM}{YZ} = \frac{4}{7}$, then $\frac{YM}{MX} =$ .............

(a) $\frac{11}{4}$
(b) $\frac{3}{4}$
(c) $\frac{4}{3}$
(d) $\frac{4}{11}$

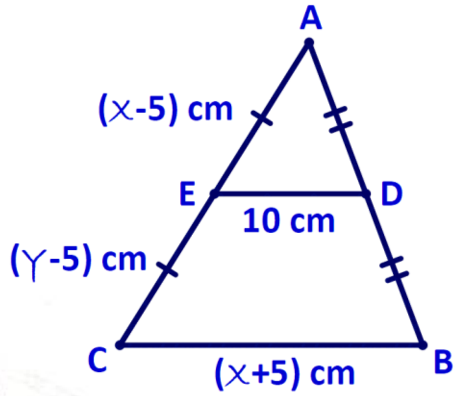
### (7) In the opposite figure:

$D, E$ are midpoints of $\overline{AB}, \overline{AC}$

, then the length of $x + y =$ ................ $cm.$

(a) 15 (b) 7

(c) 22 (d) 11



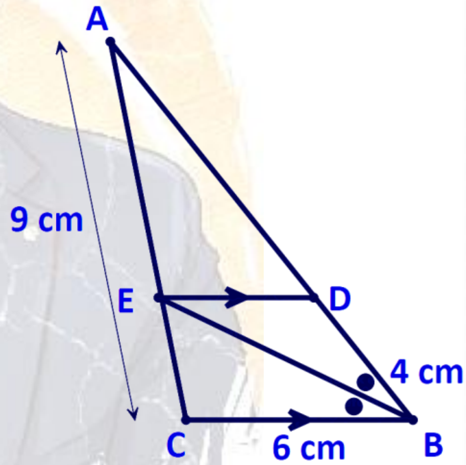

### (8) In the opposite figure:

If $AC = 9\ cm, BD = 4\ cm., BC = 6\ cm,$

then the perimeter of $\Delta\ ADE =$ ........... $cm.$

(a) 18 (b) 16

(c) 14 (d) 12



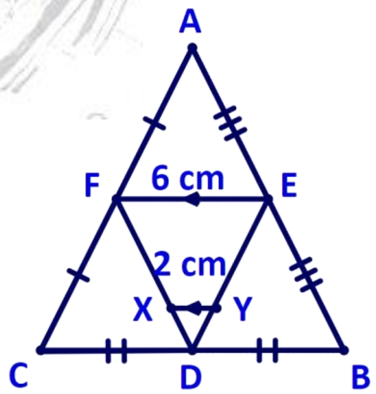

### (9) In the opposite figure:

If the perimeter of $\Delta\ DXY = 8\ cm.$

, then the perimeter of $\Delta\ ABC =$ .............. $cm.$

(a) 18 (b) 24

(c) 36 (d) 48

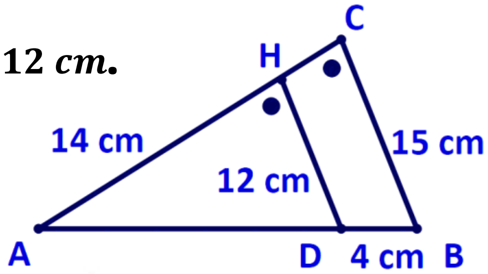


## (10) In the opposite figure:

If $m(\angle AHD) = m(\angle C)$ , $AH = 14\ cm.$ , $HD = 12\ cm.$

, $CB = 15\ cm.$ , $DB = 4\ cm.$

, then $AC + AD + AB = ..................\ cm.$




(a) $62.5$ (b) $48$

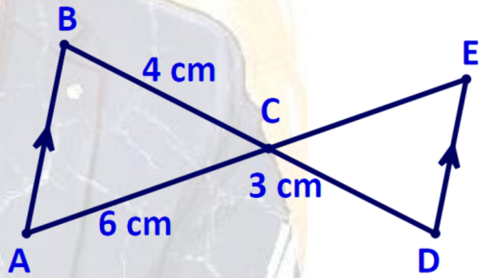
(c) $56$ (d) $53.5$

## (11) In the opposite figure:

If $\overline{AB} // \overline{DE}$ , $CD = 3\ cm.$

, $AC = 6\ cm.$ , $BC = 4\ cm.$

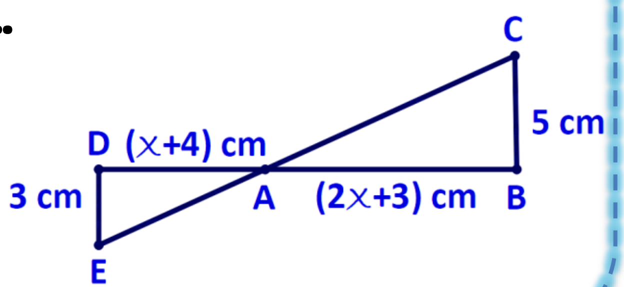
, then: $CE = ...............\ cm.$




(a) $5.4$ (b) $4.5$

(c) $8$ (d) $2.5$

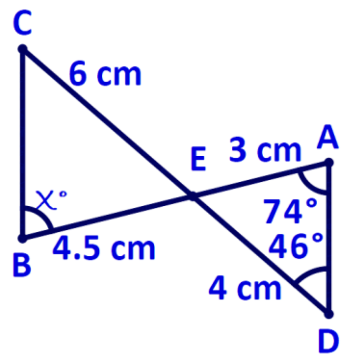
## (12) In the opposite figure: $x = ......$




(a) $5$ (b) $9$

(c) $11$ (d) $12$

**(13) In the opposite figure:**




$x =$ .............. °

**(a)** 60 **(b)** 46

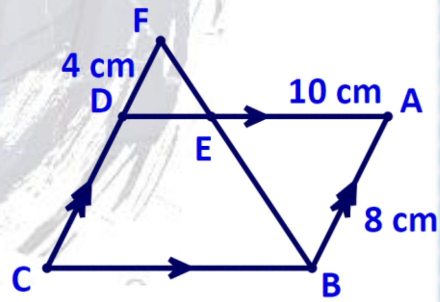
**(c)** 74 **(d)** 30

**(14) Two angles of a triangle with measures** $50°, 70°$ **similar to another triangle with angles of measures** $50°$ **and ........ °**

**(a)** 60 **(b)** 80

**(c)** 55 **(d)** 40

**(15) In the opposite figure:**



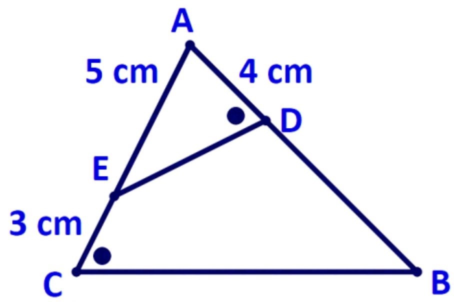

$ABCD$ **is a parallelogram ,** $F \in \overrightarrow{CD}$

**, then** $BC =$.......... $cm$.

**(a)** 5 **(b)** 15

**(c)** 10 **(d)** 8

### (16) In the opposite figure:

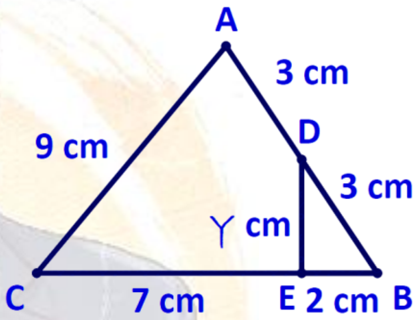



$BD =$ ................ $cm.$

**(a)** 5 **(b)** 6

**(c)** 4 **(d)** 7

### (17) In the opposite figure:

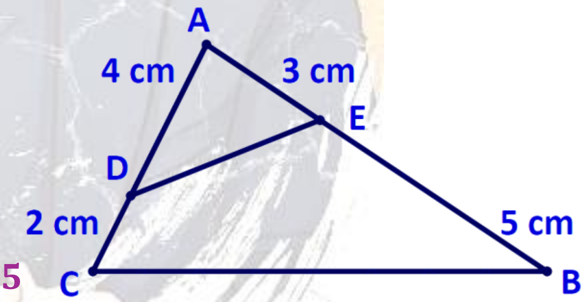



$y =$ ................ $cm.$

**(a)** 2 **(b)** 4.5

**(c)** 3.5 **(d)** 3

### (18) In the opposite figure:




**The ratio between the perimeters of the two triangles $ADE, ABC$ is ...............**

**(a)** 2: 1 **(b)** 3: 5

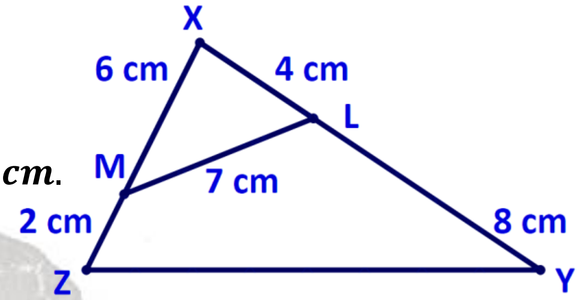
**(c)** 1: 2 **(d)** 1: 4

**(19) In the opposite figure:**

If $L \in \overline{XY}$ where $XL = 4\ cm.\ , YL = 8\ cm.$

, $M \in \overline{XZ}$ where $XM = 6\ cm.\ , ZM = 2\ cm.$

, $LM = 7\ cm.$ , then the length of $\overline{YZ} = ....\ cm.$

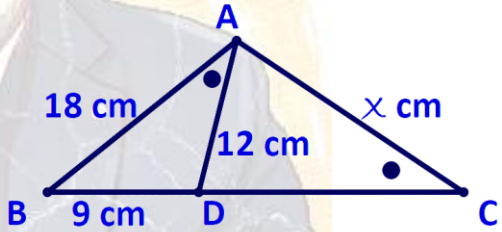



**(a)** 21 **(b)** 28

**(c)** 14 **(d)** 3

**(20) In the opposite figure:**

If $m(\angle DAB) = m(\angle C)$ , then $x = ..................$



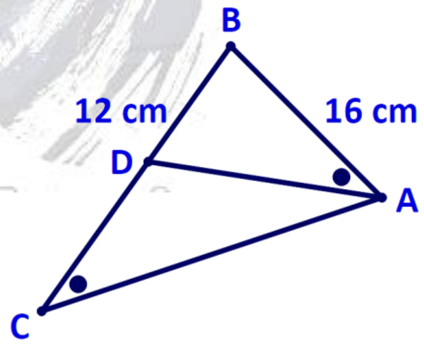

**(a)** 6 **(b)** 18

**(c)** 21 **(d)** 24

**(21) In the opposite figure:**

$m(\angle BAD) = m(\angle C)$ , $AB = 16\ cm.$

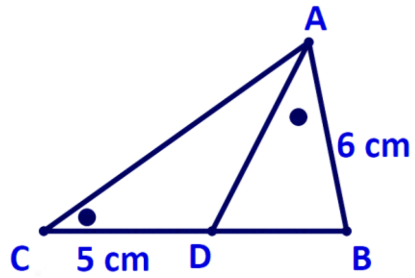
$BD = 12\ cm.$ , then $DC = ..................\ cm.$




**(a)** 16 **(b)** 12

**(c)** $9\frac{1}{3}$ **(d)** $23\frac{1}{3}$

## (22) In the opposite figure:



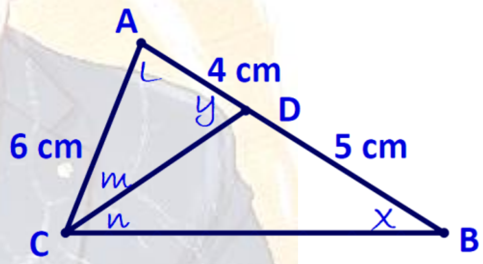

If $m(\angle BAD) = m(\angle C)$

, then $BD =$ ...................... $cm$.

**(a)** 3 **(b)** 4

**(c)** 5 **(d)** 6

## (23) In the opposite figure:

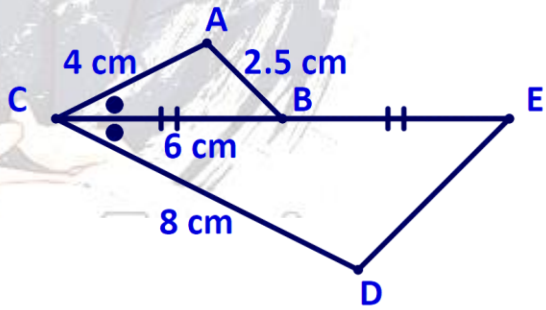



$x =$ ......................

**(a)** $m$ **(b)** $n$

**(c)** $y$ **(d)** $\ell$

## (24) In the opposite figure:



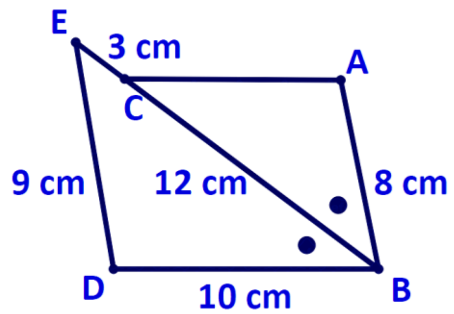

If $B$ is the midpoint of $\overline{CE}$

, then $DE =$ .................... $cm$.

**(a)** 4 **(b)** 5

**(c)** 6 **(d)** 7

**(25) In the opposite figure:**

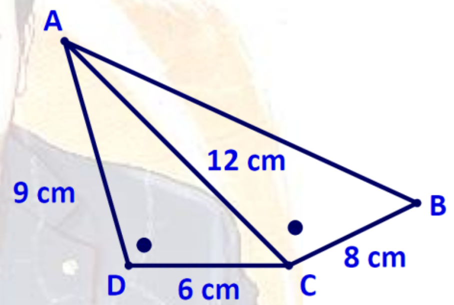



$AC =$ ................$cm.$

(a) $6.2$ (b) $6$

(c) $7.2$ (d) $7$

**(26) In the opposite figure:**



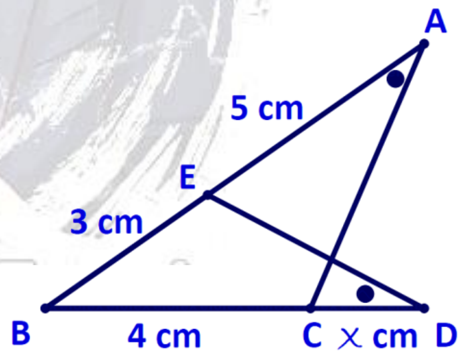

If $m(\angle ADC) = m(\angle ACB)$

, then $AB =$........... $cm.$

(a) $12$ (b) $16$

(c) $18$ (d) $20$

**(27) In the opposite figure:**



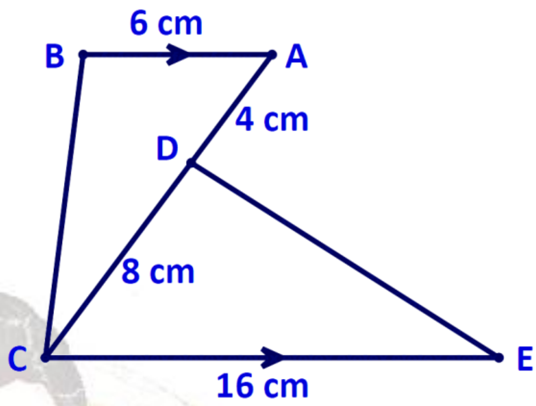

If $m(\angle A) = m(\angle D)$

, then $x =$ ................

(a) $5$ (b) $4$

(c) $3$ (d) $2$

**(28) In the opposite figure:**

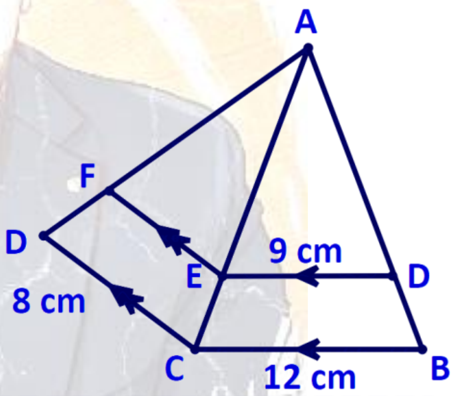



**If** $\overline{AB} // \overline{EC}$ **, then** $\frac{ED}{BC} =$ ...............

(a) $\frac{4}{3}$ (b) $\frac{3}{4}$

(c) $\frac{2}{3}$ (d) $\frac{1}{2}$

**(29) In the opposite figure:**

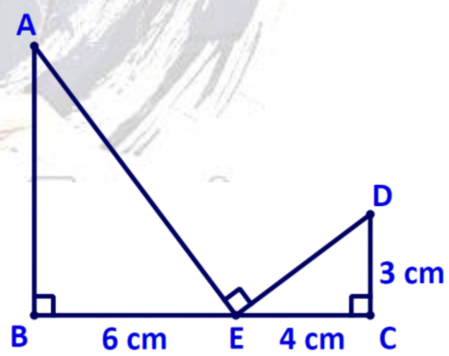



$EF =$ ............. $cm$.

(a) 3 (b) 6

(c) 9 (d) 12

**(30) In the opposite figure:**




**If** $m(\angle B) = m(\angle C) = m(\angle AED) = 90°$

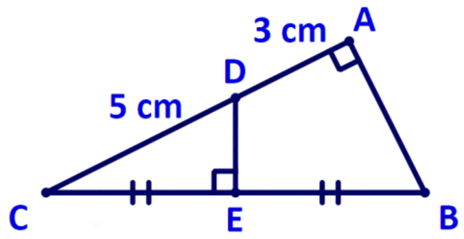
**, then the length of** $\overline{AB} =$.....$cm$.

(a) 12 (b) 8

(c) 10 (d) 15

**(31) In the opposite figure:**

$EC =$ ...................... $cm.$




(a) 3

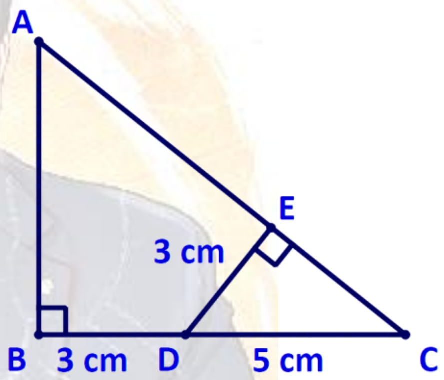
(b) 4

(c) $2\sqrt{5}$

(d) 5

**(32) In the opposite figure:**

$AE =$ ..................... $cm.$




(a) 5

(b) 6

(c) 7

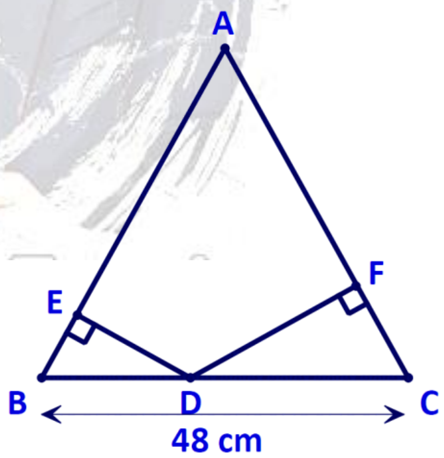
(d) 8

**(33) In the opposite figure:**

$ABC$ **is an isosceles triangle**

**where** $AB = AC$ , $BC = 48$ $cm.$

, $\frac{DE}{DF} = \frac{5}{7}$ **, then** $DC =$ ........... $cm.$




(a) 12

(b) 20

(c) 24

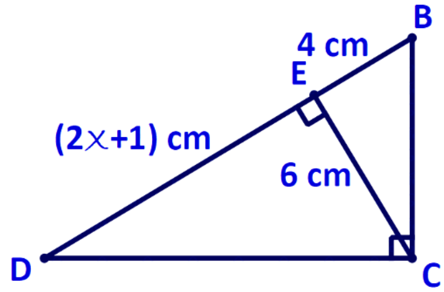
(d) 28

### (34) In the opposite figure:

$x =$.................... $cm$.

(a) 8 (b) 4

(c) 6 (d) 4.8




### (35) In the opposite figure:

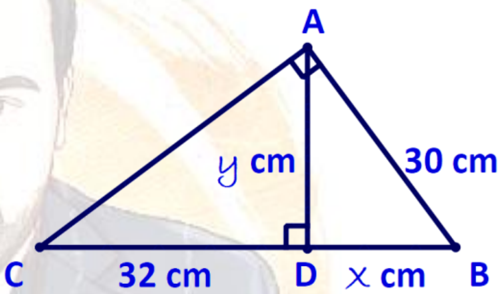
$ABC$ **is a right-angled triangle at** $A$,

$\overline{AD} \perp \overline{BC}$ , $AB = 30\ cm.$ , $DC = 32\ cm.$

**, then** $x + y =$ ..............

(a) 36 (b) 48

(c) 42 (d) 52

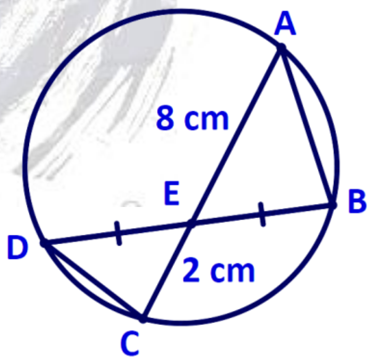



### (36) In the opposite figure:

$BD =$ .................... $cm$.

(a) 8 (b) 4

(c) 16 (d) 2



Lesson 3

## Exercises

**Choose:**

**(1) The ratio between the perimeters of two similar polygons is $4:9$, so the ratio between their areas is ............**

**(a)** $4:9$ **(b)** $9:4$ **(c)** $2:3$ **(d)** $16:8$

**(2) If $\Delta\ ABC \sim \Delta\ XYZ, AB = 3XY$, then $\frac{a(\Delta\ XYZ)}{a(\Delta\ ABC)} =$ ............**

**(a)** $3$ **(b)** $9$ **(c)** $\frac{1}{3}$ **(d)** $\frac{1}{9}$

**(3) If the ratio between the areas of two similar polygons is $9:49$, then the ratio between the lengths of their two corresponding sides is ..........**

**(a)** $3:7$ **(b)** $9:49$ **(c)** $3:10$ **(d)** $10:3$

**(4) If the lengths of two corresponding sides in two similar polygons are $7\ cm$ and $11\ cm$, then the ratio between their perimeters is ............**

**(a)** $\frac{49}{121}$ **(b)** $\frac{7}{18}$ **(c)** $\frac{7}{11}$ **(d)** $\frac{11}{18}$

**(5) The ratio between the corresponding sides of two similar triangle is $2:5$ , if the area of the first one is $16\ cm.^2$, then the area of the second one =……….. $cm^2$.**

**(a)** $40$ **(b)** $80$ **(c)** $100$ **(d)** $120$

**(6) If the lengths of two corresponding sides in two similar polygons are $12\ cm.$ , $16\ cm.$ and the area of the smaller polygon = $135\ cm.^2$, then the area of the greater polygon ………… $cm^2$.**

**(a)** $24$ **(b)** $180$ **(c)** $240$ **(d)** $200$

**(7) If the ratio between perimeters of two similar polygon is $5:7$ and the area of the greater polygon is $245\ cm.^2$, then the area of the smaller polygon equals ……….. $cm^2$.**

**(a)** $125$ **(b)** $175$ **(c)** $343$ **(d)** $480.2$

**(8) The ratio between two corresponding sides of two similar squares is $3:4$ , if the area of the greater square is $48\ cm.^2$, then the area of the smaller one = ………………… $cm.^2$**

**(a)** $16$ **(b)** $12$ **(c)** $20$ **(d)** $27$

**(9) The ratio between the lengths of the diagonals of two squares is $2:5$, if the area of the smaller one is $4\ cm^2$, so the area of the greater one is ......... $cm^2$.**

**(a)** $25$ **(b)** $16$ **(c)** $10$ **(d)** $20$

---

**(10) The ratio between the areas of two similar polygons is $9:25$ and the length of one side of the smaller one is $3\ cm.$, so the length of the corresponding side in the greater one is ................ $cm.$**

**(a)** $\frac{25}{3}$ **(b)** $\frac{9}{5}$ **(c)** $75$ **(d)** $5$

---

**(11) If the ratio between areas of two similar triangles equals $9:25$ and the perimeter of the smaller triangle is $60\ cm$, then the perimeter of the greater triangle equals ................**

**(a)** $60$ **(b)** $80$ **(c)** $100$ **(d)** $120$

---

**(12) The areas of two similar polygons are $100\ cm.^2$, $64\ cm.^2$ If the perimeter of the first is $60\ cm.$, then the perimeter of the other polygon =.................. $cm.^2$**

**(a)** $38.4$ **(b)** $40$ **(c)** $42$ **(d)** $48$

**(13) If $\Delta\, ABC \sim \Delta\, DEF, a(\Delta\, ABC) = 9a(\Delta\, DEF)$ and $DE = 4\ cm.$, then $AB =$ .............. $cm.$**

**(a)** $\frac{4}{3}$ **(b)** $12$ **(c)** $9$ **(d)** $36$

**(14) The ratio between the diameters of two circles is $3:5$, if the area of the smaller circle is $27\ cm.^2$, then the area of the greater circle equals .............. $cm^2$**

**(a)** $45$ **(b)** $50$ **(c)** $75$ **(d)** $100$

**(15) The ratio between two corresponding sides of two similar polygons is $3:4$, if the sum of its two areas is $150\ cm.^2$ then the area of the smaller polygon $=$ .................. $cm.^2$**

**(a)** $54$ **(b)** $96$ **(c)** $75$ **(d)** $52$

**(16) The ratio between the lengths of two corresponding sides in two similar polygons is $5:3$ and the difference between their areas is $32\ cm^2$, then the area of the smaller polygon is ................. $cm^2$**

**(a)** $18$ **(b)** $50$ **(c)** $32$ **(d)** $16$

**(17) If the polygon $M_1$ ~ the polygon $M_2$ and $\frac{area\ of\ polygon\ M_1}{area\ of\ polygon\ M_2} = \frac{9}{16}$, then it means that ............**

(a) the sum of their areas $= 25$ square units.

(b) the ratio between the two corresponding sides $= 9:16$

(c) the scale factor of the similarity of $M_1$ to $M_2 = \frac{9}{16}$

(d) the perimeter of polygon $M_1 = \frac{3}{4}$ the perimeter of polygon $M_2$

**(18) In the opposite figure:**

If $AB = 3\ cm.\ , BE = 5\ cm.\ , ED = 7\ cm.$

, then $\frac{a(\Delta ABE)}{a(\Delta CDE)} =$ ...............

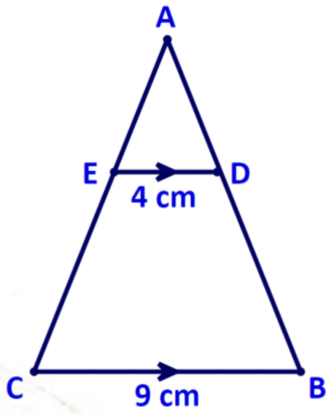

(a) $\frac{9}{49}$

(b) $\frac{25}{49}$

(c) $\frac{9}{25}$

(d) $\frac{16}{49}$

**(19) In the opposite figure:**



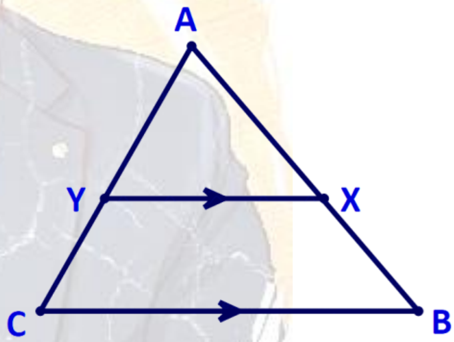

If $\overline{DE} // \overline{BC}$ , $DE = 4\ cm.$ , $BC = 9\ cm.$ ,

, then $\dfrac{a(\Delta\ ADE)}{a(\Delta\ ABC)} =$ ..............

(a) $\dfrac{16}{81}$ (b) $\dfrac{81}{65}$

(c) $\dfrac{65}{81}$ (d) $\dfrac{16}{65}$

**(20) In the opposite figure:**



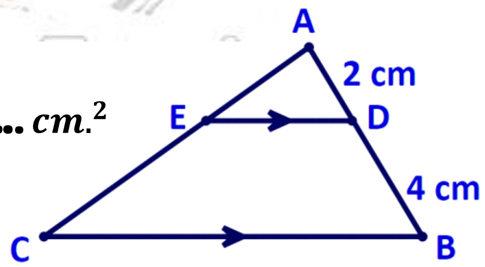

If $AX : XB = 5 : 3$, $a(\Delta\ ABC) = 25.6\ cm.^2$

, then a $(\Delta\ AXY) =$.............. $cm.^2$

(a) 10 (b) 16

(c) 41 (d) 65.5

**(22) In the opposite figure:**




$\overline{DE} // \overline{BC}$, the area of $\Delta\ ADE = 8\ cm.^2$

, then the area of the figure $DBCE =$ ............. $cm.^2$

(a) 27 (b) 64

(c) 24 (d) 16

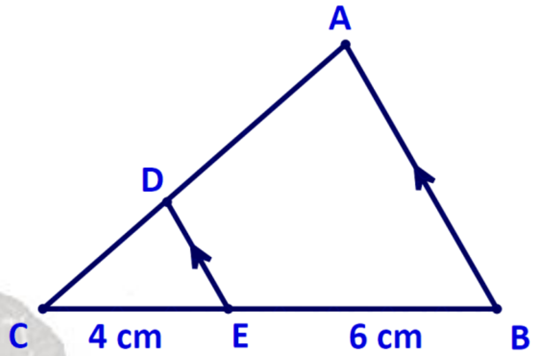
**(23) In the opposite figure:**

**If the area of the figure** $ABED = 42\ cm.^2$

**, then the area of** $\Delta\ CED =$.............. $cm.^2$

**(a)** 8 **(b)** 12

**(c)** 16 **(d)** 20

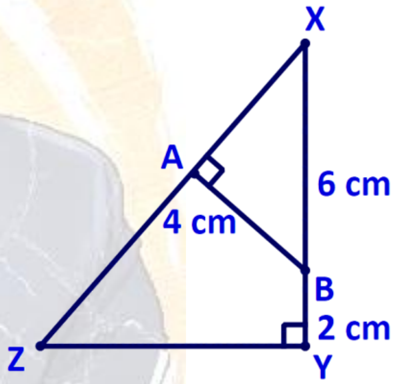



**(24) In the opposite figure:**

$$\frac{a(\Delta\ XAB)}{a(\Delta\ XYZ)} = ..............$$

**(a)** $\frac{3}{5}$ **(b)** $\frac{5}{16}$

**(c)** $\frac{9}{25}$ **(d)** $\frac{4}{5}$

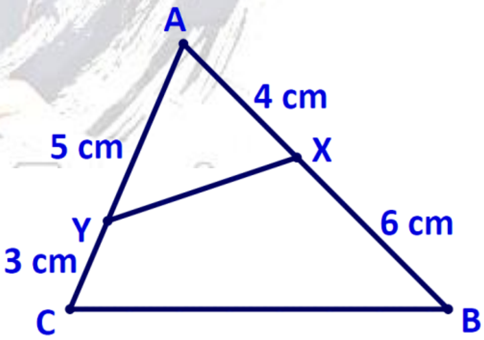



**(25) In the opposite figure:**

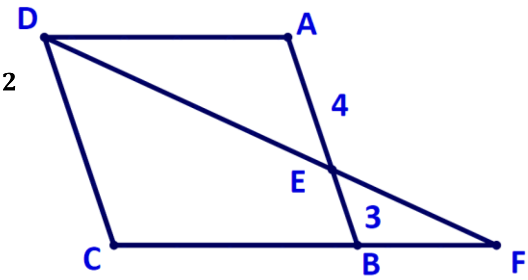
$$\frac{a(\Delta\ AXY)}{a(\Delta\ ACB)} = ..................$$

**(a)** $\frac{5}{8}$ **(b)** $\frac{2}{5}$

**(c)** $\frac{5}{2}$ **(d)** $\frac{1}{4}$



**(26)** $ABCD$ **is a parallelogram,** $AE : EB = 4 : 3$ **,** $a(\Delta\, ADE) = 32\ cm.^2$**, then** $a(\Delta\, DFC) = \ldots\ cm.^2$




**(a)** 18 **(b)** 98

**(c)** 24 **(d)** 42

**Complete:**

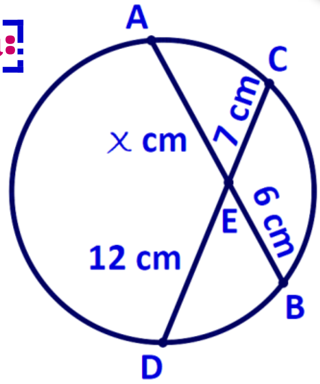
**If the polygon** $ABCD \sim$ **the polygon** $\grave{A}\grave{B}\grave{C}\grave{D}$, $\frac{AB}{\grave{A}\grave{B}} = \frac{1}{3}$**, then**

$$\frac{a\,(\text{the polygon } ABCD)}{a\,(\text{the polygon } \grave{A}\grave{B}\grave{C}\grave{D})} + \frac{\text{perimeter of } (ABCD)}{\text{perimeter of } (\grave{A}\grave{B}\grave{C}\grave{D})} = \ldots\ldots\ldots\ldots$$

# Exercises

**Choose the correct answer from those given:**

**(1) In the opposite figure:**

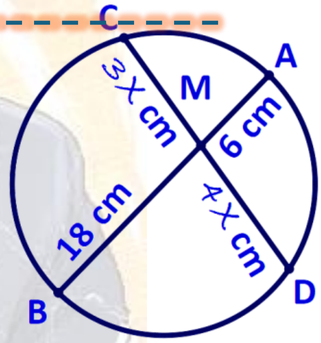



$x =$................ $cm.$

**(a)** $3.5$ **(b)** $14$

**(c)** $6$ **(d)** $12$

**(2) In the opposite figure:**




$\overline{AB} \cap \overline{CD} = \{M\}$ , $AM = 6$ $cm.$

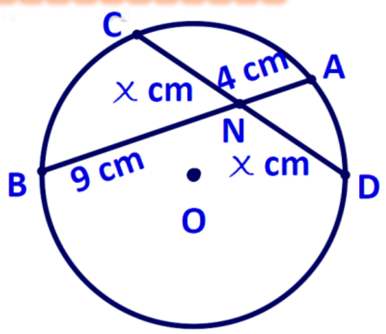
, $MB = 18$ $cm.$ , $CM = 3x$ $cm.$

, $DM = 4x$ $cm.$ , then $CD =$................ $cm.$

**(a)** $3$ **(b)** $9$

**(c)** $18$ **(d)** $21$

**(3) In the opposite figure:**

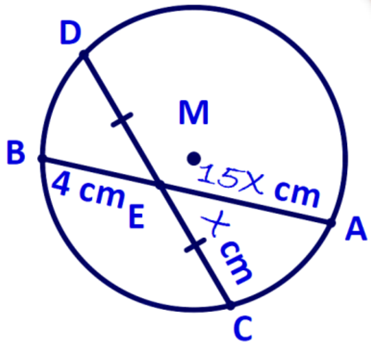



$x =$................

**(a)** $6$ **(b)** $-6$

**(c)** $\pm 6$ **(d)** $36$

**(4) In the opposite figure:**

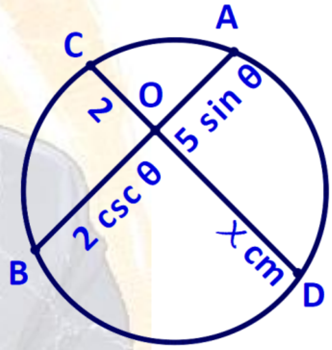



$x =$.............. $cm.$

**(a)** $6.5$ **(b)** $13$

**(c)** $6$ **(d)** $36$

**(5) In the opposite figure:**




**If** $\overline{AB}, \overline{CD}$ **are two chords in the circle,**

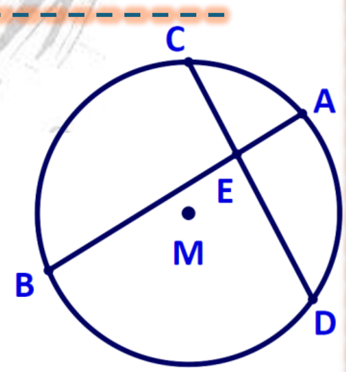
$\overline{AB} \cap \overline{CD} = \{O\}, AO = (5 \sin \theta)cm.$

$, OB = (2 \csc \theta)cm, OC = 2\ cm,$ **then** $x =$ ............ $cm.$

**(a)** $5$ **(b)** $10$

**(c)** $\frac{\sqrt{3}}{2}$ **(d)** $10\sqrt{3}$

**(6) In the opposite figure:**




**If** $AE = 5\ cm.\ , CE = 8\ cm.$

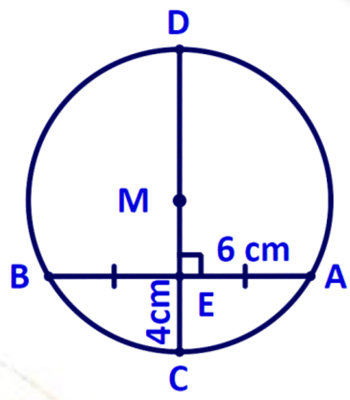
**,** $DE = 10\ cm., BE = (x + 1)cm.$

**, then** $x =$.............. $cm.$

**(a)** $12$ **(b)** $14$

**(c)** $16$ **(d)** $15$

**(7) In the opposite figure:**



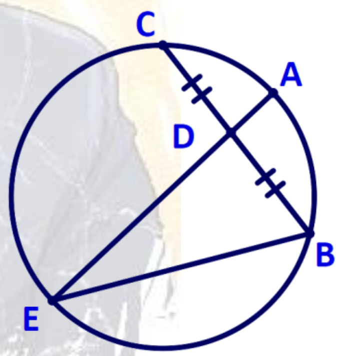

**The radius length of the circle =** .............. $cm$.

**(a)** $9$ **(b)** $4.5$

**(c)** $6$ **(d)** $6.5$

---

**(8) In the opposite figure:**



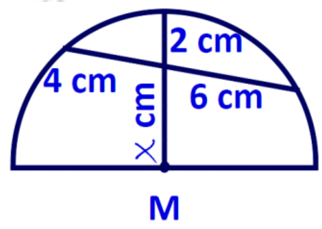

$(BD)^2 =$ ...................

**(a)** $AD \times DB$ **(b)** $AD \times DE$

**(c)** $AD \times BE$ **(d)** $AC \times BD$

---

**(9) In the opposite figure:**




**If** $M$ **is the centre of a circle, then** $x =$ ................ $cm$.

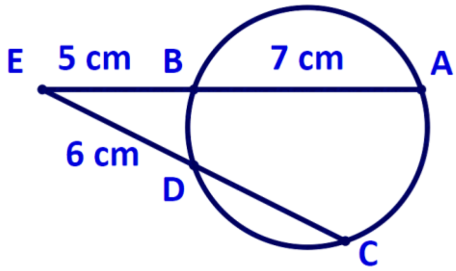
**(a)** $5$ **(b)** $7$

**(c)** $8$ **(d)** $12$

## (10) In the opposite figure:

**If** $AB = 7\ cm.\ , BE = 5\ cm., DE = 6\ cm.$

**, then the length of** $\overline{CD} = ..................\ cm.$

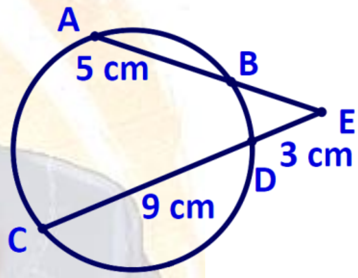



**(a)** 6      **(b)** 5

**(c)** 4      **(d)** 3

## (11) In the opposite figure:

$BE = ......................\ cm.$

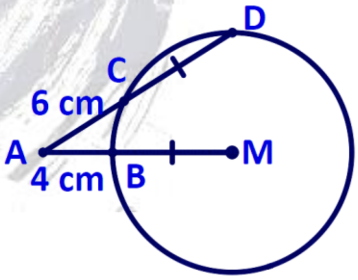



**(a)** 6      **(b)** 5

**(c)** 4      **(d)** 3

## (12) In the opposite figure:

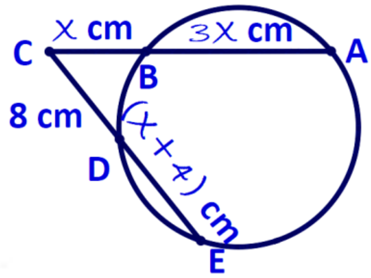
**If** $DC = MB$**, then the circumference of circle** $M = ................\ cm.$




**(a)** $15\pi$      **(b)** $18\pi$

**(c)** $20\pi$      **(d)** $24\pi$

**(13) In the opposite figure:**

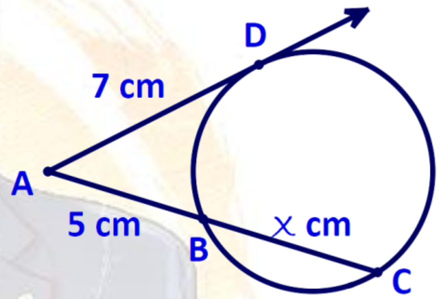



$x =$ ...............

**(a)** 5 **(b)** 6

**(c)** 3 **(d)** 9

**(14) In the opposite figure:**

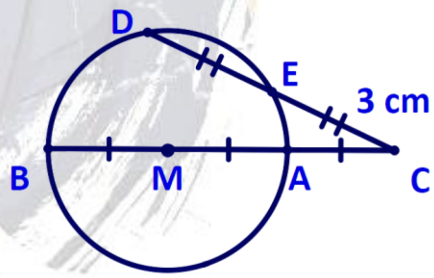



$x =$ ................

**(a)** 4.8 **(b)** 5.6

**(c)** 4.2 **(d)** 5.2

**(15) In the opposite figure:**

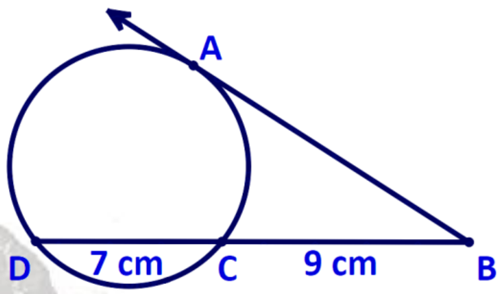



**The area of the circle** $M =$ ................ $cm^2$

**(a)** $6\pi$ **(b)** $18\pi$

**(c)** $2\sqrt{6}\pi$ **(d)** $\sqrt{6}\pi$

### (16) In the opposite figure:



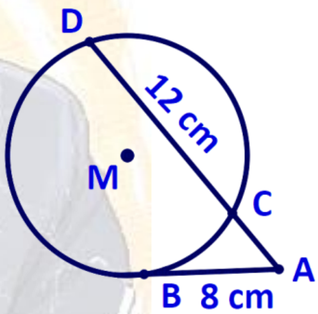

$\overrightarrow{BA}$ **is a tangent ,** $BC = 9\ cm.$ , $CD = 7\ cm.$

**, then** $AB =$ ............. $cm.$

**(a)** $63$ **(b)** $144$

**(c)** $12$ **(d)** $\frac{9}{16}$

### (17) In the opposite figure:

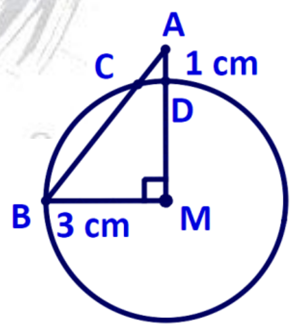



$AC =$ ............. $cm.$

**(a)** $12$ **(b)** $18$

**(c)** $4$ **(d)** $6$

### (18) In the opposite figure:




$AMB$ **is a right-angled triangle at** $M$

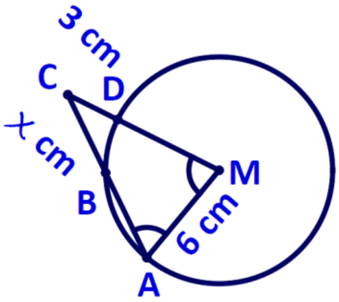
**the radius of the circle** $= 3\ cm.$ , $AD = 1\ cm.$

**, then** $BC =$ .................. $cm.$

**(a)** $3.6$ **(b)** $1.4$

**(c)** $5$ **(d)** $3$

**(19) In the opposite figure:**

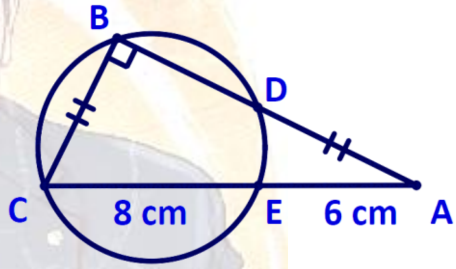



$x =$ ………………

**(a)** 6 **(b)** 4

**(c)** 3 **(d)** 5

**(20) In the opposite figure:**

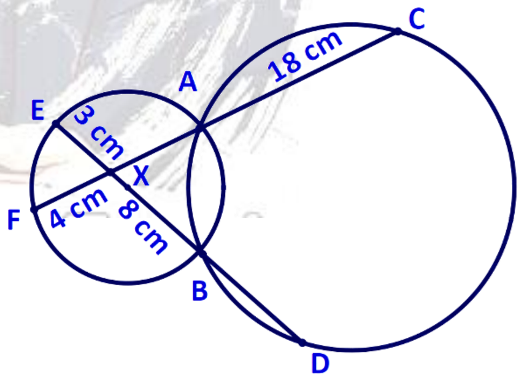



$a(\Delta\ ABC) =$ ……………… $cm^2$.

**(a)** 48 **(b)** 42

**(c)** 40 **(d)** 24

**(21) In the opposite figure:**




$BD =$ ……………… $cm$.

**(a)** 6 **(b)** 8

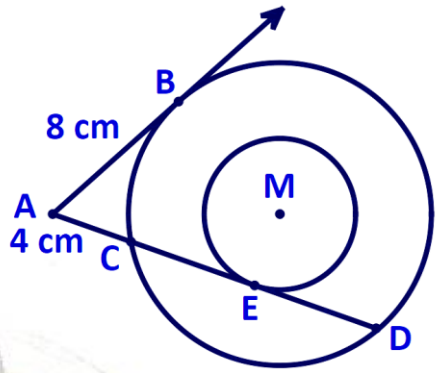
**(c)** 10 **(d)** 12

**(22) In the opposite figure:**

$\overleftrightarrow{AB}$ is a tangent to the greater circle

, $\overleftrightarrow{AD}$ is a tangent to the smaller circle

$DE =$ ………… $cm.$



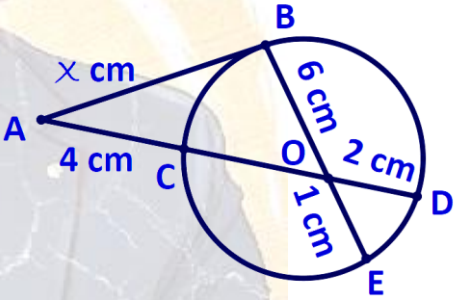

**(a)** 4 **(b)** 5

**(c)** 6 **(d)** 8

---

**(23) In the opposite figure:**

$x =$ ……………………



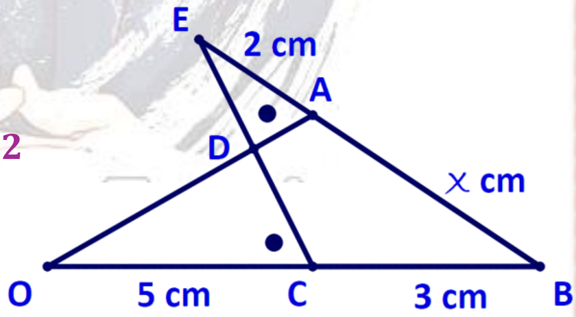

**(a)** 8 **(b)** 6

**(c)** 4.8 **(d)** 5

---

**(24) In the opposite figure:**

$x =$ ……………




**(a)** 4 **(b)** 3.2

**(c)** 5 **(d)** 3

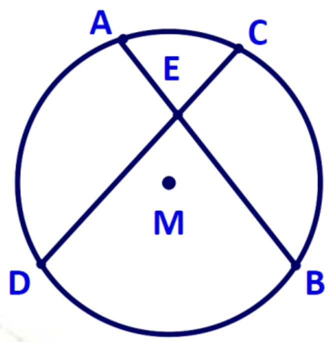
**complete:**

**(1) In the opposite figure:**

$\overline{AB} \cap \overline{CD} = \{E\}$ , $AE = 4$ cm.

, $EB = 6$ cm. , $DE = (x+1)$cm.

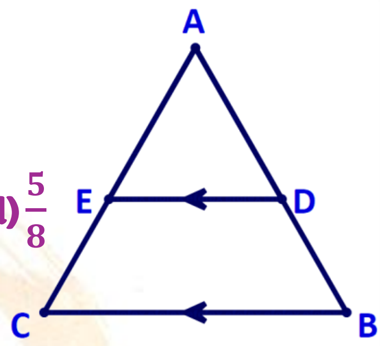
, $CE = (x-1)$cm. , then $x =$ .................... cm.





## Exercises

### (1) In the opposite figure :




**First : If** $\frac{AD}{DB} = \frac{5}{3}$ **, then** $\frac{AB}{BD} =$.......

(a) $\frac{3}{5}$ (b) $\frac{8}{3}$ (c) $\frac{3}{8}$ (d) $\frac{5}{8}$

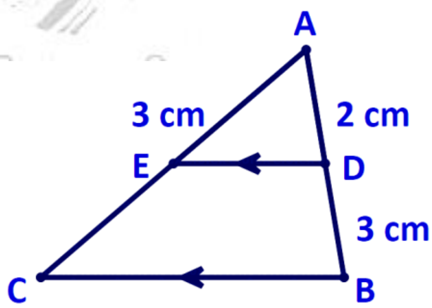
**Second : If** $\frac{AE}{AC} = \frac{4}{7}$ **, then** $\frac{CE}{EA} =$ .........

(a) $\frac{7}{4}$ (b) $\frac{4}{3}$ (c) $\frac{2}{5}$ (d) $\frac{3}{4}$

**Third : If** $\frac{DE}{BC} = \frac{3}{5}$ **, then** $\frac{AD}{DB} =$ ............

(a) $\frac{5}{3}$ (b) $1.5$ (c) $\frac{2}{3}$ (d) $\frac{3}{4}$

### (2) In the opposite figure :



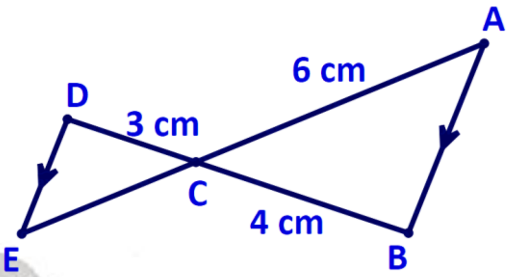

**If** $\overline{DE}//\overline{BC}$ , $AD = 2\ cm.$ **and** $AE = DB = 3\ cm.$

**, then the length of** $\overline{EC} =$ ........ $cm$ **.**

(a) 3 (b) 4

(c) 5 (d) 4.5

**(3) In the opposite figure :**




$\overline{AB} // \overline{DE}$ , $\overline{AE} \cap \overline{BD} = \{C\}$

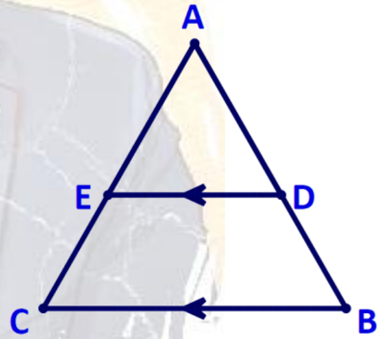
, $AC = 6\ cm.$, $BC = 4\ cm.$ and $CD = 3\ cm.$

, then the length of $\overline{CE} = ........\ cm$ .

(a) $5$ (b) $4$

(c) $4.5$ (d) $3.5$

**(4) In the opposite figure :**

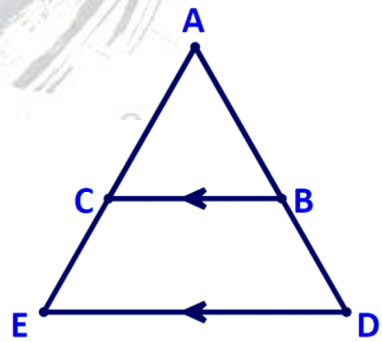



All the following statements are true except ……

(a) $\frac{AD}{DB} = \frac{AE}{EC}$ (b) $\frac{AD}{DB} = \frac{DE}{BC}$

(c) $\frac{AD}{AB} = \frac{AE}{AC}$ (d) $\frac{AB}{BD} = \frac{AC}{EC}$

**(5) In the opposite figure :**




If $\overline{BC} // \overline{DE}$ , then ………

(a) the shape $DBCE$ is a cyclic quadrilateral

(b) $\triangle ABC \sim \triangle ADE$

(c) $AB \times AD = AC \times AE$ (d) $\frac{AB}{BD} = \frac{BC}{DE}$

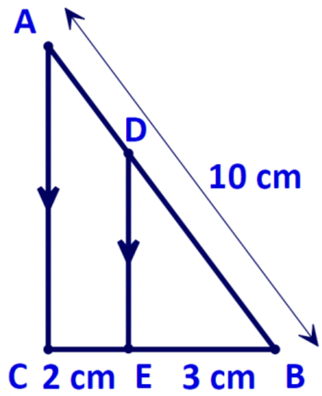
## (6) In the opposite figure :

If $\overline{DE} // \overline{AC}$ , $BE = 3$ cm. , $EC = 2$ cm.

, then $AD =$ .......... cm .

(a) 6 (b) 4

(c) 5 (d) 7

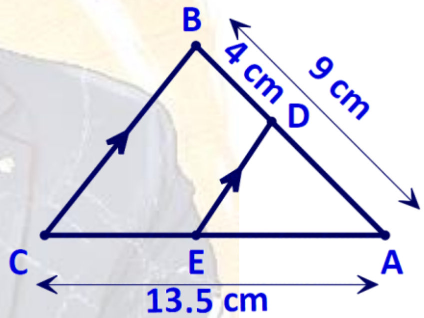



## (7) In the opposite figure :

$\overline{DE} // \overline{BC}$, then $AE =$ ........ cm.

(a) 4 cm. (b) 5 cm.

(c) 6 cm. (d) 7.5 cm.

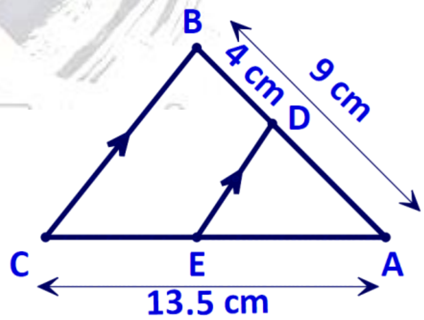



## (8) In the opposite figure :

If $\overline{DE} // \overline{BC}$ , then $\dfrac{a(\triangle ADE)}{a(\triangle ABC)} =$ .......

(a) $\dfrac{3}{2}$ (b) $\dfrac{9}{4}$

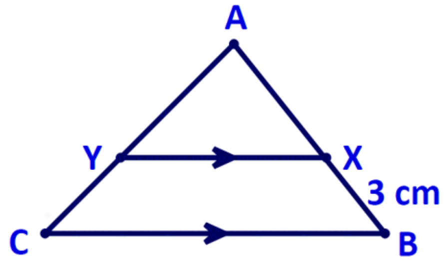
(c) $\dfrac{9}{25}$ (d) $\dfrac{3}{5}$



**(9) In the opposite figure :**

If $\overline{XY} // \overline{BC}$ , $\frac{AX+AY}{AB+AC} = \frac{3}{5}$

, then $AX =$............. $cm$ .

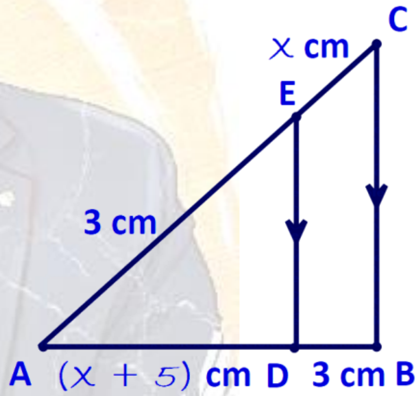



(a) 3 (b) 6

(c) 4.5 (d) 4

**(10) In the opposite figure :**

$\overline{DE} // \overline{BC}$ , then $x =$..........

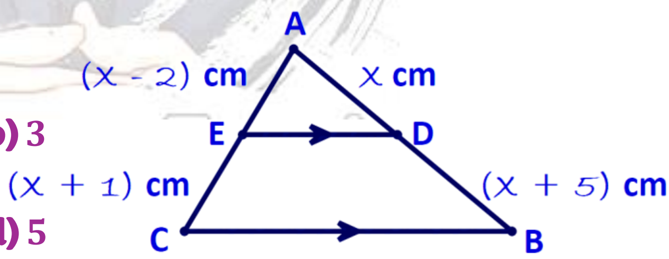



(a) 4 (b) 9

(c) 12 (d) 3

**(11) In the opposite figure :**

If $\overline{DE} // \overline{BC}$ , then $x =$............ $cm$ .




(a) 2 (b) 3

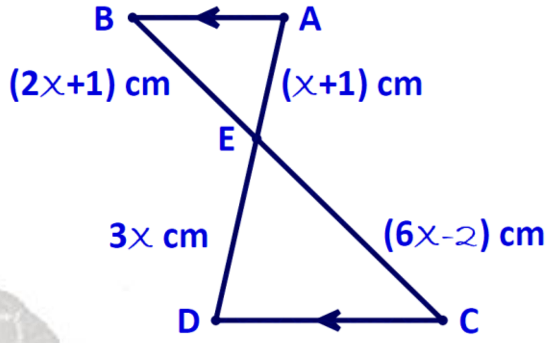
(c) 4 (d) 5

**(12) In the opposite figure :**

If $\overline{AB}//\overline{CD}$, then $x =$..........

(a) 2 (b) 3

(c) 4.5 (d) 6

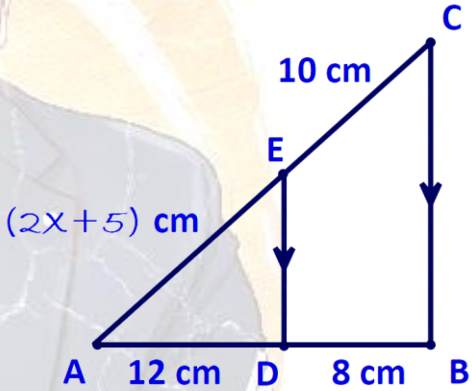



**(13) In the opposite figure :**

If $\overline{DE}//\overline{BC}$, then $x =$ ..........

(a) 12 (b) 7

(c) 5 (d) 4

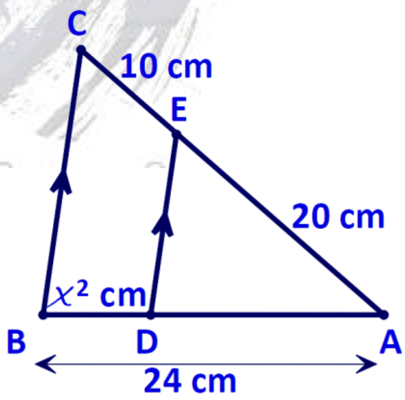



**(14) In the opposite figure :**

If $\triangle ABC$ in which $\overline{DE}//\overline{BC}$ , then $x =$.........

(a) $2\sqrt{2}$ (b) $\pm 3$

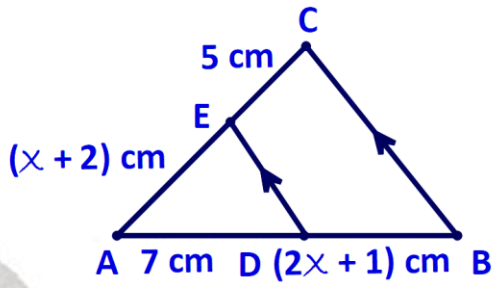
(c) 4 (d) $\pm 2\sqrt{2}$



**(15) In the opposite figure :**

If $\triangle ABC$ in which $\overline{DE} // \overline{BC}$

, then $x =$.........




(a) $-5.5$ or $3$ (b) $-5.5$

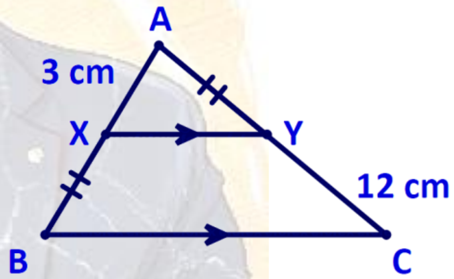
(c) $3$ (d) $2.5$

---

**(16) In the opposite figure :**

If $\overline{XY} // \overline{BC}$ , then

$AC =$ .......... $cm$ .




(a) $15$ (b) $16$

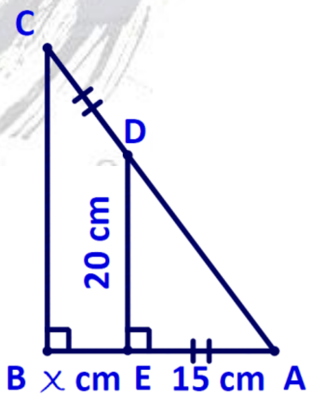
(c) $18$ (d) $20$

---

**(17) In the opposite figure :**

If $\overline{DE} // \overline{BC}$, then

$x =$.........

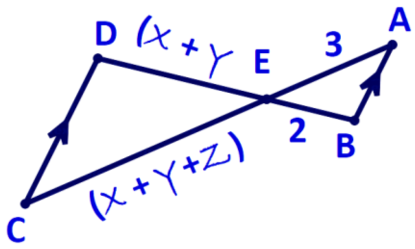



(a) $15$ (b) $25$

(c) $24$ (d) $9$

## (18) In the opposite figure :

If $\overline{AB} // \overline{CD}$ , then $z =$.............




(a) $\frac{x-y}{2}$

(b) $\frac{x+y}{2}$

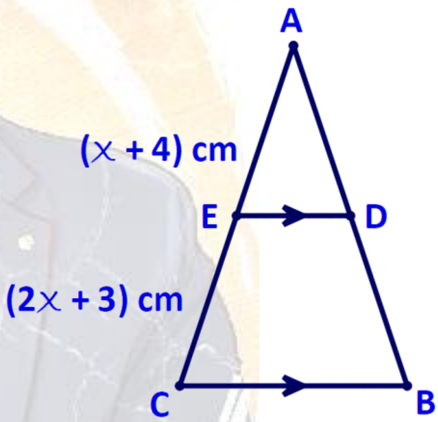
(c) $5x + 5y$

(d) $\frac{x+y}{5}$

## (19) In the opposite figure :

$\overline{ED} // \overline{BC}$ , $AD : AB = 2 : 5$

, then $x =$..........




(a) 8

(b) 6

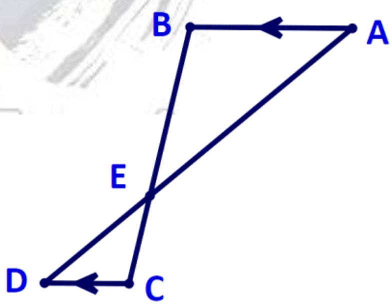
(c) 4

(d) 2

## (20) In the opposite figure :

If $\overline{AB} // \overline{CD}$ , $2AE = 3ED$ , $BE - CE = 4$ cm.

, then $BC =$ cm.




(a) 18

(b) 20

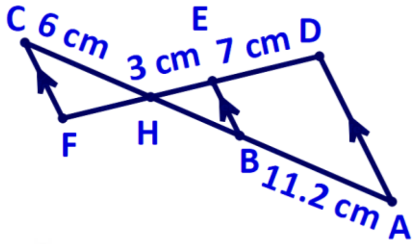
(c) 24

(d) 25

**(21) In the opposite figure :**

$\overline{AD} // \overline{BE} // \overline{FC}$

, then $HF = .......\ cm$ .



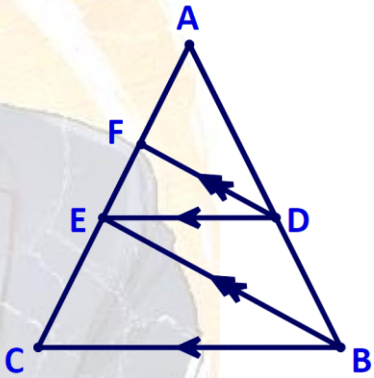

**(a)** $3.6$ **(b)** $4.8$

**(c)** $6.3$ **(d)** $3.75$

**(22) In the opposite figure :**

If $\overline{DE} // \overline{BC}$ , $\overline{DF} // \overline{BE}$

, then $AF \times AC = ..........$




**(a)** $AE$ **(b)** $(AE)^2$

**(c)** $(DE)^2$ **(d)** $FE \times EC$

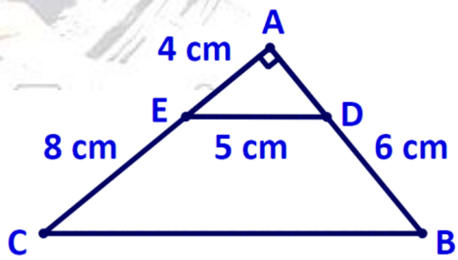
**essay**

**(1) the opposite figure :**

$ABC$ is a right-angled triangle at $A$

**(1) Prove that :** $\overline{DE} // \overline{BC}$

**(2) Find the length of:** $\overline{BC}$

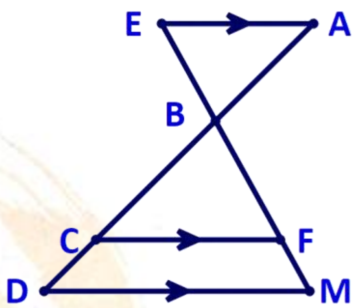


Unit 2
Lesson 2

# Exercises

## Choose the correct answer from those given :

### (1) In the opposite figure :

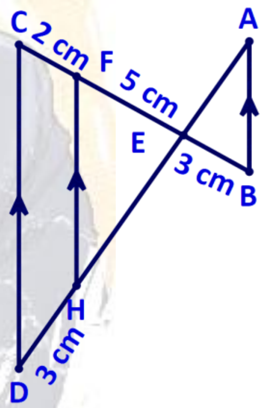



$AB : BC : CD =$.........

**(a)** $AE : FC : MD$ **(b)** $EB : BF : FM$

**(c)** $EB : BC : CD$ **(d)** $EB : EF : EM$

### (2) In the opposite figure :

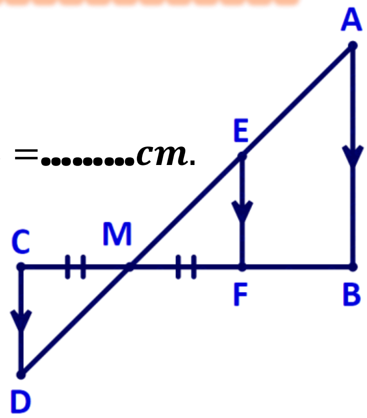



$AH =$..........$cm.$

**(a)** 6 **(b)** 7.5

**(c)** 10 **(d)** 12

### (3) In the opposite figure :




If $DA = 21$ $cm.$, $MC = 5$ $cm.$, $FB = 4$ $cm.$ , then AE =.........$cm.$

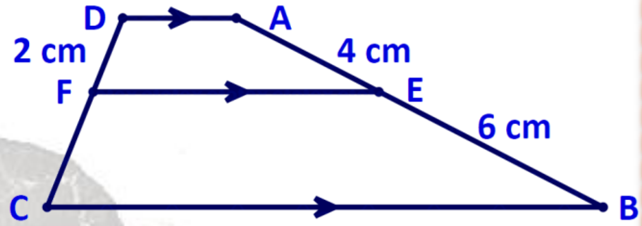
**(a)** 3 **(b)** 5

**(c)** 6 **(d)** 4

### (4) In the opposite figure :

If $\overline{AD}//\overline{EF}//\overline{BC}$ , $AE = 4$ cm. , $EB = 6$ cm. , $DF = 2$ cm.

, then the length of $\overline{CF} = $ ............cm.




(a) 2 (b) 3

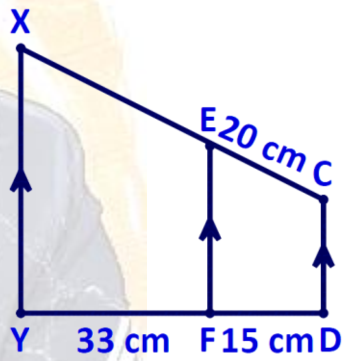
(c) 4 (d) 5

### (5) In the opposite figure :

$\overline{CD}//\overline{EF}//\overline{XY}$ , $CE = 20$ cm.

, $DF = 15$ cm. , $FY = 33$ cm.

, then the length of $\overline{CX} = $ cm.

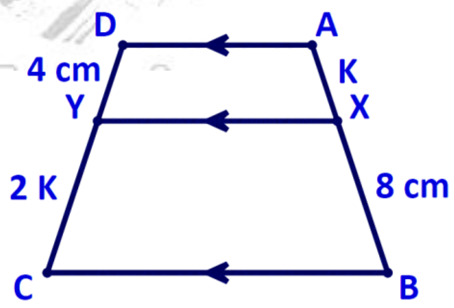



(a) 48 (b) 64

(c) 44 (d) 21

### (6) In the opposite figure :

If $\overline{AD}//\overline{XY}//\overline{BC}$ , then $AX = $ ............ cm.



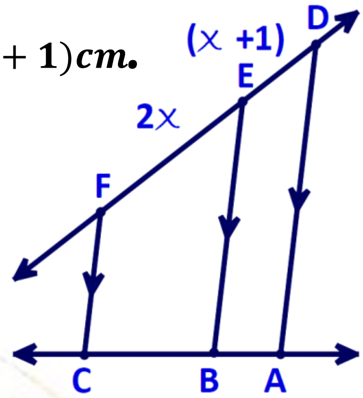

(a) $\frac{3}{8}$ (b) 4

(c) 16 (d) 32

## 7) In the opposite figure :

If $\overline{AD} // \overline{BE} // \overline{CF}$ , $AB = 3\ cm.$ , $BC = 5\ cm.$ , $DE = (x+1)cm.$

, $EF = 2x\ cm.$ , then $x = \cdots$.........$cm.$



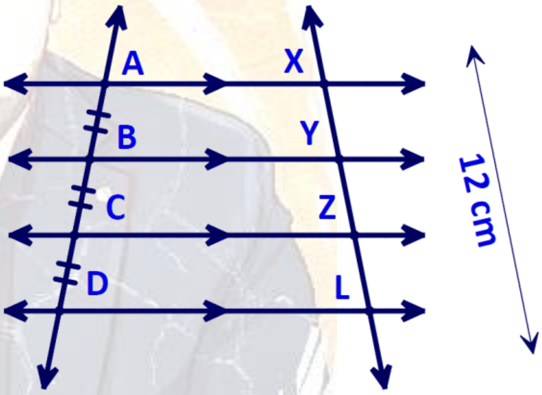

(a) 3 (b) 4

(c) 5 (d) 8

## (8) In the opposite figure :

If $AB = BC = CD$ , $XL = 12\ cm.$

, then $XZ =$...........



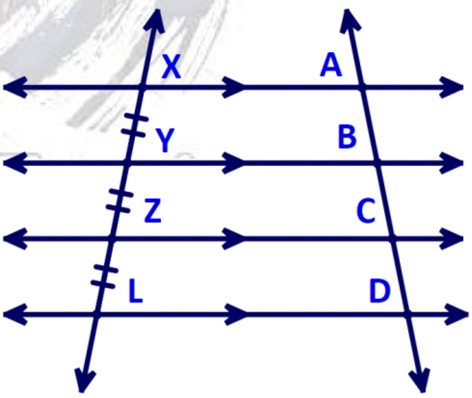

(a) $4\ cm$ . (b) $YL$

(c) $AC$ (d) $BC$

## (9) In the opposite figure :

If $BD = 14\ cm.$

, $AC =$........... $cm$ .

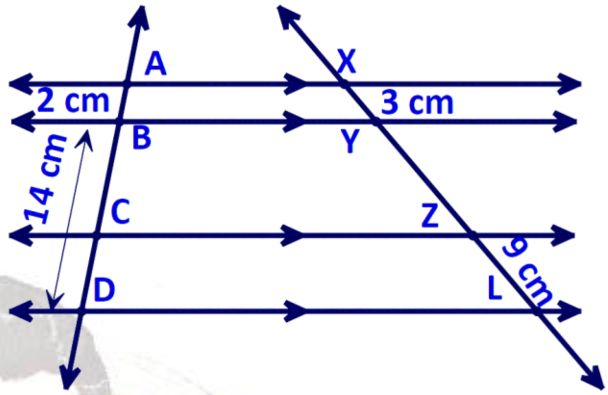



(a) 7 (b) 14

(c) 21 (d) 28

**(10) In the opposite figure :**

CD $=$.......... $cm$.



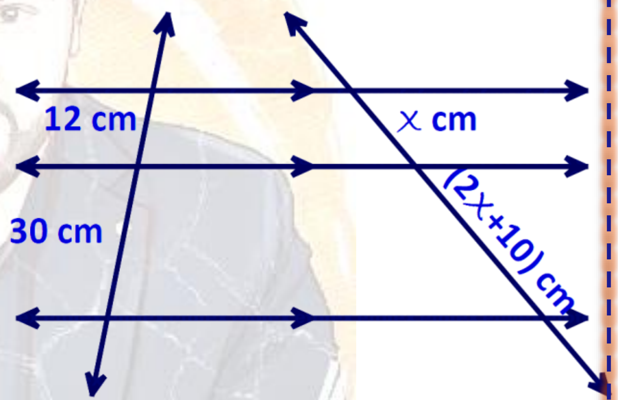

**(a)** 12 **(b)** 6

**(c)** 14 **(d)** 5

---

**(11) In the opposite figure :**

$x =$.......... $cm$.



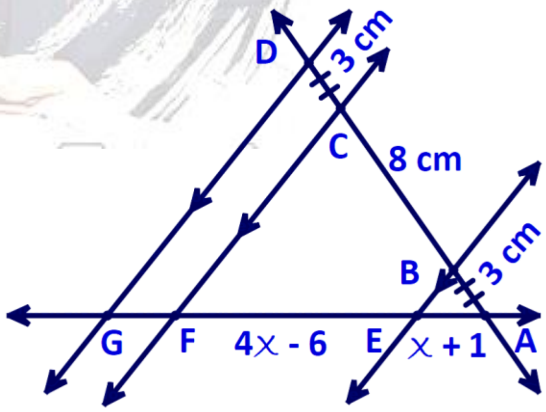

**(a)** 10 **(b)** 20

**(c)** 15 **(d)** 8

---

**(12) In the opposite figure :**

$x =$..............




**(a)** 2 **(b)** 3.5

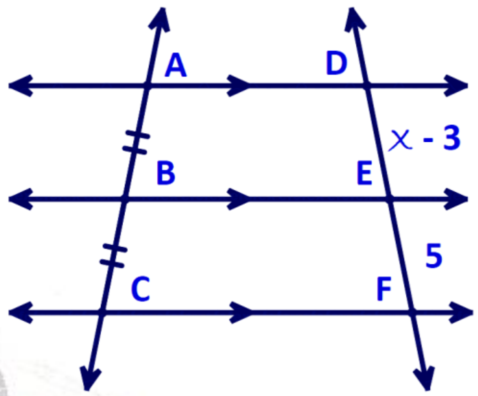
**(c)** 5 **(d)** 6.5

**(13) In the opposite figure :**

$x =$............

**(a)** 3 **(b)** 5

**(c)** 8 **(d)** 2

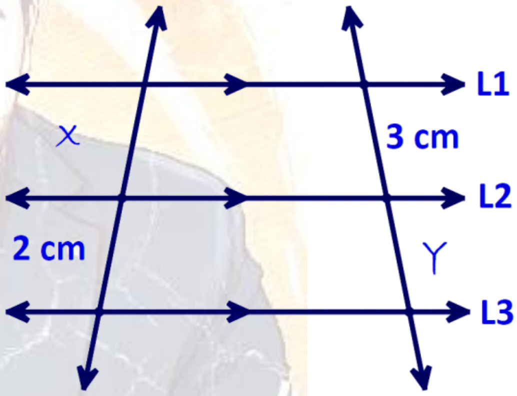



**(14) In the opposite figure :**

**If** $x > 2$**, then ............**

**(a)** $y = 3$ **(b)** $y > 3$

**(c)** $y < 3$ **(d)** $y \leq 3$



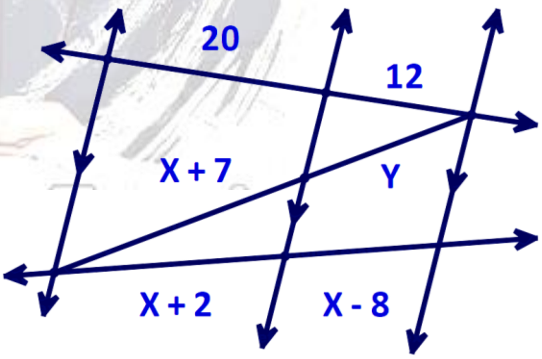

**(15) In the opposite figure :**

**If the given lengths in** $cm$.

**, then** $x + y =$............ $cm$.

**(a)** 23 **(b)** 18

**(c)** 41 **(d)** 51



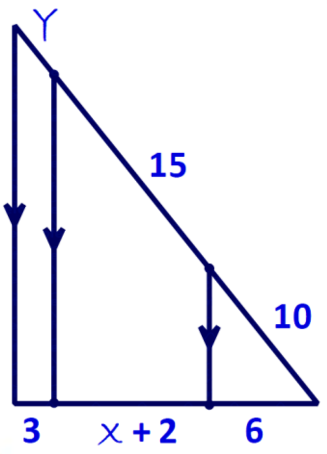
**(16) In the opposite figure :**

**If the given lengths in** $cm$.

**, then** $x + y =$ ............... $cm$.

**(a)** 5 **(b)** 7

**(c)** 11 **(d)** 12

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**Essay**

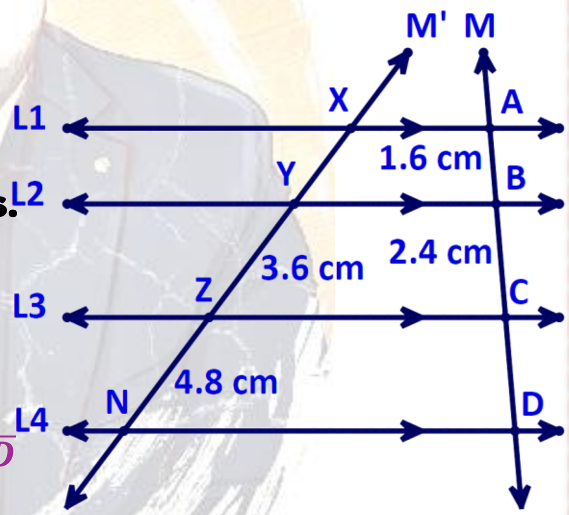
**(1) In the opposite figure :**

$L_1 // L_2 // L_3 // L_4$, $M, \grave{M}$ **are two transversals.**

**If** $AB = 1.6\ cm.$ , $BC = 2.4\ cm.$,

$YZ = 3.6\ cm.$ , $ZN = 4.8\ cm$

**Calculate the length of each of :** $\overline{XY}$ **and** $\overline{CD}$

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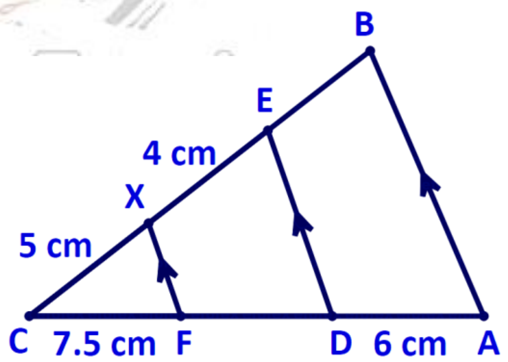
**(2) In the opposite figure :**

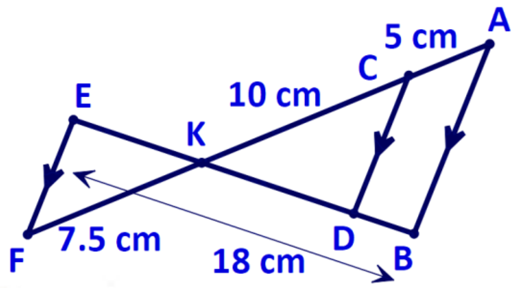
**If** $\overline{AB} // \overline{DE} // \overline{FX}$ , $AD = 6\ cm.$, $EX = 4\ cm$

$FC = 7.5\ cm.$ , $CX = 5\ cm$

**Find the length of each of :** $\overline{DF}, \overline{BE}$



**(3) In the opposite figure :**




**If** $\overline{AB}//\overline{CD}//\overline{EF}$,

$AC = 5\ cm.,\ CK = 10\ cm.$

$KF = 7.5\ cm.,\ BE = 18\ cm$

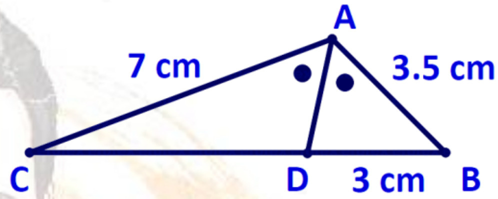
**Find the length of each of :** $\overline{BD}, \overline{DK}$ **and** $\overline{KE}$

Unit 2
Lesson 3

# Exercises

## Choose the correct answer from those given :

### (1) In the opposite figure :

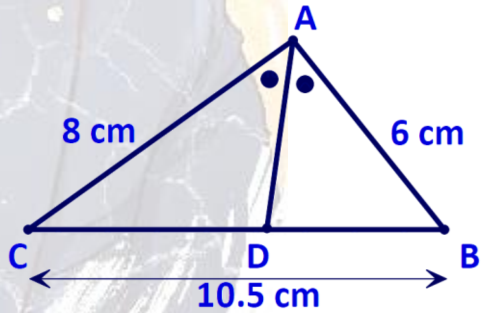



$CD =$ ........... $cm.$

**(a)** $4.5$ **(b)** $5$

**(c)** $4.9$ **(d)** $6$

### (2) In the opposite figure :

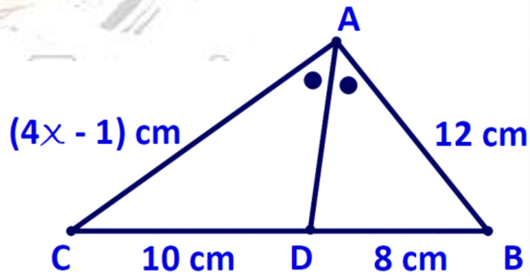



$BD =$.......... $cm.$

**(a)** $4$ **(b)** $\frac{2}{3}$

**(c)** $4.5$ **(d)** $45$

### (3) In the opposite figure :




$x =$.........

**(a)** $4$ **(b)** $3$

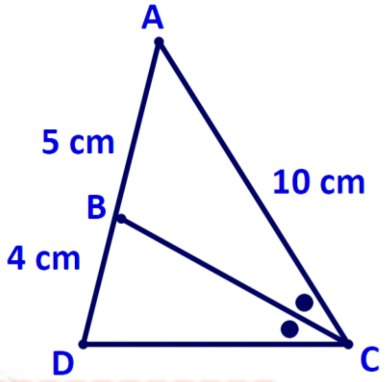
**(c)** $4.5$ **(d)** $6$

**(4) In the opposite figure :**

$CB = \cdots\cdots\cdots cm.$

**(a)** 8 **(b)** $4\sqrt{2}$

**(c)** $2\sqrt{15}$ **(d)** 6




**( 5 ) In the opposite figure :**

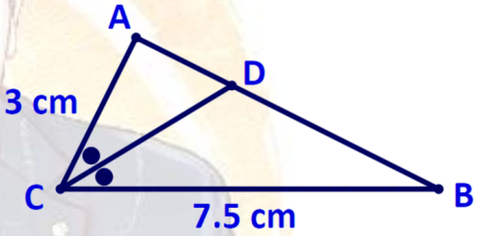
$\overrightarrow{CD}$ **bisects** $\angle C$,

$AC = 3\ cm.$, $BC = 7.5\ cm.$

**, then** $AD : BD = \cdots\cdots\cdots$

**(a)** $\frac{3}{5}$ **(b)** $\frac{2}{3}$

**(c)** $\frac{2}{5}$ **(d)** $\frac{5}{2}$

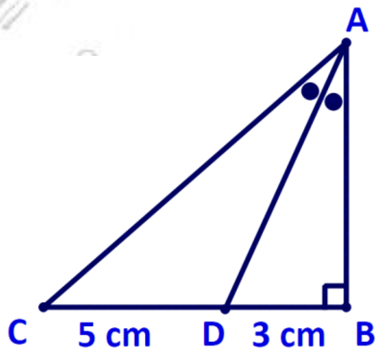



**(6) In the opposite figure :**

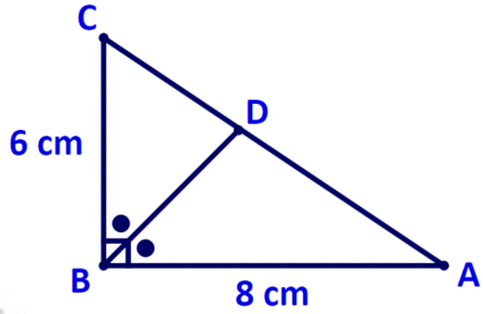
AB $= \cdots\cdots\cdots$cm.

**(a)** 4 **(b)** 5

**(c)** 6 **(d)** 7



**(7) In the opposite figure :**

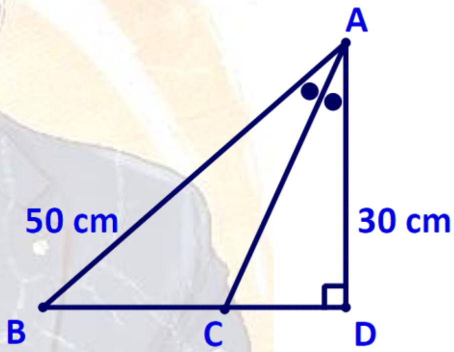



$AD =$.........$cm.$

(a) $5\frac{5}{7}$ (b) $6\frac{3}{4}$

(c) $5$ (d) $\frac{4}{3}$

**(8) In the opposite figure :**

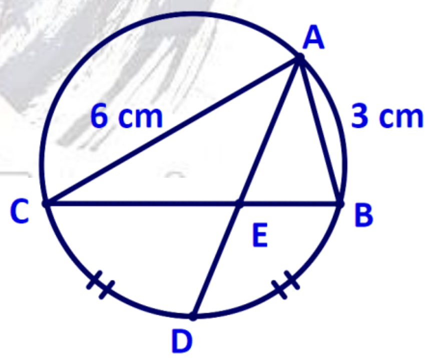



The perimeter of $\triangle ABC \approx$ ......... $cm.$

(a) $123.5$ (b) $375$

(c) $98.5$ (d) $108.5$

**(9) In the opposite figure :**




$\frac{BE}{BC}$= ..............

(a) $\frac{1}{2}$ (b) $2$

(c) $\frac{1}{3}$ (d) $3$

**(10) The exterior bisector of the vertex angle of an isosceles triangle ......... the base.**

(a) bisects
(b) perpendicular to
(c) intersect
(d) parallel

**(11) The bisector of the exterior angle of an equilateral triangle ......... the side opposite to the vertex of this angle.**

(a) bisects
(b) congruent to
(c) parallel
(d) perpendicular to

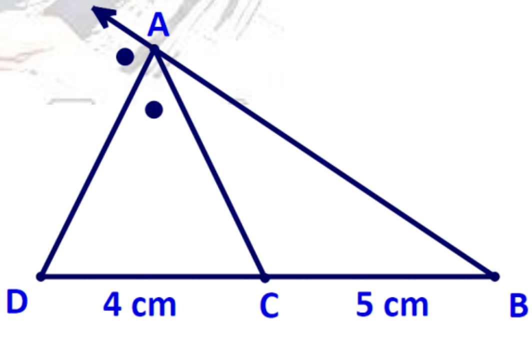
**(12) The measure of the angle included between the interior and the exterior bisector at any vertex of angles of the triangle equal ..........**

(a) $45^\circ$
(b) $90^\circ$
(c) $135^\circ$
(d) $180^\circ$

**(13) In the opposite figure :**

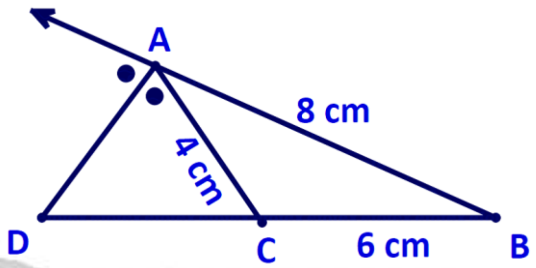
$AB : AC =$ ..........

(a) $5 : 4$
(b) $5 : 9$
(c) $9 : 5$
(d) $9 : 4$



**(14) In the opposite figure :**

CD = .......... $cm$.

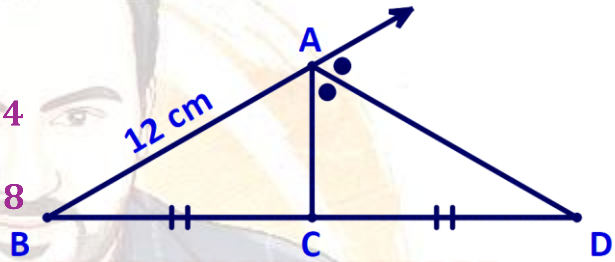



**(a)** 2 **(b)** 6

**(c)** 4 **(d)** 8

**(15) In the opposite figure :**

$AC$ = .......... $cm$.

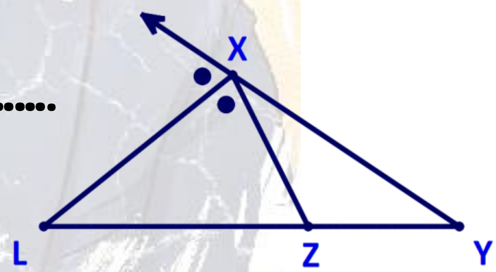



**(a)** 3 **(b)** 4

**(c)** 6 **(d)** 8

**(16) In the opposite figure :**

$\overrightarrow{XL}$ **bisects the exterior angle** $X$ **, then** $\frac{YL}{YX}$ = ..........

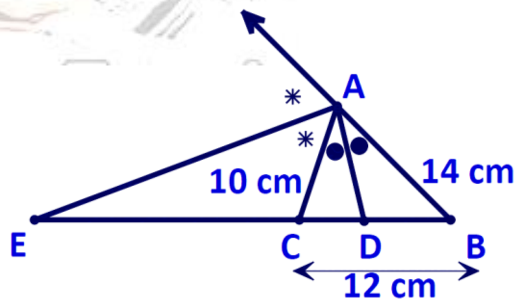



**(a)** $\frac{YZ}{ZL}$ **(b)** $\frac{YL}{LZ}$

**(c)** $\frac{LZ}{ZX}$ **(d)** $\frac{XZ}{XY}$

**(17) In the opposite figure :**

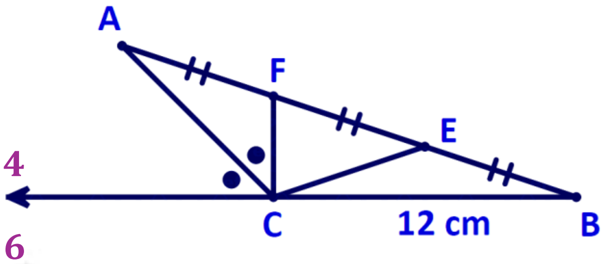
$DE$ = .......... $cm$.




**(a)** 12 **(b)** 24

**(c)** 30 **(d)** 35

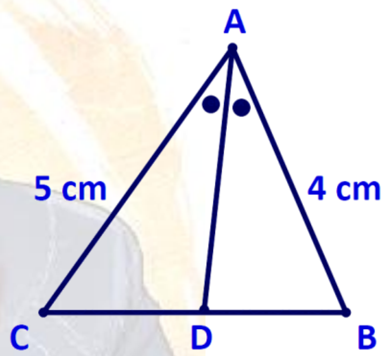
**(18) In the opposite figure :**




$CF =$.............. $cm.$

(a) 3
(b) 4
(c) 5
(d) 6

**(19) In the opposite figure :**

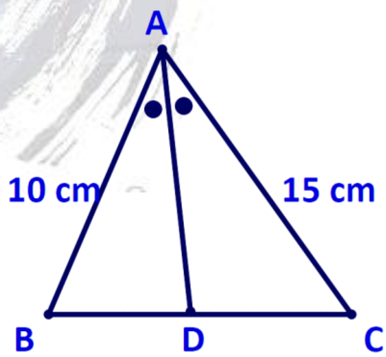



$AB = 4\ cm.$ , $AC = 5\ cm.$ , $\overrightarrow{AD}$ **bisects** $\angle A$

**, then a** $(\triangle ABD) : a(\triangle ACD) =$........

(a) $16 : 25$
(b) $25 : 16$
(c) $4 : 5$
(d) $5 : 2$

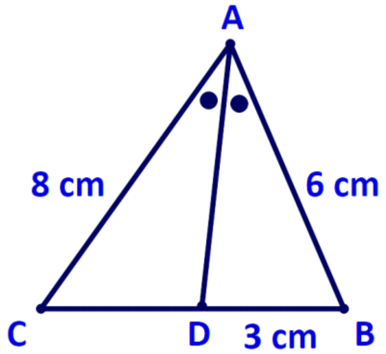
**(20) In the opposite figure :**




**If a** $(\Delta ABC) = 75\ cm.^2$
**, then a** $(\Delta ADB) =$..........$cm.^2$

(a) 30
(b) $3\frac{1}{13}$
(c) $51\frac{12}{13}$
(d) 45

**(21) In the opposite figure :**




If $\overrightarrow{AD}$ bisects $\angle A$ , then $AD =$....... $cm$.

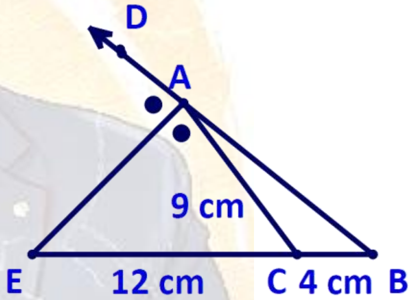
(a) 12

(b) 6

(c) 21

(d) $\frac{6\times8}{7}$

**(22) In the opposite figure :**




The length of $\overline{AE} =$..........$cm$.

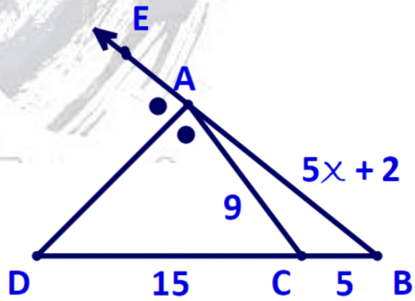
(a) $2\sqrt{15}$

(b) 6

(c) 15

(d) $2\sqrt{21}$

**(23) In the opposite figure :**




$AD =$..............

(a) 2

(b) 4

(c) $5\sqrt{3}$

(d) $8\sqrt{3}$

**(24) In the opposite figure :**

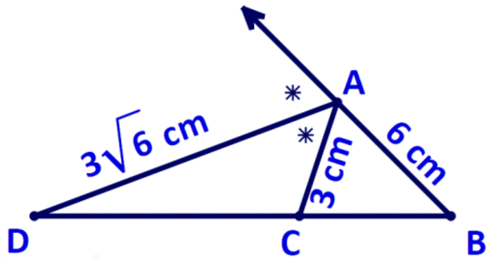
$DC=$ ........ $cm$

(a) $6$

(b) $6\sqrt{3}$

(c) $3\sqrt{6}$

(d) $3$




**(25) In the opposite figure :**

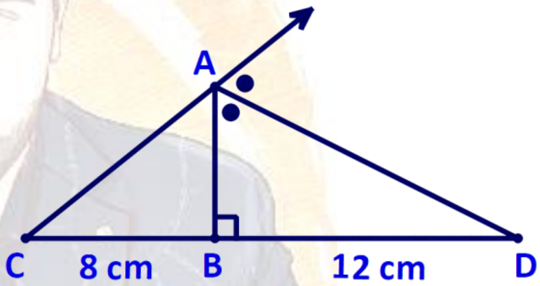
$AD=$........ $cm.$

(a) $10$

(b) $4\sqrt{5}$

(c) $6\sqrt{5}$

(d) $9\sqrt{2}$




**(26) In the opposite figure :**

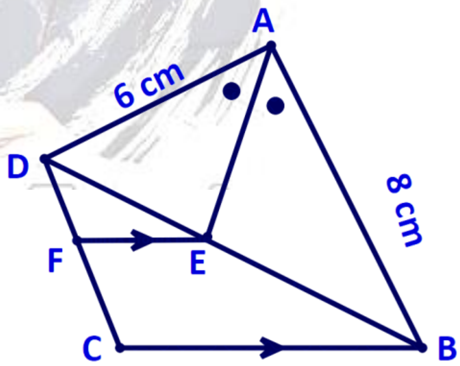
$\frac{DF}{FC}=$.........

(a) $\frac{4}{3}$

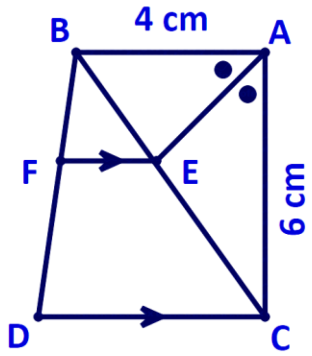
(b) $\frac{8}{7}$

(c) $\frac{2}{3}$

(d) $\frac{3}{4}$



**(27) In the opposite figure :**




$\frac{EF}{CD} = \text{.........}$

(a) $\frac{2}{3}$

(b) $\frac{2}{5}$

(c) $\frac{3}{5}$

(d) $\frac{3}{2}$