Questions

(1) Complete:

1) tan 45 sin 30 = ……………..

2) If $\overleftrightarrow{AB} \perp \overleftrightarrow{CD}$ and the slope of $\overleftrightarrow{AB} = \frac{1}{2}$ then the slope of $\overleftrightarrow{CD}$ = ……….

3) The line segment which is drawn between the two points (0 , 0) and (6 , 8) = …………….. length unit.

4) If sin 30 = cos B then m (∠ B) = ……………..

5) If sin A = cos A then m (∠ A) = ……………..

6) The straight line whose equation y = 2x – 6 its slope = …………….. and its intercepts from the y-axis a part of length …………….. unit.

7) If $\overleftrightarrow{AB}$ // $\overleftrightarrow{CD}$ and the slope of $\overleftrightarrow{AB} = \frac{2}{3}$ then the slope of $\overleftrightarrow{CD}$ = …………

8) If the straight line $\overleftrightarrow{AB}$ // to x-axis, where A (8 , 3) , B (2 , k) then k = ……………..

9) Tan A = $\frac{\sin A}{\dots\dots\dots}$

10) The straight line which passes through the two points (1 , y) , (3 , 4) its slope is tan 45 they y = ……………..

11) cos 3x = $\frac{1}{2}$ where x is an acute angle then x = ……………..

12) The distance between the point (2 , - 5) and the x-axis = …………

13) The equation of the straight line which passes through the point (3 , -4) and parallel to the x-axis is ……………..

14) If $(\sqrt{2}\cos 3x = 1)$ then x = ……………..

15) If the point (0 , 4) is the midpoint of the distance between the two points (-1 , -1) , (x , y) then the point (x , y) is ……………..

16) The slope of the straight line whose equation 2x – 3y + 5 = 0 equals ……………..

17) The equation of the straight line whose slope is 1 passes through the origin point is ……………..

18) DHO is isosceles triangle, DH = DO , sin D = 1 then m (∠ O) = ……

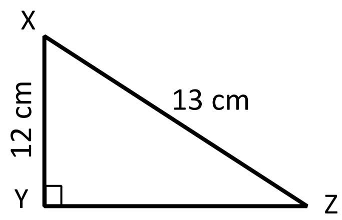
19) If the two straight lines x + y = 5 and kx + 2y = 0 are parallel, then k =……………..

20) If X : Y are two complementary angles, where X : Y = 1 : 2 then sin X + cos Y = ………….

(2) Find the equation of straight line passing through $(\sqrt{3}, -2)$ and makes with the positive –x direction on angle of measure 60°, then calculate the length of the y- intercepted.

(3) Find the equation of the straight line which passes through the point (1 , 6) and the midpoint of $\overline{AB}$ where A (1 , - 2) , B (3 , - 4)

(4)

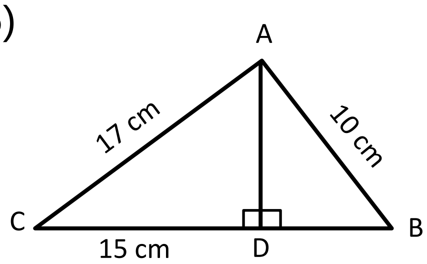


1) Find sin X cos Z + cos sin Z

2) Find m (∠ YXZ)

(5) ABCD is a parallelogram where A (3, 4) , B (2 , - 1) , C (-4 , - 3) Find the coordinates of D.

(6)

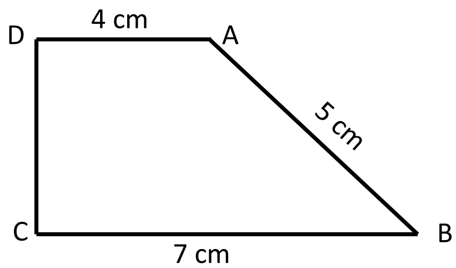


Find the value of 3 tan (∠ C) + sin (∠ B)

(7) If the distance between the two points (a , 2) , (2a + 1 , -1) equal 5 length unit find the value of a.

(8) Find the equation of the straight line passing through the point (2, -3) and perpendicular to the straight line y = 3x + 2

(9)

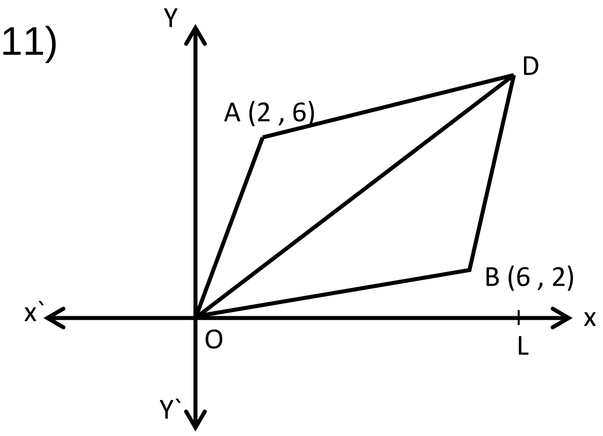


Find: 1) sin B , m (∠ B)

2) The surface area of trapezium ABCD

(10) ABC is a right-angled triangle at A, where AB = 8 cm and m (∠ B) = 50° find the length of $\overline{AC}$ to the nearest one decimal no.

(11)



1) The coordinates of the point D

2) The equation of straight line OD

3) m (∠ DOL)

(12) Prove that: the triangle whose vertices A (5 , -5) , B (-1 , 7) , C (15 , 15) is right angled at B then find its area.

(13) If the points A (-1 , -1) , B (2 , 3) and C)k , 0) are vertices of the right angled triangle at B

Find: 1) The value of k

2) The area of Δ ABC

(14) Find the slope and intercepted part of y-axis of the straight line whose equation $\frac{x}{2} + \frac{y}{3} = 1$

(15) ABC is a right angled Δ at B, 2 AB = $\sqrt{3}$ AB find the trignometrical ratio of ∠ C

(16) Find the equation of the straight line passes through (2 , -1) and parallel to the straight line 2x – y + 5 = 0

(17) $\overline{AB}$ is a diameter of circle M if B (8 , 11) , M (5 , 7) then find:

1) The coordinates of A
2) The length of the radius of the circle.
3) The equation of the perpendicular straight line to $\overline{AB}$ from the point B.

(18) If the two equations of two straight lines L_1 and L_2 are $2x - 3y + a = 0$, $3x + by - 6 = 0$

1) Find the value of b which makes $L_1 // L_2$
2) Find the value of b which makes $L_1 \perp L_2$

(19) Because of wind, the upper part of a tree was broken made an angle of measure 60 with the ground if the point of contact of the top of the tree with the ground was at distance 4 m from its bottom. Find the length of the tree to the nearest metre.

Model Answers

(1) Complete:

1) $1 \times \frac{1}{2} = \frac{1}{2}$ 2) $-\frac{2}{1}$ = - 2

3) $\sqrt{(x_2-x_1)^2 + (y_2-y_1)^2} = \sqrt{(6-0)^2+(8-0)^2}$ = 10 unit

4) m (∠ B) = 60°

5) m (∠ A) = 45°

6) The slope = 2 because the form y = mx + c and part length of y-axis = 6 unit

7) slope of $\overleftrightarrow{CD} = \frac{2}{3}$

8) $\overleftrightarrow{AB}$ // to x-axis it means the slope is zero

so $\frac{y_2-y_1}{x_2-x_1} = \frac{3-k}{8-2} = \frac{3-k}{6} = 0$

$\frac{3-k}{6} = \frac{0}{1}$ → 3 – k = 0 → - k = - 3 → **k = 3**

9) tan A = $\frac{\sin A}{\cos A}$

10) The slope = tan 0 = tan 45 = 1

$\therefore \frac{y_2-y_1}{x_2-x_1}$ = 1 → $\frac{4-y}{3-1}$ = 1

$\frac{4-y}{2} = \frac{1}{1}$

4 – y = 2

– y = 2 – 4

– y = – 2

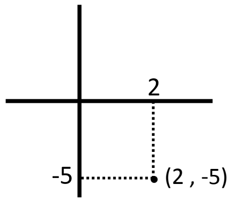
y = 2

11) Shift cos $\left(\frac{1}{2}\right)$

$\therefore$ 3x = 60

x = $\frac{60}{3} = 20$

12)



= 5 unit

13) y = - 4

14) cos 3x = $\frac{1}{\sqrt{2}}$

3x = 45

x = $\frac{45}{3} = 15$

15) midpoint = $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

(0 , 4) = $\left(\frac{-1+x}{2}, \frac{-1+y}{2}\right)$

$\frac{-1+x}{2} = \frac{0}{1}$	$\frac{-1+y}{2} = \frac{4}{1}$
- 1 + x = 0	- 1 + y = 8
x = 1	y = 8 + 1 = 9

The point (x, y) = (1 , 9)

16) The slope = $\frac{-a}{b} = \frac{-2}{3} = \frac{2}{3}$

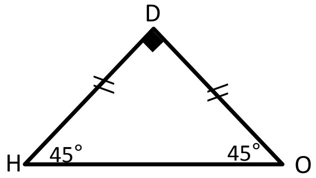
17) y = mx + c

y = x + c

0 = 0 + c

c = 0 The final form is y = x

18)



m (∠ O) = 45

because sin D = 1   so shift sin (1) = 90°

19) Slope 1 = $\frac{-a}{b} = \frac{-1}{1} = -1$ ∵ L_1 // L_2

Slope 2 = $\frac{-k}{2}$ so $\frac{-k}{2} = -1$

- k = - 2

k = 2

(20) m (∠ X) : m (∠ Y) : sum

1 : 2 : 3

x : y : 90

m (∠ X) = $\frac{1\times980}{3} = 30°$

m (∠ Y) = $\frac{2\times90}{3} = 60°$

sin 30 + cos 60 = $\frac{1}{2} + \frac{1}{2} = 1$

(2) The slope = tan 60 = $\sqrt{3}$

so y = $\sqrt{3}$ x + c

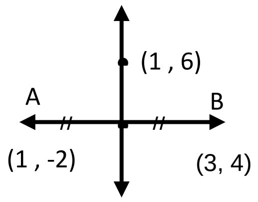
- 2 = $\sqrt{3}$ × $\sqrt{3}$ + c

- 2 = 3 + c

c = –5

so y = $\sqrt{3}$ x – 5

(3)



The midpoint between A, B = $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right) = \left(\frac{1+3}{2}, \frac{-2+(-4)}{2}\right)$

= (2 , - 3)

So the straight line passing through (1, 6) , (2 , -3)

slope = $\frac{y_2-y_1}{x_2-x_1} = \frac{-3-6}{2-1} = \frac{-9}{1} = -9$

y = - 9 + c

6 = - 9 × 1 + c

6 = - 9 + c

6 + 9 = c

c = 15

y = -9x + 15

(4)

$(yz)^2 = (xz)^2 - (xy)^2 = 169 - 144 = 25$

yz = $\sqrt{25}$ = 5 cm

Find: sin x = $\frac{opp.}{hyp.} = \frac{5}{13}$, cos z = $\frac{adj.}{hyp.} = \frac{5}{13}$

cos x = $\frac{12}{13}$, sin z = $\frac{12}{13}$

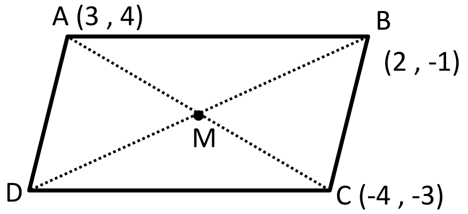
sin x cos z + cos x sin z = $\frac{5}{13} \times \frac{5}{13} + \frac{12}{13} \times \frac{12}{13} = 1$

2) m (∠ YXZ)

∵ sin (∠ YXZ) = $\frac{5}{13}$

∴ m (∠ YXZ) = shift sin $\left(\frac{5}{13}\right)$ = 22° 37` 51``

(5)



M = $\left(\frac{3-4}{2}\ ,\ \frac{4-3}{2}\right)$

M = $\left(\frac{-1}{2}\ ,\ \frac{1}{2}\right)$

$\left(\frac{-1}{2}\ ,\ \frac{1}{2}\right) = \left(\frac{x_2+2}{2}\ ,\ \frac{y_2-2}{2}\right) \rightarrow \frac{x_2+2}{2} = \frac{-1}{2}$ $\quad \frac{y_2-1}{2} = \frac{1}{2}$

$x_2 = -3$ $\quad y_2 = 2$ $\quad$ D = (-3, 2)

(6)

$(AD)^2 = (17)^2 - (15)^2 = 64$

AD = $\sqrt{64} = 8$

in Δ ADB

$(DB)^2 = (AB)^2 - (AD)^2$

$= 100 - 64 = 36$

DB = 6 cm

3 tan ($\angle$ C) + sin ($\angle$ B) = $3 \times \frac{8}{15} + \frac{8}{10} = \frac{12}{5}$

(7)

$\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$ = 5 length unit

$\sqrt{(2a+1-a)^2+(-1-2)^2} = 5$

$\left(\sqrt{(a+1)^2+9}\ \right)^2 = (5)^2$

$(a+1)^2 + 9 = 25$

$(a+1)^2 = 25 - 9$

$(a+1)^2 = 16$

$a + 1 = \sqrt{16}$

$a + 1 = \pm 4$

$a+1=4$	$a+1=-4$
$a=4-1$	$a=-4-1$
$a=3$	$a=-5$

(8) The line passing through (2 , -3) and its slope $-\frac{1}{3}$

y = mx + c

$y = -\frac{1}{3}x + c$

$-3 = -\frac{1}{3} \times 2 + c$

$c = -2 + \frac{2}{3} = \frac{-7}{3}$

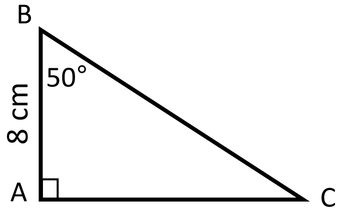
$y = -\frac{1}{3} \times \frac{-7}{3}$

(9)

1) $\sin B = \frac{4}{5}$ m (∠ B) = 53.1°

2) the surface area = $\frac{1}{2}[b_1 + b_2] \times H = \frac{1}{2}[7 + 4] \times 4 = 22\ cm^2$

(10)



$\tan 50 = \frac{AC}{AB}$

$\frac{\tan 50}{1} = \frac{AC}{8}$

AC = 8 × tan 50 = 9.5 cm

(11) D = A + B – O

1) = (2 , 6) + (6 , 2) – (0 , 0) = (8 , 8)

2) y = mx + c

slope = $\frac{8-0}{8-0} = 1$

y = x + c

0 = 0 + c

c = 0

y = x

3) Slope $\overleftrightarrow{OD}$ = 1 tan θ

∴ tan θ = 1

∴ θ = 45°

(12)

AB = $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} = \sqrt{(-1-5)^2 + (7+5)^2}$

$= \sqrt{36 + 144} = 6\sqrt{5}$

A = (5 , -5) , B (- 1 , 7)

BC = $\sqrt{(15+1)^2 + (15-7)^2} = \sqrt{256 + 64} = 8\sqrt{5}$

B (-1 , 7) , C (15 , 15)

CA $\sqrt{(5-15)^2 + (5-15)^2} = \sqrt{100 + 400} = 10\sqrt{5}$

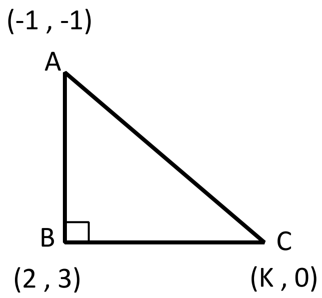
$(CA)^2 = (10\sqrt{5})^2 = 500$

$(BC)^2 + (AB)^2 = (8\sqrt{5})^2 + (6\sqrt{5})^2 = 500$

∴ABC is right angled ∆ at B

Area of ∆ ABC = $\frac{1}{2}(6\sqrt{5} \times 8\sqrt{5}) = 120 \text{ cm}^2$

(13)



Slope AB = $\frac{3-(-1)}{2-(-1)} = \frac{4}{3}$

Slope of BC = $\frac{0-3}{k-2} = -\frac{3}{k-2}$

$\frac{k-2}{-3} = \frac{-4}{3}$

3 (k – 2) = 12

3k – 6 = 12

3k = 12 + 6

3k = 18

k = 6

area of Δ $\frac{1}{2}$ × base × height

AB = $\sqrt{(2+1)^2+(3+1)^2}$= 5

BC = $\sqrt{(6-2)^2+(0-3)^2}$ = 5

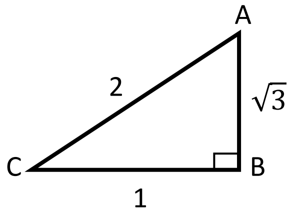
area = $\frac{1}{2}$ × 5 × 5 = 12.5 cm^2

(14) $\frac{1}{2}$ x + $\frac{1}{3}$ y – 1 = 0

Slope = $\frac{-a}{b} = \frac{-\frac{1}{2}}{\frac{1}{3}} = -\frac{1}{2} \div \frac{1}{3} = -\frac{3}{2}$

intercept part of y-axis = $\frac{-c}{b} = \frac{1}{\frac{1}{3}} = 3$

(15) 2 AB = $\sqrt{3}$ AC



$\frac{AB}{AC} = \frac{\sqrt{3}}{2}$

sin C = $\frac{\sqrt{3}}{2}$ cos C = $\frac{1}{2}$ tan C = $\frac{\sqrt{3}}{1}$

(16) The slope of L_1 = the slope of L_2 because L_1 // L_2

slope $L_2 = \frac{-a}{b} = \frac{-2}{-1} = 2$

So Slope $L_1 = 2$

$y = 2x + c$

$2 = 2(-1) + c$

$2 = -2 + c$

$2 + 2 = c$

$c = 4$

$y = 2x + 4$

(17) Midpoint = $\left(\frac{x_1+8}{2}, \frac{y_1+11}{2}\right)$

$(5, 7) = \left(\frac{x_1+8}{2}, \frac{y_1+11}{2}\right)$

1) $\frac{x_1+8}{2} = 5$ | $\frac{y_1+11}{2} = 7$ | A = (2 , 3)

$x_1 + 8 = 10$ | $y_1 + 11 = 14$

$x_1 = 2$ | $y_1 = 3$

2) The length of radius = $\sqrt{(8-5)^2 + (11-7)^2}$ = 5 unit

3) $\overleftrightarrow{AB} \perp L_1$

Slope $\overleftrightarrow{AB} = \left(\frac{y_2-y_1}{x_2-x_1}\right) = \frac{11-3}{8-2} = \frac{8}{6} = \frac{4}{3}$

Slope $L_1 = -\frac{3}{4}$

The equation $y = mx + c$

$y = -\frac{3}{4}x + c$

$11 = -\frac{3}{4} \times 8 + c$

$11 = -6 + c$

$c = 11 + 6 = 17$

$y = -\frac{3}{4}x + 17$

(18)

1) If $L_1 // L_2$ $\therefore$ slope 1 = slope 2 = $\frac{-a}{b}$

$\frac{-2}{-3} = \frac{-3}{b}$

$\frac{2}{3} = \frac{-3}{b}$

$b = \frac{3(-3)}{2} = \frac{-9}{2}$

2) If $L_1 \perp L_2$ slope 1 × slope 2 = - 1

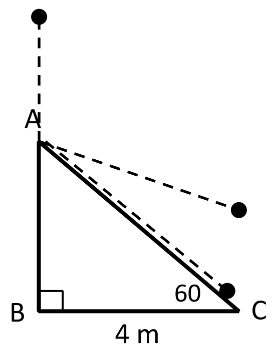
slope 1 = $\frac{2}{3}$

slope 2 = $\frac{-3}{b}$

$\therefore \frac{-3}{b} = \frac{-3}{2}$

$b = \frac{-6}{-3} = 2$

(19)



$(AC)^2 = (4)^2 + (4\sqrt{3})^2 = 64$

AC = 8m

the height of tree

$= 4\sqrt{3} + 8 = 14.928 \simeq 15$ m

$\frac{\tan 60}{1} = \frac{AB}{Bc}$

AB = 4 tan 60

$= 4\sqrt{3}$