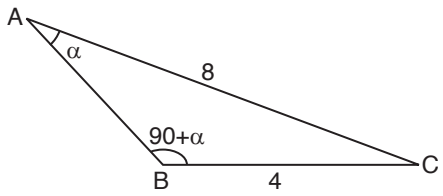
1.



$\cot\alpha = ?$

$$\frac{4}{\sin\alpha} = \frac{8}{\sin(90+\alpha)}$$

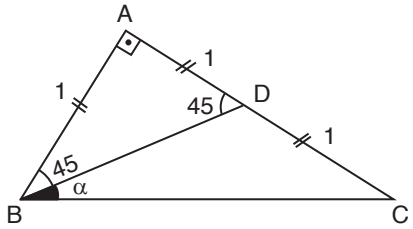
$$\frac{4}{\sin\alpha} = \frac{8}{\cos\alpha}$$

$4\cos\alpha = 8.\sin\alpha$

$$\frac{\cos\alpha}{\sin\alpha} = \frac{8}{4} = 2$$

Cevap: D

2.



$$\tan(45 + a) = \frac{\tan 45 + \tan\alpha}{1 - \tan 45.\tan\alpha}$$

$$\frac{2}{1} = \frac{1+\tan\alpha}{1-\tan\alpha}$$

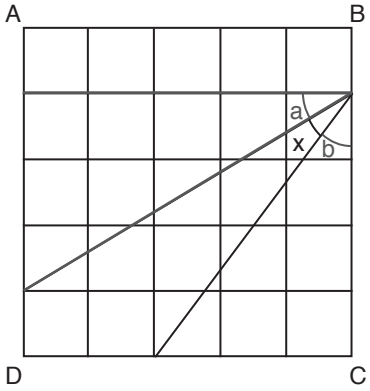
$2 - 2\tan a = 1 + \tan a$

$1 = 3\tan a$

$$\boxed{\frac{1}{3} = \tan\alpha}$$

Cevap: A

3.



$x + a + b = 90$

$x = 90 - (a + b)$

$\tan x = \tan(90 - (a + b))$

$= \cot(a + b)$

$$= \frac{1}{\tan(a+b)}$$

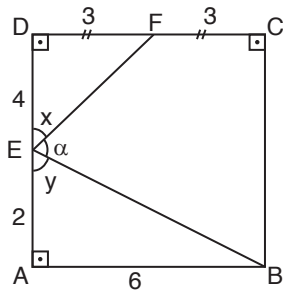
$$= \frac{1}{\frac{\tan a + \tan b}{1 - \tan a.\tan b}}$$

$$= \frac{1}{\frac{\frac{3}{5}+\frac{3}{4}}{1-\frac{3}{5}\cdot\frac{3}{4}}} = \frac{1}{\frac{12+15}{\frac{20}{11}}}$$

$$= \frac{1}{\frac{\frac{27}{20}}{\frac{11}{20}}} = \frac{1}{\frac{27}{20}\cdot\frac{20}{11}} = \frac{11}{27}$$

Cevap: A

4.



$x + y + \alpha = 180$

$\alpha = 180 - (x + y)$

$\tan\alpha = \tan(180 - (x + y))$

$= -\tan(x + y)$

$$= -\frac{\tan x + \tan y}{1 - \tan x.\tan y}$$

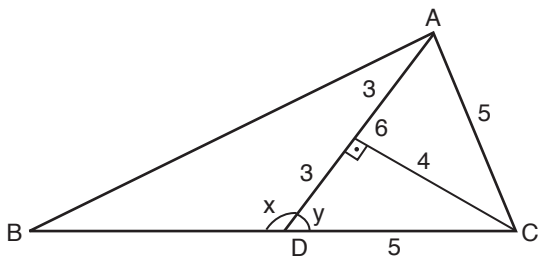
$$= -\frac{\frac{3}{4} + \frac{6}{2}}{1 - \frac{3}{4}\cdot\frac{6}{2}} = -\frac{\frac{3+12}{4}}{\frac{8-18}{8}}$$

$$= -\frac{\frac{15}{4}}{\frac{-10}{8}} = \frac{15}{4}\cdot\frac{8}{10}$$

$= 3$

Cevap: E

5.



A($\widehat{ADC}$)yi bulalım.

$x + y = 180$

$x = 180 - y$

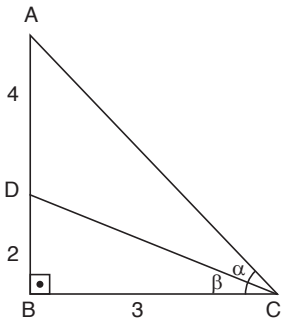
$\sin x = \sin(180 - y)$

$= \sin y$

$= \frac{4}{5}$

Cevap: E

6.



$$\tan(\alpha + \beta) = \frac{\tan\alpha + \tan\beta}{1 - \tan\alpha.\tan\beta} = \frac{\tan\alpha + \frac{2}{3}}{1 - \tan\alpha\cdot\frac{2}{3}} = \frac{6}{3}$$

$$\tan\alpha + \frac{2}{3} = 2 - \frac{4}{3}\cdot\tan\alpha$$

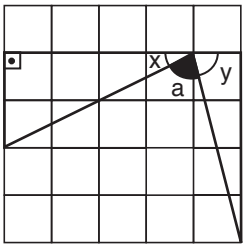
$$\tan\alpha + \frac{4}{3}\cdot\tan\alpha = 2 - \frac{2}{3}$$

$$\frac{7.\tan\alpha}{3} = \frac{4}{3}$$

$$\tan\alpha = \frac{4}{7}$$

Cevap: A

7.



$x + a + y = 180$

$a = 180 - (x + y)$

$\cot a = \cot(180 - (x + y))$

$= -\cot(x + y)$

$$= \frac{-1}{\tan(x+y)} = \frac{-1}{\frac{\tan x + \tan y}{1 - \tan x.\tan y}}$$

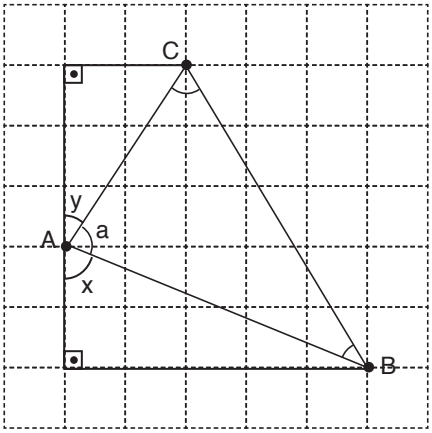
$$= \frac{\tan x.\tan y - 1}{\tan x + \tan y}$$

$$= \frac{\frac{2}{4}\cdot\frac{4}{1} - 1}{\frac{2}{4} + \frac{4}{1}} = \frac{1}{\frac{9}{2}}$$

$$= \frac{2}{9}$$

Cevap: C

8.



$\tan(\widehat{A})$

$x + y + a = 180$

$a = 180 - (x + y)$

$\tan a = \tan(180 - (x + y))$

$= -\tan(x + y)$

$= -\dfrac{\tan x + \tan y}{1 - \tan x.\tan y}$

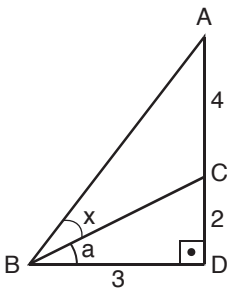
$= -\dfrac{\frac{5}{2} + \frac{2}{3}}{1 - \frac{5}{2}\cdot\frac{2}{3}}$

$= -\dfrac{\frac{15+4}{6}}{1 - \frac{5}{3}} = -\dfrac{\frac{19}{6}}{-\frac{2}{3}}$

$= \dfrac{19}{6}\cdot\dfrac{3}{2} = \dfrac{19}{4}$

Cevap: C

9.



$\tan(x + a) = \dfrac{\tan x + \tan a}{1 - \tan x.\tan a}$

$= \dfrac{6}{3} = \dfrac{\tan x + \frac{2}{3}}{1 - \tan x\cdot\frac{2}{3}}$

$= 2 - \dfrac{4}{3}\cdot\tan x = \tan x + \dfrac{2}{3}$

$= 2 - \dfrac{2}{3} = \tan x + \dfrac{4}{3}\tan x$

$= \dfrac{4}{3} = \dfrac{7}{3}\cdot\tan x$

$= \dfrac{4}{7} = \tan x$

Cevap: E

10. $\sin\left(\dfrac{\pi}{4} + \dfrac{\pi}{2}\right) + \cos\left(\dfrac{\pi}{4} - \dfrac{\pi}{2}\right)$

$\sin\left(\dfrac{6\pi}{8}\right) + \cos\left(\dfrac{-2\pi}{8}\right)$

$\sin\left(\dfrac{6\pi}{8}\right) + \sin\left(\dfrac{6\pi}{8}\right)$

$2.\sin\left(\dfrac{6\pi}{8}\right) = 2.\sin\left(\dfrac{3\pi}{4}\right)$

$= 2.\sin 135$

$= 2\sin(180 - 45)$

$= 2\sin 45$

$= 2\cdot\dfrac{\sqrt{2}}{2} = \sqrt{2}$

Cevap: D

11. $f(x) = \sin^2x - e^{2x}$

$$\lim_{h\to 0}\frac{f\left(\frac{\pi}{2}+h\right)-f\left(\frac{\pi}{2}\right)}{h} = f'\left(\frac{\pi}{2}\right)$$

$f'(x) = 2.\sin x.\cos x - 2.e^{2x}$

$f'\left(\frac{\pi}{2}\right) = 2.\sin\frac{\pi}{2}.\cos\frac{\pi}{2} - 2.e^{2\frac{\pi}{2}}$

$= 0 - 2.e^{\pi} = -2.e^{\pi}$

Cevap: D

12. $(\sin x - \cos x)^2 = \left(\frac{1}{2}\right)^2$

$\sin^2x - 2.\sin x.\cos x + \cos^2x = \frac{1}{4}$

$1 - 2\sin x.\cos x = \frac{1}{4}$

$1 - \frac{1}{4} = 2\sin x.\cos x$

$\frac{3}{4} = \sin 2x$

Cevap: C

13. $\cos x + \tan x \,.\, \sin x = 2$

$1 - 2.\sin^2x$

$\cos x + \tan x.\sin x = 2$

$\cos x + \frac{\sin x}{\cos x}\cdot\sin x = 2$

$\frac{\cos^2x + \sin^2x}{\cos x} = 2$

$1 = 2.\cos x$

$\frac{1}{2} = \cos x$

$1 - 2.\sin^2x = 2.\cos^2x - 1$

$= 2\cdot\left(\frac{1}{2}\right)^2 - 1$

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

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

Cevap: B

14. $\frac{\sin 2x + 1}{\sin x + \cos x} - \sin x$

$\frac{\sin 2x + 1 - \sin^2x - \sin x.\cos x}{\sin x + \cos x}$

$\frac{\sin 2x + 1 - \sin^2x - \frac{\sin 2x}{2}}{\sin x + \cos x}$

$\frac{2.\sin 2x + 2 - 2.\sin^2x - \sin 2x}{2(\sin x + \cos x)}$

$\frac{\sin^2x + 2(1 - \sin^2x)}{2.(\sin x + \cos x)}$

$\frac{2.\sin x.\cos x + 2.\cos^2x}{2(\sin x + \cos x)}$

$\frac{2.\cos x(\sin x + \cos x)}{2.(\sin x + \cos x)} = \cos x$

Cevap: D

15. $\frac{\arctan\left(\tan\frac{\pi}{3}\right)}{2} = \frac{\arctan(\sqrt{3})}{2}$

$= \frac{\frac{\pi}{3}}{2} = \frac{\pi}{6}$

Cevap: D

16. $\sin x.\cos x = \frac{1}{4}$

$(\sin^2x + \cos^2x)^2 = (1)^2$

$\sin^4x + 2.\sin^2x.\cos^2x + \cos^4x = 1$

$\sin^4x + \cos^4x + 2.\left(\frac{1}{4}\right)^2 = 1$

$\sin^4x + \cos^4x = 1 - \frac{2}{16} = \frac{14}{16} = \frac{7}{8}$

Cevap: C

17. $\tan x + \cot x = \frac{3}{2}$

$\tan^2 x + \cot^2 x = ?$

$(\tan x + \cot x)^2 = \left(\frac{3}{2}\right)^2$

$\tan^2 x + 2.\tan x.\cot x + \cot^2 x = \frac{9}{4}$

$\tan^2 x + \cot^2 x + 2 = \frac{9}{4}$

$\tan^2 x + \cot^2 x = \frac{9}{4} - 2$

$\tan^2 x + \cot^2 x = \frac{1}{4}$

Cevap: A

18. $\frac{2\sin x.\cos x - 1}{\sin x} = \frac{2.\cos^2 x - 1}{\cos x}$

$2.\cos x - \frac{1}{\sin x} = 2.\cos x - \frac{1}{\cos x}$

$\frac{1}{\sin x} = \frac{1}{\cos x}$

$\cos x = \sin x$

$x = \frac{\pi}{4}$

Cevap: D

19. $f(x) = \sin(x^2 + 2x)$

$f'(x) = (2x + 2).\cos(x^2 + 2x)$

$f'(0) = (2.0 + 2).\cos(0^2 + 2.0)$

$= 2$

Cevap: E

20. $\frac{\sin 12.\cos 32 + \cos 12.\sin 32}{2.\cos 22.\sin 22}$

$= \frac{\sin 44}{\sin 44} = 1$

Cevap: E