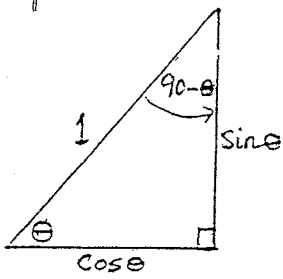


WORKSHEET (7) - P1



① $\sin(90-\theta) \equiv \cos\theta$
 $\cos(90-\theta) \equiv \sin\theta$

② $\tan\theta \equiv \frac{\sin\theta}{\cos\theta}$

$\cot\theta \equiv \frac{\cos\theta}{\sin\theta}$

③ $\cot\theta \equiv \frac{1}{\tan\theta}$ $\operatorname{cosec}\theta = \frac{1}{\sin\theta}$ $\sec\theta = \frac{1}{\cos\theta}$

④ $\cos^2\theta + \sin^2\theta \equiv 1$

$\sin^2\theta \equiv 1 - \cos^2\theta$

$\cos^2\theta \equiv 1 - \sin^2\theta$

⑤ $1 + \tan^2\theta \equiv \sec^2\theta$

$1 + \cot^2\theta \equiv \operatorname{cosec}^2\theta$

1) $\frac{\sin\theta}{\cos\theta} =$

12) $\operatorname{cosec}^2\theta - 1 =$

2) $\frac{\cos\theta}{\sin\theta} =$

13) $\frac{\cos(90-\theta)}{\sin(90-\theta)} =$

3) $\sec\theta \times \sin\theta =$

14) $\sin(90-\theta) \times \tan\theta =$

4) $\cot\theta \times \tan\theta =$

15) $\frac{2\cos\theta}{\sqrt{1-\sin^2\theta}} =$

5) $\operatorname{cosec}\theta \times \tan\theta =$

16) $\frac{\cos\theta}{\sqrt{1-\cos^2\theta}} =$

6) $\sec\theta \times \cos^2\theta =$

17) $\cot\theta \times \sin\theta =$

7) $1 - \cos^2\theta =$

18) $\tan\theta \times \sqrt{1-\sin^2\theta} =$

8) $\sqrt{1-\sin^2\theta} =$

19) $\frac{1}{\sec\theta} =$

9) $5\cos^2\theta + 5\sin^2\theta =$

20) $\cos\theta \sqrt{1+\tan^2\theta} =$

10) $\cos^3\theta + \cos\theta \cdot \sin^2\theta =$

21) $(\cos\theta + \sin\theta)^2 - 2 \cdot \cos\theta \cdot \sin\theta =$

11) $6 + 6\tan^2\theta =$

22) $\frac{\cos\theta}{\sin\theta} + \frac{\sin\theta}{\cos\theta} =$

ANSWERS

- (1) $\tan\theta$ (2) $\tan\theta$ (3) $\sec\theta$ (4) $\sin^2\theta$ (5) $\sec\theta$ (6) $\cos\theta$ (7) 1 (8) $\cos\theta$ (9) 5 (10) $5\sec^2\theta$ (11) 2 (12) $\cos\theta$ (13) $\tan\theta$ (14) 2 (15) $\cos\theta$ (16) $\cos\theta$ (17) $\cot\theta$ (18) $\sin\theta$ (19) $\cos\theta$ (20) $\cos\theta$ (21) 1 (22) $\sec\theta \operatorname{cosec}\theta$

THE TRIG. IDENTITIES

$$(1) \tan \theta = \frac{\sin \theta}{\cos \theta}$$

$$\text{or } \cot \theta = \frac{\cos \theta}{\sin \theta}$$

$$(3) \cos^2 \theta + \sin^2 \theta = 1$$

$$\text{or } \cos^2 \theta = 1 - \sin^2 \theta$$

$$(4) \operatorname{cosec} \theta = \frac{1}{\sin \theta}$$

$$\sec \theta = \frac{1}{\cos \theta}$$

$$(2) \cos \theta = \sin(90^\circ - \theta)$$

$$\text{or } \sin^2 \theta = 1 - \cos^2 \theta$$

$$\cot \theta = \frac{1}{\tan \theta}$$

Use any of the above to simplify:-

a) $\tan x \cdot \cos x$

b) $1 - \sin^2 x$

c) $\cot x \cdot \sec x$

d) $\frac{\sin^2 x}{\cos^2 x}$

e) $4\cos^2 x + 4\sin^2 x$

f) $5 - 5\cos^2 x$

g) $\tan^2 x \cdot (1 - \sin^2 x)$

h) $\sqrt{1 - \sin^2 x}$

i) $\frac{1}{\sqrt{1 - \cos^2 x}}$

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

k) $\frac{\sqrt{1 - \sin^2 x}}{\cos x}$

l) $\operatorname{cosec} x \cdot \tan x$

m) $\sec^2 x - \tan^2 x$

n) $\cos A \cdot (\cos A + \sin A) + \sin A \cdot (\sin A - \cos A)$

ANSWERS: (a) $\sin x$ (b) $\cos^2 x$ (c) $\operatorname{cosec} x$ (d) $\tan^2 x$ (e) 4 (f) $5\sin^2 x$ (g) $\sin^2 x$
(h) $\cos x$ (i) $\operatorname{cosec} x$ (j) $\cot^2 x$ (k) 1 (l) $\sec x$ (m) 1 (n) 1

PYTHAGOREAN TRIG. IDENTITIES - LESSON (29)

① $TAN \theta = \frac{SIN \theta}{COS \theta}$

② $COT \theta = \frac{COS \theta}{SIN \theta}$

③ $COS^2 \theta + SIN^2 \theta = 1$

④ $COS^2 \theta = 1 - SIN^2 \theta$

$SIN^2 \theta = 1 - COS^2 \theta$

⑤ $1 + TAN^2 \theta = SEC^2 \theta$

⑥ $1 + COT^2 \theta = COSEC^2 \theta$

⑦ $COS(90 - \theta) = SIN \theta$

PART (A)

Simplify the following: - USING THE ABOVE RULES (SUBSTITUTED IN.)

- | | |
|--|---|
| 1. $\tan x \cos x$ | 16. $\tan A \sqrt{1 - \sin^2 A}$ |
| 2. $\cot x \sin x$ | 17. $\cos^4 A + \cos^2 A \sin^2 A$ |
| 3. $\sec A \cos(90^\circ - A)$ | 18. $(\sin A + \cos A)^2$ |
| 4. $\operatorname{cosec} A \cos A$ | 19. $(\sin A - \cos A)^2$ |
| 5. $\sec A \cot A$ | 20. $(\sin A + \cos A)^2 + (\sin A - \cos A)^2$ |
| 6. $\tan A \sin(90^\circ - A)$ | 21. $(1 - \cos x)(1 + \cos x) \sec^2 x$ |
| 7. $3 - 3 \sin^2 A$ | 22. $\frac{\sin A}{\operatorname{cosec} A} + \frac{\cos A}{\sec A}$ |
| 8. $1 + \frac{\sin^2 A}{\cos^2 A}$ | 23. $\frac{1}{1 - \cos A} + \frac{1}{1 + \cos A}$ |
| 9. $\sqrt{1 - \sin^2 A}$ | 24. $(\sec^2 A - 1) \div \sec^2 A$ |
| 10. $\sqrt{1 - \cos^2 A}$ | 25. $2 - \sin^2 A - \cos^2 A$ |
| 11. $\frac{\sqrt{1 - \sin^2 A}}{\sin A}$ | 26. $\operatorname{cosec} \theta \cot(90^\circ - \theta)$ |
| 12. $\sqrt{(1 - \sin A)(1 + \sin A)}$ | 27. $5 \cos^2 24^\circ 12' + 5 \sin^2 24^\circ 12'$ |
| 13. $(1 - \cos^2 A)(1 + \tan^2 A)$ | 28. $\sqrt{\sec^2 \theta - 1}$ |
| 14. $(\sec A - \tan A)(\sec A + \tan A)$ | 29. $\sin A - \sin^3 A$ |
| 15. $\cos^3 A + \cos A \sin^2 A$ | |

- | | |
|--|-----------------------------|
| 29. $\sin A \cos^2 A$ | 9. $\cos A$ |
| 28. $\tan \theta$ | 8. $\sec^2 A$ |
| 27. 5 | 7. $3 \cos A$ |
| 26. $\frac{\cos \theta}{1}$ or $\sec \theta$ | 6. $\sin A^2$ |
| 25. 1 | 5. $\operatorname{cosec} A$ |
| 24. $\sin^2 A$ | 4. $\cot A$ |
| 23. $2 \sec^2 A$ | 3. $\tan x$ |
| 22. 1 | 2. $\cos x$ |
| 21. $\tan^2 x$ | 1. $\sin x$ |
| 20. 2 | |
| 19. $1 - 2 \sin A \cos A$ | |
| | 18. $1 + 2 \sin A \cos A$ |
| | 17. $\cos^2 A$ |
| | 16. $\sin A$ |
| | 15. $\cos A$ |
| | 14. 1 |
| | 13. $\tan A$ |
| | 12. $\cos A^2$ |
| | 11. $\cot A$ |
| | 10. $\sin A$ |

ANSWERS

EXERCISE : 7