REG-TRIG-2324-ASM-SET 1-MATH
Suggested solutions

Multiple Choice Questions

1. A	2. B	3. C	4. B	5. B
6. C	7. B	8. B	9. C	10. C
11. A	12. B	13. A	14. B	15. A
16. C	17. D	18. A		

1. A

$OP = \sqrt{1^2 + 3} = 2$

$\tan\theta + \sin\theta = \dfrac{\sqrt{3}}{-1} + \dfrac{\sqrt{3}}{2}$

$= -\dfrac{\sqrt{3}}{2}$

2. B

$OP = \sqrt{5^2 + 2^2} = \sqrt{29}$

$\sin\theta = \dfrac{-2}{\sqrt{29}}$

3. C

$OA = \sqrt{10^2 - 6^2} = 8$

The coordinates of P are $(-8,\ -6)$.

$\cos\theta = \dfrac{-8}{10}$

$= -\dfrac{4}{5}$

4. B

$OP = \sqrt{3^2 + 4^2} = 5$

$\dfrac{\sin\theta(1 - \cos\theta)}{\tan\theta} = \dfrac{\frac{3}{5}\left(1 - \frac{4}{5}\right)}{\frac{3}{4}}$

$= \dfrac{4}{25}$

5. B

Note that $\tan\theta$ and $\cos\theta$ must be both positive or both negative.

Then θ must lie in quadrant I or II.

6. C

Since $\tan\theta < 0$ and $\sin\theta < 0$, θ lies in quadrant IV.

7. B

Note that $\cos\theta < 0$ and $\tan\theta < 0$, θ lies in quadrant II.

8. B

Note that $\sin\theta$ and $\tan\theta$ must have different signs.
Then θ must lie in quadrant II or III.
The answer is B.

9. C

$\tan\theta = -\frac{3}{2} < 0$
Then θ lie in quadrant II or IV.

10. C

Note that a is positive.
Let $x = 1$ and $y = a$.
$r = \sqrt{a^2 + 1}$
$\cos\theta = \frac{1}{\sqrt{a^2 + 1}}$

11. A

Let $x = -1$ and $r = 3$.
Then $y = -\sqrt{3^2 - 1^2} = -\sqrt{8}$.
$\tan\theta = \frac{-\sqrt{8}}{-1} = \sqrt{8}$

12. B

Let $x = -5$ and $r = 13$.
Then $y = -\sqrt{13^2 - 5^2} = -12$.
$$\frac{1}{\sin\theta} + \frac{1}{\tan\theta} = \frac{13}{-12} + \frac{-5}{-12}$$
$$= -\frac{2}{3}$$

13. A

Let $x = 4$ and $y = -3$. Then $r = \sqrt{3^2 + 4^2} = 5$.
$$\sin\theta + \cos\theta = \frac{-3}{5} + \frac{4}{5}$$
$$= \frac{1}{5}$$

14. B

Let $x = 12$ and $r = 13$.
$y = \sqrt{13^2 - 12^2} = 5$
$\tan\theta = \frac{5}{12}$

15. A

Let $x = \sqrt{13}$ and $y = 6$.

$r = \sqrt{(\sqrt{13})^2 + 6^2} = 7$

$\sin\theta = \dfrac{6}{7}$

16. C

Note that k is positive.

Let $y = -1$ and $r = k$.

$x = -\sqrt{k^2 - 1^2} = -\sqrt{k^2 - 1}$

$\cos\theta = \dfrac{-\sqrt{k^2 - 1}}{k}$

17. D

Note that $\sin\theta = -\dfrac{4}{5} < 0$ and $\cos\theta > 0$, θ lies in quadrant IV.

Let $y = -4$ and $r = 5$.

$x = \sqrt{5^2 - 4^2} = 3$

$\tan\theta = \dfrac{-4}{3}$

18. A

Let $x = -4$ and $y = 3$.

$r = \sqrt{4^2 + 3^2} = 5$

$\sin\theta + \cos\theta = \dfrac{3}{5} + \dfrac{-4}{5}$

$= -\dfrac{1}{5}$

Conventional Questions

19. (a) $\sin\theta = \dfrac{-\sqrt{8^2 - 5^2}}{8}$

$= \dfrac{-\sqrt{39}}{8}$ 1A

(b) $(4\sin\theta - \tan\theta)^2 = \left[4\left(\dfrac{-\sqrt{39}}{8}\right) - \left(\dfrac{-\sqrt{39}}{5}\right)\right]^2$ 1A

$= \left(-\dfrac{3\sqrt{39}}{10}\right)^2$

$= \dfrac{351}{100}$ 1A

20. (a) $\tan\theta = \dfrac{15}{\sqrt{113^2 - 15^2}}$

$= \dfrac{15}{112}$ 1A

(b) $\dfrac{1}{\cos\theta} + \tan\theta = \dfrac{113}{112} + \dfrac{15}{112}$ 1A

$= \dfrac{8}{7}$ 1A

21. $\sin\theta = \dfrac{-\sqrt{10^2 - 9^2}}{10}$

$= -\dfrac{\sqrt{19}}{10}$ 1A

$\tan\theta = \dfrac{-\sqrt{10^2 - 9^2}}{-9}$

$= \dfrac{\sqrt{19}}{9}$ 1A

$\dfrac{1}{\tan\theta} - \dfrac{1}{\sin\theta} = \dfrac{9}{\sqrt{19}} - \left(-\dfrac{10}{\sqrt{19}}\right)$

$= \sqrt{19}$ 1A

22. $\sin\theta = \dfrac{-\sqrt{1^2 - k^2}}{1}$

$= -\sqrt{1 - k^2}$ 1A

$\tan\theta = \dfrac{-\sqrt{1^2 - k^2}}{k}$

$= -\dfrac{\sqrt{1 - k^2}}{k}$ 1A

$\sin\theta\tan\theta = \left(-\sqrt{1 - k^2}\right)\left(-\dfrac{\sqrt{1 - k^2}}{k}\right)$

$= \dfrac{1 - k^2}{k}$ 1A

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