

Precalculus – Semester II Review
Units 8-12, 14, 15

Unit 8:

1. Factor and simplify: $2\sin^2x - 2\sin^4x$

- (a) $2\tan^2x$ (b) 0 (c) $2\sin^2x \cdot \cos^2x$ (d) $2\cos^4x$

2. Simplify: $2\sin(x + \theta) - \sin(x - \theta)$

- (a) $3\cos x \sin \theta + \sin x \cos \theta$ (b) $\sin x \cos \theta + \cos x \sin \theta$
(c) $2\cos x \sin \theta + \sin x \cos \theta$ (d) $\sin x + 3\sin \theta$

3. Find all solution in the interval $[0, 2\pi)$: $\cos x - 1 = 0$

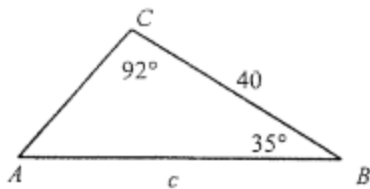
- (a) $\frac{\pi}{4}, \frac{7\pi}{4}$ (b) $\frac{\pi}{2}, \frac{3\pi}{2}$ (c) 0 (d) π

4. Find all solutions in the interval $[0, 2\pi)$: $6\sin^2x + 5\sin x - 4 = 0$

- (a) -1.3333, -4.4749 (b) $\frac{\pi}{6}, \frac{5\pi}{6}$ (c) 2.0000, 5.1416 (d) $\frac{7\pi}{6}, \frac{11\pi}{6}$

Unit 9:

5. Find c:



- (a) $c = 49.1$ (b) $c = 50.1$ (c) $c = 50.1$ or $c = 51.1$ (d) No solution

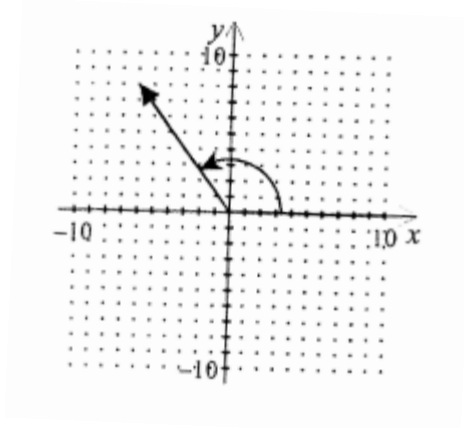
6. Find the area of the triangle having the indicated sides and angles.

$A = 89^\circ, b = 5, c = 2$

- (a) 5 (b) 0.09 (c) 10 (d) None of these

12. Find the direction angle of the vector.

- (a) $\theta = 36.9^\circ$ (b) $\theta = 125.9^\circ$
 (c) $\theta = 37.9$ (d) $\theta = 126.9^\circ$



13. A force of 815 pounds is needed to push a stalled car up a hill inclined at an angle of 15° to the horizontal. Find the weight of the car. Ignore friction.

- (a) 3137 lb (b) 3042 lb (c) 2854 lb (d) 3149 lb

14. Use the given vectors to find the indicated quantities. $\vec{u} = \langle -2, -5 \rangle$, $\vec{v} = \langle -3, -4 \rangle$, $\vec{w} = \langle 2, 1 \rangle$

- (a) $(\vec{u} \cdot \vec{v})\vec{w}$ (b) $-4\vec{u} \cdot \vec{v}$

- (a) (a) $\langle 44, 22 \rangle$ (b) (a) $\langle -28, -14 \rangle$ (c) (a) $\langle 46, 23 \rangle$ (d) (a) $\langle 52, 26 \rangle$
 (b) -88 (b) 56 (b) -92 (b) -104

15. Find the work done by the force F in moving a particle from P to Q . \vec{F} is given by $\vec{F} = -5\vec{i} - 2\vec{j}$, $P = (2, 1)$, $Q = (-2, -5)$

- (a) 22 (b) 9.6 (c) 32 (d) 14

16. A horizontal force of 110 pounds is applied to an object as it is pushed up a ramp that is 10 feet long. Find the work done if the ramp is inclined at an angle of 50° above the horizontal.

- (a) 1100 ft-lbs (b) 843 ft-lbs (c) 707 ft-lbs (d) 611 ft-lbs

Unit 10:

17. Sue bought some saltwater fish for \$4 each and some freshwater fish for \$1 each for her two new aquariums. If she bought a total of 17 fish and spent \$47, how many freshwater fish did she buy?

- (a) 8 (b) 11 (c) 10 (d) 7

18. Solve the system:
$$\begin{aligned} 2x - 5y &= 1 \\ 3x + 5y &= -11 \end{aligned}$$

- (a) (a, 4a+2) (b) (1, -1) (c) (-2, -1) (d) (a, 2a+4)

19. Solve the system of equations:

- (a) (6, 3, -3) (b) (6, 3, -7)
$$\begin{aligned} x + 5y + 6z &= 50 \\ 9x + y - 4z &= 28 \\ 4x - 2y - 7z &= -21 \end{aligned}$$

 (c) (5, 3, 5) (d) (2a+10, 3a-11, a)

Unit 11:

20. $A + B$ $A = \begin{bmatrix} -\frac{9}{2} & \frac{5}{3} \\ -9 & -8 \end{bmatrix}$, $B = \begin{bmatrix} \frac{43}{3} & -48 \\ \frac{19}{4} & \frac{11}{6} \end{bmatrix}$

- (a) $\begin{bmatrix} \frac{59}{6} & -\frac{139}{3} \\ -\frac{17}{4} & -\frac{37}{6} \end{bmatrix}$ (b) $\begin{bmatrix} \frac{59}{6} & -57 \\ \frac{77}{12} & -\frac{37}{6} \end{bmatrix}$ (c) $\begin{bmatrix} \frac{59}{6} & \frac{77}{12} \\ -57 & -\frac{37}{6} \end{bmatrix}$ (d) $\begin{bmatrix} -\frac{113}{6} & \frac{149}{3} \\ -\frac{55}{4} & -\frac{59}{6} \end{bmatrix}$

21. AB , if $A = \begin{bmatrix} 0 & -3 & 1 \\ 2 & -1 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -2 \\ 0 & 1 \\ -2 & -1 \end{bmatrix}$

- (a) $\begin{bmatrix} -2 & -4 \\ 2 & -5 \end{bmatrix}$ (b) $\begin{bmatrix} -4 & -1 & 1 \\ 2 & -1 & 0 \\ -2 & 7 & 0 \end{bmatrix}$ (c) $\begin{bmatrix} -2 & 2 \\ -4 & -5 \end{bmatrix}$ (d) $\begin{bmatrix} 0 & -4 \\ 0 & -1 \\ 0 & 0 \end{bmatrix}$

22. Find the inverse of the matrix (if it exists): $\begin{bmatrix} -5 & 4 & -1 \\ 3 & 2 & 1 \\ 5 & -2 & -4 \end{bmatrix}$

(a) $\begin{bmatrix} -\frac{1}{19} & \frac{17}{114} & -\frac{8}{57} \\ \frac{3}{19} & \frac{25}{114} & \frac{5}{57} \\ \frac{1}{19} & \frac{1}{57} & -\frac{11}{57} \end{bmatrix}$

(b) $\begin{bmatrix} -\frac{1}{19} & -\frac{3}{19} & \frac{1}{19} \\ -\frac{17}{114} & \frac{25}{114} & -\frac{1}{57} \\ -\frac{8}{57} & -\frac{5}{57} & -\frac{11}{57} \end{bmatrix}$

(c) $\begin{bmatrix} -\frac{1}{19} & \frac{3}{19} & \frac{1}{19} \\ \frac{17}{114} & \frac{25}{114} & \frac{1}{57} \\ -\frac{8}{57} & \frac{5}{57} & -\frac{11}{57} \end{bmatrix}$

(d) Does not exist

23. Find the determinant of the matrix $\begin{bmatrix} -1 & 1 \\ 4 & -5 \end{bmatrix}$

(a) -11

(b) 1

(c) -1

(d) 9

24. Find the determinant of the matrix $\begin{bmatrix} 1 & -2 & -4 \\ -3 & 4 & 5 \\ 5 & 2 & 3 \end{bmatrix}$

(a) 38

(b) -26

(c) -38

(d) 26

25. Use Cramer's Rule to solve (if possible) the system of equations.

(a) (4, -3, -2)

(b) (-3, 1, -1)

(c) (3, -1, 1)

(d) (-4, 3, 2)

$$2x - y - 3z = -4$$

$$2x + y - 3z = -2$$

$$2x - y + 3z = -10$$

Unit 12:

26. Write the first five terms of the sequence. Assume that n begins with 1.

$$a_n = \frac{(2n-1)!}{(2n)!}$$

(a) $1, \frac{1}{2}, \frac{1}{6}, \frac{1}{24}, \frac{1}{120}$

(b) $\frac{1}{2}, \frac{1}{4}, \frac{1}{6}, \frac{1}{8}, \frac{1}{10}$

(c) $\frac{1}{2}, \frac{2}{3}, \frac{3}{8}, \frac{2}{15}, \frac{5}{144}$

(d) $1, \frac{1}{4}, \frac{2}{9}, \frac{3}{8}, \frac{24}{25}$

27. Simplify the ratio of factorials: $\frac{10!}{4!}$

(a) 151,200

(b) 5,040

(c) $\frac{5}{2}$

(d) 210

28. $\sum_{n=1}^{42} (5n - 6)$

(a) 4263

(b) 4515

(c) 4368

(d) 241

29. Find the sum of the finite geometric series to three decimal places. $\sum_{n=2}^6 -2 \left(\frac{1}{2}\right)^n$

(a) 0.469

(b) -0.984

(c) -0.969

(d) -0.242

30. $\sum_{n=1}^{\infty} -4 \left(\frac{3}{4}\right)^{n-1}$

(a) -20

(b) -16

(c) 16

(d) Undefined

31. Use the Binomial Theorem to expand $(2a - b)^4$.

(a) $16a^4 - 32a^3b + 24a^2b^2 - 8ab^3 + b^4$

(b) $16a^4 - 8a^3b + 12a^2b^2 - 8ab^3 + b^4$

(c) $16a^4 + 32a^3b + 24a^2b^2 + 8ab^3 + b^4$

(d) $16a^4 + 8a^3b + 12a^2b^2 + 8ab^3 + b^4$

36. Find the vertices, foci, and the equation of the asymptotes of the hyperbola $256x^2 - 36y^2 - 64 = 0$.

(a) Vertices: $\left(\pm \frac{1}{2}, 0\right)$; Foci: $\left(\pm \frac{1}{6}\sqrt{73}, 0\right)$; Asymptotes: $y = \pm \frac{8}{3}x$

(b) Vertices: $\left(\pm \frac{1}{2}, 0\right)$; Foci: $\left(\pm \frac{1}{6}\sqrt{73}, 0\right)$; Asymptotes: $y = \pm \frac{3}{8}x$

(c) Vertices: $\left(0, \pm \frac{4}{3}\right)$; Foci: $\left(0, \pm \frac{1}{6}\sqrt{73}\right)$; Asymptotes: $y = \pm \frac{8}{3}x$

(d) Vertices: $\left(0, \pm \frac{4}{3}\right)$; Foci: $\left(0, \pm \frac{1}{6}\sqrt{73}\right)$; Asymptotes: $y = \pm \frac{3}{8}x$

37. Eliminate the parameter $\begin{matrix} x = t^3 \\ y = \frac{1}{4}t \end{matrix}$

(a) $y = \frac{1}{4}x^3$

(b) $y = 4x^3$

(c) $y = \frac{1}{4}\sqrt[3]{x}$

(d) $y = 4\sqrt[3]{x}$

38. Graph the point $\left(6, \frac{17\pi}{12}\right)$

