

Name _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**Find the equation of the line through the given pair of points. Solve it for y if possible.**

1) $(-5, -7), (-2, 8)$

A) $y = 15x + 68$

B) $x = -5$

C) $y = 3x + 8$

D) $y = 5x + 18$

1) _____

Find the requested composition of functions.

2) Given $f(x) = 4x^2 + 3x + 8$ and $g(x) = 3x - 4$, find $(g \circ f)(x)$.

A) $12x^2 + 9x + 28$

B) $12x^2 + 9x + 20$

C) $4x^2 + 9x + 20$

D) $4x^2 + 3x + 4$

2) _____

Find the inverse of the function.

3) $f(x) = 4x^3 + 7$

A) $f^{-1}(x) = \sqrt[3]{\frac{x+7}{4}}$

B) $f^{-1}(x) = \sqrt[3]{\frac{x}{4}} - 7$

C) $f^{-1}(x) = \sqrt[3]{\frac{x-7}{4}}$

D) Not invertible

3) _____

Find A, B, and C for the partial fraction decomposition.

4) $\frac{2x+1}{(x+2)^3} = \frac{A}{x+2} + \frac{B}{(x+2)^2} + \frac{C}{(x+2)^3}$

A) $A = 0, B = 3, C = -2$

B) $A = 0, B = 2, C = -3$

C) $A = 0, B = -3, C = 2$

D) $A = 0, B = -2, C = 3$

4) _____

Decompose into partial fractions.

5) $\frac{14x^2 - 35x + 11}{(x-4)(x^2+3)}$

A) $\frac{9x+1}{x^2+3} + \frac{5}{x-4}$

B) $-\frac{9x+1}{x^2+3} + \frac{5}{x-4}$

C) $\frac{9x+5}{x^2+3} + \frac{1}{x-4}$

D) $\frac{9x-1}{x^2+3} - \frac{5}{x-4}$

5) _____

Find the exact value of the composition.

6) $\csc\left(\sin^{-1}\left(\frac{3}{5}\right)\right)$

A) $\frac{3}{5}$

B) $\frac{5}{3}$

C) $\frac{3}{4}$

D) $\frac{4}{3}$

6) _____

7) $\arccos\left(\cos\frac{7\pi}{6}\right)$ 7) _____
 A) $\frac{5\pi}{6}$ B) $\frac{\pi}{3}$ C) $\frac{4\pi}{3}$ D) $\frac{\pi}{6}$

Use the fundamental identities to simplify the expression.

8) $\sin\theta\cos\theta\sec\theta\csc\theta$ 8) _____
 A) 1 B) $\csc^2\theta$ C) $\tan^2\theta$ D) $\sec^2\theta$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Prove that the equation is an identity.

9) $\frac{\sin^3 x + \sin x \cos^2 x}{\tan x} = \cos x$ 9) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find all real numbers in the interval $[0, 2\pi)$ that satisfy the equation.

10) $2\sin^2 x = \sin x$ 10) _____
 A) $\left\{0, \pi, \frac{\pi}{6}, \frac{5\pi}{6}\right\}$ B) $\left\{\frac{\pi}{3}, \frac{2\pi}{3}\right\}$
 C) $\left\{\frac{\pi}{6}, \frac{5\pi}{6}\right\}$ D) $\left\{\frac{\pi}{2}, \frac{3\pi}{2}, \frac{\pi}{3}, \frac{2\pi}{3}\right\}$

Use an appropriate identity to find the exact value of the expression.

11) $\cos\left(\frac{\pi}{12}\right)$ 11) _____
 A) $\frac{\sqrt{6}-\sqrt{2}}{4}$ B) $\frac{\sqrt{6}+\sqrt{2}}{4}$ C) $\frac{\sqrt{2}-\sqrt{6}}{4}$ D) $-\frac{\sqrt{6}+\sqrt{2}}{4}$

Find the exact value, given that $\sin A = -4/5$ with A in quadrant IV, $\tan B = 7/24$ with B in quadrant III, and $\cos C = -5/13$ with C in quadrant II.

12) $\sin 2B$ 12) _____
 A) $\frac{336}{625}$ B) $-\frac{527}{625}$ C) $-\frac{336}{625}$ D) $\frac{527}{625}$

Find the angle between the given vectors to the nearest tenth of a degree.

13) $\langle 3, 6 \rangle, \langle 4, -5 \rangle$ 13) _____
 A) 47.4° B) 124.8° C) 114.8° D) 57.4°

Express the given vector as a linear combination of the unit vectors i and j.

14) $\langle -7, -7 \rangle$ 14) _____
 A) $7\mathbf{i} + 7\mathbf{j}$ B) $-7\mathbf{i} - 7\mathbf{j}$ C) $14\mathbf{i} + \mathbf{j}$ D) $-7\mathbf{i} + 7\mathbf{j}$

Find the absolute value of the complex number.

15) $9 - 6i$

A) $\sqrt{15}$

B) $3\sqrt{13}$

C) 15

D) 117

15) _____

Write the complex number in the form $a + bi$.

16) $\sqrt{6}(\cos 315^\circ + i \sin 315^\circ)$

A) $\frac{\sqrt{6}}{2} - \frac{\sqrt{6}}{2}i$

B) $\sqrt{6} - \sqrt{6}i$

C) $\frac{\sqrt{3}}{2} - \frac{\sqrt{3}}{2}i$

D) $\sqrt{3} - \sqrt{3}i$

16) _____

Perform the indicated operation. Write the answer in the form $a + bi$.

17) $[4(\cos 225^\circ + i \sin 225^\circ)] [6(\cos 225^\circ + i \sin 225^\circ)]$

A) $-24i$

B) 24

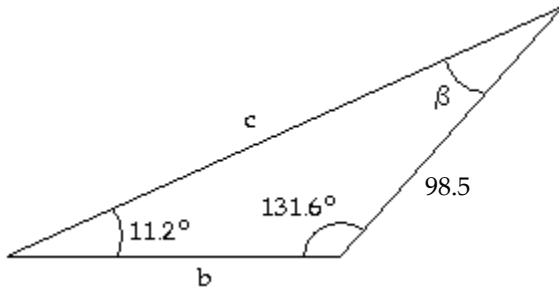
C) -24

D) $24i$

17) _____

Solve the triangle with the given parts.

18)



A) $\beta = 37.2^\circ, b = 31.6, c = 25.7$

B) $\beta = 37.2^\circ, b = 379.2, c = 306.6$

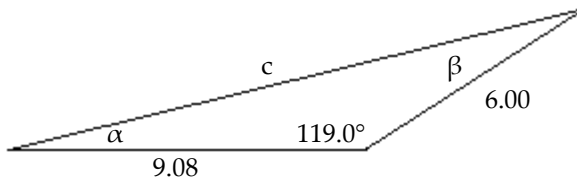
C) $\beta = 37.2^\circ, b = 306.6, c = 379.2$

D) $\beta = 36.8^\circ, b = 303.8, c = 379.2$

18) _____

Solve the triangle. Approximate values to the nearest tenth when appropriate.

19)



A) $c = 13.1, \alpha = 23.6^\circ, \beta = 37.4^\circ$

B) $c = 16, \alpha = 25.6^\circ, \beta = 35.4^\circ$

C) $c = 18.9, \alpha = 21.6^\circ, \beta = 39.4^\circ$

D) No solution

19) _____

Approximate the area of the triangle to the nearest tenth.

20) $\beta = 95.4^\circ, \gamma = 34.0^\circ, a = 21.6$

A) 199.6

B) 130.4

C) 336.1

D) 168.1

20) _____

Solve.

- 21) Two ships leave a harbor together traveling on courses that have an angle of 124° between them. If they each travel 513 miles, how far apart are they (to the nearest mile)? 21) _____
- A) 1812 mi B) 482 mi C) 40 mi D) 906 mi

Perform the indicated operation. Use the form $\langle a, b \rangle$ for vectors.

- 22) $\mathbf{v} = \langle 8, -4 \rangle$, $\mathbf{u} = \langle 5, 4 \rangle$; Find $3\mathbf{v} + 5\mathbf{u}$. 22) _____
- A) $\langle 60, 135 \rangle$ B) $\langle 12, 45 \rangle$ C) $\langle 49, 8 \rangle$ D) $\langle 39, 0 \rangle$
- 23) $\mathbf{u} = \langle -15, -8 \rangle$ and $\mathbf{v} = \langle 12, -4 \rangle$; Find $\mathbf{u} \cdot \mathbf{v}$. 23) _____
- A) -212 B) 32 C) -180 D) -148

Find the coordinates of the vertex of the parabola.

- 24) $x = y^2 + 8y + 9$ 24) _____
- A) $(-4, -7)$ B) $(-7, -4)$ C) $(-4, 0)$ D) $(0, -7)$

Write the equation for the circle described.

- 25) Center $(20, 12)$, containing the origin 25) _____
- A) $(x - 12)^2 + (y - 20)^2 = 544$ B) $(x - 20)^2 + (y - 12)^2 = 23$
- C) $(x - 20)^2 + (y - 12)^2 = 544$ D) $(x - 12)^2 + (y - 20)^2 = 23$

Find the equation of the hyperbola.

- 26) Vertices at $(0, 2)$ and $(0, -2)$, foci at $(0, 9)$ and $(0, -9)$ 26) _____
- A) $\frac{y^2}{77} - \frac{x^2}{4} = 1$ B) $\frac{y^2}{4} - \frac{x^2}{77} = 1$ C) $\frac{y^2}{4} - \frac{x^2}{81} = 1$ D) $\frac{y^2}{81} - \frac{x^2}{4} = 1$

The polar coordinates of a point are given. Find the rectangular coordinates of the point.

- 27) $\left(-3, \frac{2\pi}{3}\right)$ 27) _____
- A) $\left(-\frac{3}{2}, \frac{3\sqrt{3}}{2}\right)$ B) $\left(\frac{3}{2}, \frac{3\sqrt{3}}{2}\right)$ C) $\left(-\frac{3}{2}, -\frac{3\sqrt{3}}{2}\right)$ D) $\left(\frac{3}{2}, -\frac{3\sqrt{3}}{2}\right)$

The rectangular coordinates of a point are given. Find polar coordinates for the point.

- 28) $(-\sqrt{3}, -1)$ 28) _____
- A) $\left(2, \frac{5\pi}{6}\right)$ B) $\left(2, \frac{\pi}{6}\right)$ C) $\left(2, -\frac{5\pi}{6}\right)$ D) $\left(2, -\frac{\pi}{6}\right)$

The letters x and y represent rectangular coordinates. Write the equation using polar coordinates (r, θ) .

- 29) $xy = 1$ 29) _____
- A) $r \sin 2\theta = 2$ B) $r^2 \sin 2\theta = 2$
- C) $2r^2 \sin \theta \cos \theta = 1$ D) $2r \sin \theta \cos \theta = 1$

The letters r and θ represent polar coordinates. Write the equation using rectangular coordinates (x, y) .

30) $r = \frac{5}{1 + \cos \theta}$ 30) _____

- A) $x^2 = 10y - 25$ B) $x^2 = 25 - 10y$ C) $y^2 = 10x - 25$ D) $y^2 = 25 - 10x$

The given pattern continues. Write down the n th term of the sequence $\{a_n\}$ suggested by the pattern.

31) $\frac{1}{1 \cdot 2}, \frac{1}{2 \cdot 3}, \frac{1}{3 \cdot 4}, \frac{1}{4 \cdot 5}, \dots$ 31) _____

- A) $a_n = \frac{1}{n \cdot 1n}$ B) $n(n+1)$ C) $a_n = \frac{1}{n(n+1)}$ D) $a_n = \frac{1}{1n}$

Express the sum using summation notation.

32) $3^2 + 6^3 + 9^4 + \dots + 24^9$ 32) _____

- A) $\sum_{k=1}^8 3k^{2k-1}$ B) $\sum_{k=1}^8 (3k)^{k+1}$
 C) $\sum_{k=1}^8 (3k)^k$ D) $\sum_{k=1}^8 2(k-1)^{k+1}$

Find the sum of the sequence.

33) _____ 33) _____

$$\sum_{k=2}^4 k(k-5)$$

- A) 3 B) -10 C) -20 D) -16

Find the sum.

34) $\sum_{n=1}^{34} (-2n - 6)$ 34) _____

- A) -1309 B) -1360 C) -1394 D) -1190

Find the first term, the common difference, and give a recursive formula for the arithmetic sequence.

35) 9th term is 56; 16th term is 28 35) _____

- A) $a_1 = 92, d = 4, a_n = a_{n-1} + 4$ B) $a_1 = 88, d = 4, a_n = a_{n-1} + 4$
 C) $a_1 = 88, d = -4, a_n = a_{n-1} - 4$ D) $a_1 = 92, d = -4, a_n = a_{n-1} - 4$

Solve.

36) A local civic theater has 22 seats in the first row and 21 rows in all. Each successive row contains 3 additional seats. How many seats are in the civic theater? 36) _____

- A) 1010 seats B) 1070 seats C) 790 seats D) 1092 seats

Use a graphing utility to find the sum of the geometric sequence. Round answer to two decimal places, if necessary.

37)

$$\sum_{k=1}^5 3(4)^k$$

A) 7710

B) 4092

C) 252

D) 268

37) _____

Expand the expression using the Binomial Theorem.

38) $(x^2 - 4y)^4$

A) $x^8 - 4x^6y + 96x^4y^2 - 128x^2y^3 + 256y^4$

B) $x^8 - 16x^6y + 96x^4y^2 + 16x^2y^3 + 256y^4$

C) $x^8 - 16x^6y + 96x^4y^2 - 256x^2y^3 + 256y^4$

D) $x^4 - 16x^3y + 96x^2y^2 - 256xy^3 + 256y^4$

38) _____

Answer Key

Testname: PRECAL REVIEW FINAL (2)

- 1) D
- 2) B
- 3) C
- 4) B
- 5) A
- 6) B
- 7) A
- 8) A

9) $\frac{\sin^3 x + \sin x \cos^2 x}{\tan x} = \frac{\sin x(\sin^2 x + \cos^2 x)}{\tan x}$

$$= \frac{\sin x \cdot 1}{\tan x} \quad \text{Pythagorean identity}$$

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

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

$$= \cos x$$

- 10) A
- 11) B
- 12) A
- 13) C
- 14) B
- 15) B
- 16) D
- 17) D
- 18) C
- 19) A
- 20) D
- 21) D
- 22) C
- 23) D
- 24) B
- 25) C
- 26) B
- 27) A
- 28) C
- 29) B
- 30) D
- 31) C
- 32) B
- 33) D
- 34) C
- 35) C
- 36) D
- 37) B
- 38) C