جامعة خليفة
Khalifa University

College of Computing and Mathematical Sciences
Department of Mathematics

Mathematics Admission Test – Sample questions.

1) Simplify and state the excluded values : $\dfrac{5x-10}{100-40x-5x^2}\cdot\dfrac{5x^2-38x+21}{30x-50x^2}$

A) $\dfrac{x-7}{10x(10+x)}$; $\{2,-10,0,\dfrac{3}{5}\}$ B) $(x-7)(x+3)$; None

C) $\dfrac{9x(x-10)}{x+3}$; $\{-3\}$ D) $\dfrac{4}{5(x-3)}$; $\{3\}$

2) Solve $x=\sqrt{30-x}$

A) $\{1,-5\}$ B) $\{5,-5\}$ C) $\{5\}$ D) $\{1,-8\}$

3) Simplify $\dfrac{(a^{-2}b^2)^0}{(-a^{-1}b^{-3})^4\cdot -1a^3b^{-5}}$

A) $\dfrac{a^{11}}{b^9}$ B) $-\dfrac{1}{a^{45}}$ C) $-ab^{17}$ D) $-a^6b^{12}$

4) Simplify $\dfrac{7-4i}{-10+i}$

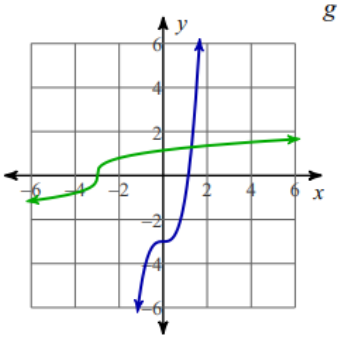
A) $\dfrac{-64+33i}{107}$ B) $\dfrac{-7+4i}{9}$ C) $\dfrac{-74+33i}{101}$ D) $\dfrac{-5+4i}{7}$

Find the inverse of the function. Then graph the function and its inverse.

5) $g(n) = 2n^3 - 3$

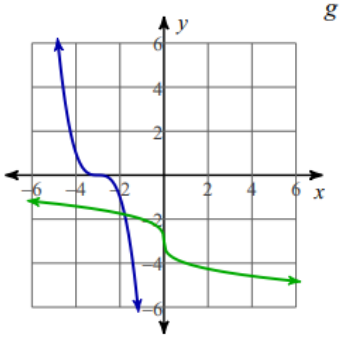
A)

$g^{-1}(n) = \sqrt[3]{\frac{n+3}{2}}$



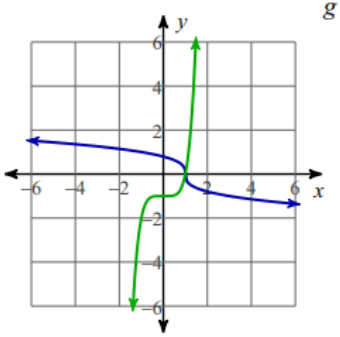
B)

$g^{-1}(n) = -\sqrt[3]{n} - 3$



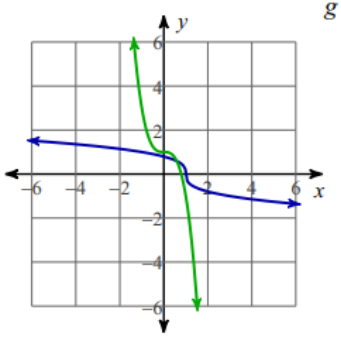
C)

$g^{-1}(n) = -1 + n^5$



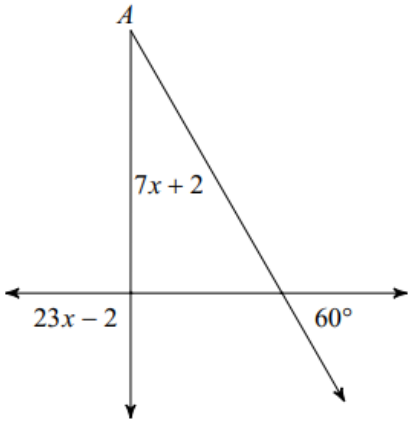
D)

$g^{-1}(n) = 1 - 2n^3$



Find the measure of angle A.

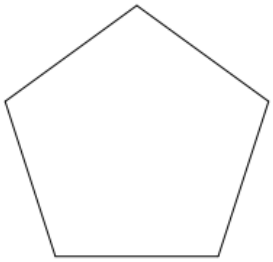
6)



A) 90° B) 30° C) 160° D) 38°

Find the measure of one exterior angle in the regular polygon.

7)

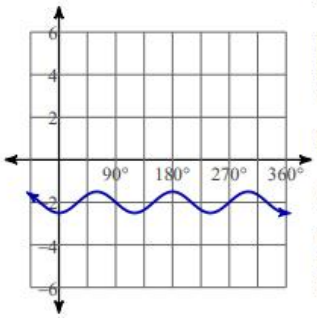


A) 90° B) 36° C) 72° D) 60°

Find the amplitude, the period in degrees, the phase shift in degrees, the vertical shift, the minimum and maximum values, and the transformations required to obtain the graph starting with a basic trig function. Then sketch the graph using degrees.

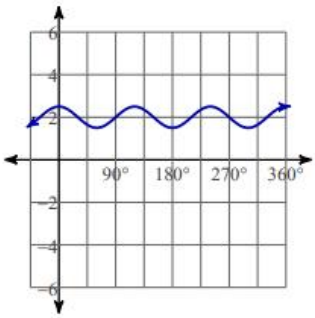
8) $y = \frac{1}{2} \cdot \sin(3\theta - 270) + 2$

A)



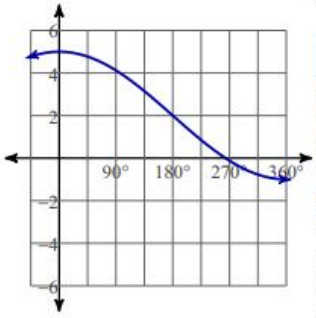
Amplitude: $\frac{1}{2}$
Period: 120°
Phase shift: Left 90°
Vert. shift: Down 2
Min: $-\frac{5}{2}$
Max: $-\frac{3}{2}$
Vert asym: None
Transformations: Starting with sin θ, vertically shrink by $\frac{1}{2}$, horizontally shrink by $\frac{1}{3}$, translate left 90, translate down 2

B)



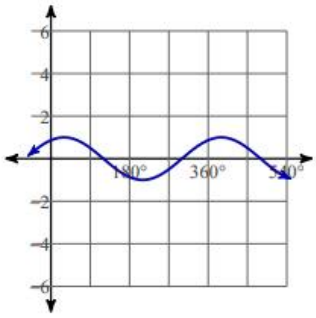
Amplitude: $\frac{1}{2}$
Period: 120°
Phase shift: Right 90°
Vert. shift: Up 2
Min: $\frac{3}{2}$
Max: $\frac{5}{2}$
Vert asym: None
Transformations: Starting with sin θ, vertically shrink by $\frac{1}{2}$, horizontally shrink by $\frac{1}{3}$, translate right 90, translate up 2

C)



Amplitude: $\frac{1}{2}$
Period: 120°
Phase shift: Right 540°
Vert. shift: Up 2
Min: −1
Max: 5
Vert asym: None
Transformations: Starting with sin θ, vertically stretch by 3, horizontally stretch by 2, translate right 540, translate up 2

D)



Amplitude: 1
Period: 360°
Phase shift: Right 300°
Vert. shift: None
Min: −1
Max: 1
Vert asym: None
Transformations: Starting with sin θ, translate right 300

Find the exact value of

9) $\dfrac{\tan\frac{13\pi}{18}-\tan\frac{\pi}{18}}{1+\tan\frac{13\pi}{18}\tan\frac{\pi}{18}}$

A) $\frac{\sqrt{3}}{3}$ B) $-\sqrt{3}$ C) 1 D) 0

10) $\cos\theta=-\frac{5}{13}$ where $90\le\theta<180$

Find $\sin 2\theta$

A) $\frac{120}{169}$ B) $-\frac{119}{169}$ C) $-\frac{169}{120}$ D) $-\frac{120}{169}$

Solve the following equation for $0\le\theta\le 2\pi$

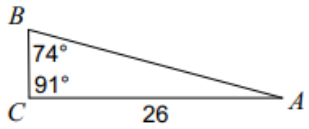
11) $-5=\cot^2\theta+4\csc\theta$

A) $\left\{\frac{2\pi}{3},\frac{3\pi}{2}\right\}$ B) $\left\{\frac{7\pi}{6}\right\}$ C) $\left\{\frac{7\pi}{6},\frac{11\pi}{6}\right\}$ D) $\left\{\frac{\pi}{3},\frac{2\pi}{3},\frac{4\pi}{3},\frac{5\pi}{3}\right\}$

12) Find $\cos\theta$ if $\tan\theta=\frac{3}{4}$

A) $\frac{3}{5}$ B) $\frac{3}{4}$ C) $\frac{4}{3}$ D) $\frac{4}{5}$

13) Find AB



A) 30 B) 28 C) 27 D) 25

Solve the following equation. Round your answer to the nearest ten thousandth.

14) $-6e^{9p+7} - 5 = -32.3$

A) –0.7047 B) –0.6094 C) –0.7433 D) No solution.

Solve:

15) $\log_5 4 - \log_5 (5 - 3x) = \log_5 10$

A) $\left\{\frac{149}{24}\right\}$ B) $\left\{\frac{23}{15}\right\}$ C) No solution. D) $\left\{\frac{102}{55}\right\}$

Answers:

1) A
2) C
3) C
4) C
5) A
6) B
7) C
8) B
9) B
10) D
11) C
12) D
13) C
14) B
15) B