PRINTABLE VERSION

Practice Final

You scored 100 out of 100

Question 1

Your answer is CORRECT.

Find the y-intercept(s) of the polynomial

$x=0$

$$p(x) = -9\,x^4\,(x+8)^3\,(x-1)\,(x+2)^4$$

a) (8, 0), (-1, 0), (-2, 0), (0, 0)

$P(0) = -9(0)^4(0+8)^3(0-1)(0+2)^4$

b) (-8, 0), (1, 0), (-2, 0)

$P(0) = 0$

c) (0, 0), (-8, 0), (1, 0), (-2, 0)

$\rightarrow (0,0)$

d) (-9, 0), (-8, 0), (1, 0)

e) (0, 0)

f) None of the above.

Question 2

Your answer is CORRECT.

Give the vertical asymptote(s) for the graph of

$$f(x) = \frac{x^2 + 16\,x + 63}{x^2 - x - 2} = \frac{(x+6)(x+9)}{(x-2)(x+1)}$$

a) $x = 7,\ x = -2$

$x-2=0$ $\quad$ $x+1=0$

b) $x = 1,\ x = -2$

$x=2$ $\quad$ $x=-1$

c) $x = -1,\ x = 2$

d) $x = -9,\ x = 1$

e) $x = -1,\ x = 2,\ x = -7$

f) None of the above.

Question 3

Your answer is CORRECT.

Identify the location of any holes (i.e. removable discontinuities) in the graph of

$$f(x) = \frac{-x^2 + 5x - 4}{x^2 - 8x + 7} = \frac{-(x^2 - 5x + 4)}{x^2 - 8x + 7} = \frac{-(\cancel{x-1})(x-4)}{(\cancel{x-1})(x-7)}$$

a) $(1, {}^{-1}\!/\!_2)$ and $(4, 0)$

$$\text{new } f(x) = \frac{-(x-4)}{x-7}$$

$x - 1 = 0$

$x = 1$

b) $(-4, {}^{-8}\!/\!_{11})$

$$\text{new } f(1) = \frac{-(1-4)}{1-7} = \frac{-(-3)}{-6} = -\frac{1}{2}$$

c) $(4, 0)$

$(1, {}^{-1}\!/\!_2)$

d) $(-1, {}^{-5}\!/\!_8)$

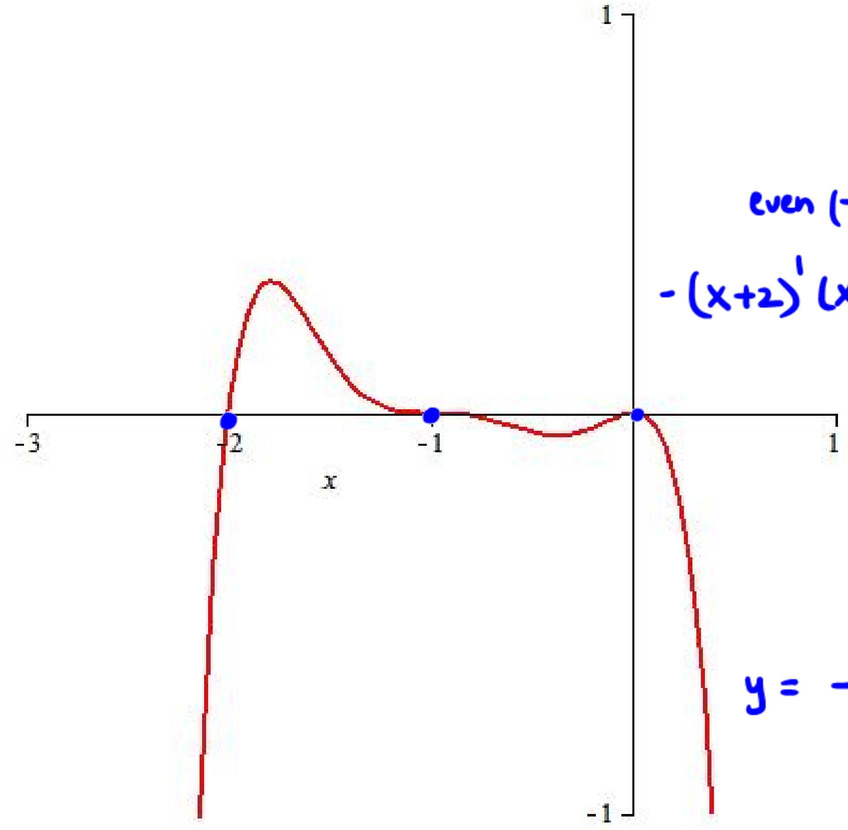
e) $(1, {}^{-1}\!/\!_2)$

f) None of the above.

Question 4

Your answer is CORRECT.

Which of the following functions could represent the graph given below?



even (−)

$-(x+2)^1(x+1)^3(x)^2 = y$

$y = -(x+2)(x+1)^3x^2$

a) $f(x) = x^2(x+2)^2(x+1)^3$

b) $f(x) = x^2(x+2)(x+1)^3$

c) $f(x) = -x^2(x+2)^3(x+1)$

d) $f(x) = -x^2(x+2)(x+1)^3$

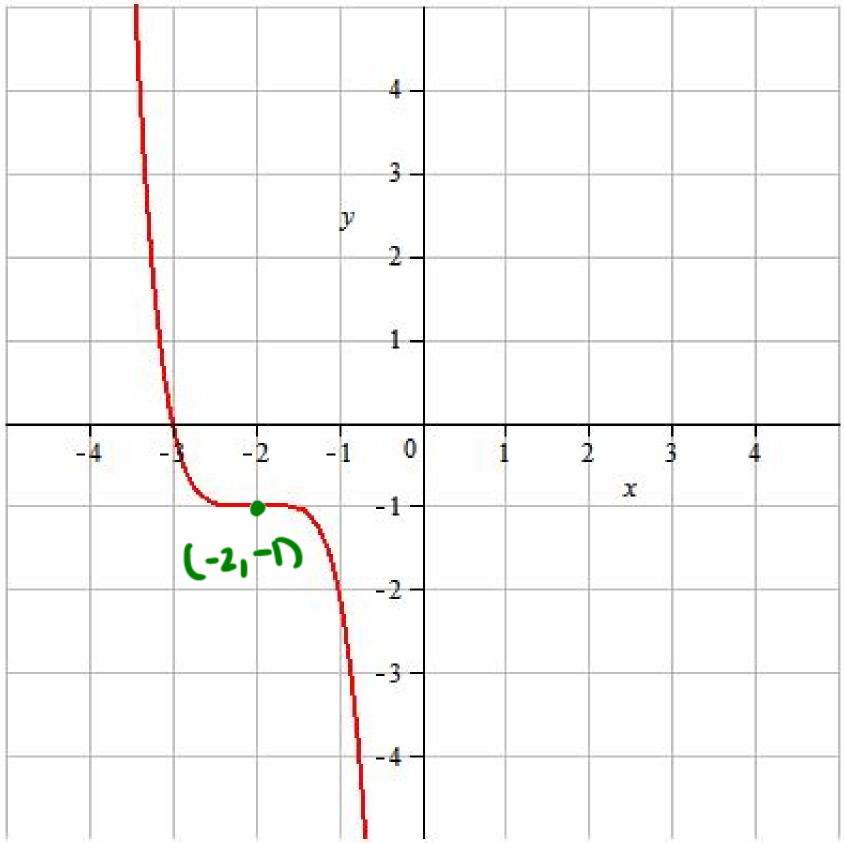
e) $f(x) = -x(x-2)^2(x-1)^3$

f) None of the above.

Question 5

Your answer is CORRECT.

Which of the following functions would result in the graph shown below?



reflect over y

$y = -(x+2)^5 - 1$

a) $f(x) = -(x+2)^5 - 1$

b) $f(x) = -(x+2)^4 + 1$

c) $f(x) = (x+2)^5 - 1$

d) $f(x) = -(x-2)^5 - 1$

e) $f(x) = (x-2)^5 + 1$

f) None of the above.

Question 6

Your answer is CORRECT.

Write the following in standard form for a parabola.

$$x^2 + 10x + 39 - 2y = 0$$

a) $\left(x + \frac{5}{2}\right)^2 = 2(y + 7)$

b) $(x-5)^2 = -2(y-7)$

c) $(x+5)^2 = 2(y-7)$

d) $(x-5)^2 = 2(y-7)$

e) $\left(x+\frac{5}{2}\right)^2 = -2(y-7)$

f) None of the above.

$x^2 + 10x + 39 = 2y$

$x^2 + 10x + \underline{5^2} = 2y - 39 + \underline{5^2}$

$(x+5)^2 = 2y - 14$

$(x+5)^2 = 2(y-7)$

Question 7

Your answer is CORRECT.

Write the equation of the circle with center (-6, -4) and radius of length $5\sqrt{7}$.

a) $(x+6)^2 + (y+4)^2 = 5\sqrt{7}$

b) $(x+6)^2 + (y+4)^2 = 175$

c) $(x-6)^2 + (y-4)^2 = 10\sqrt{7}$

d) $(x-6)^2 + (y-4)^2 = 5\sqrt{7}$

e) $(x-6)^2 + (y-4)^2 = 175$

f) None of the above.

$(x+6)^2 + (y+4)^2 = (5\sqrt{7})^2$

$(x+6)^2 + (y+4)^2 = 175$

Question 8

Your answer is CORRECT.

Write the following in standard form for an ellipse.

$$16x^2 - 192x + 468 + 9y^2 + 36y = 0$$

a) $\frac{(x+6)^2}{(9)} + \frac{(y-2)^2}{(16)} = 1$

b) $\frac{(x-6)^2}{(16)} + \frac{(y+2)^2}{(9)} = 1$

c) ○ $\frac{(x+6)^2}{(16)} + \frac{(y-2)^2}{(9)} = 1$

d) ◉ $\frac{(x-6)^2}{(9)} + \frac{(y+2)^2}{(16)} = 1$

e) ○ $\frac{(x-6)^2}{(12)} + \frac{(y+2)^2}{(12)} = 1$

f) ○ None of the above.

$16x^2 - 192x + 9y^2 + 36y = -468$

$16(x^2 - 12x + \underline{-6^2}) + 9(y^2 + 4y + \underline{2^2}) = -468 + 16(\underline{36}) + 9(\underline{4})$

$16(x-6)^2 + 9(y+2)^2 = -468 + 576 + 36$

$\frac{16(x-6)^2}{144} + \frac{9(y+2)^2}{144} = \frac{144}{144}$

$\frac{(x-6)^2}{9} + \frac{(y+2)^2}{16} = 1$

Question 9

Your answer is CORRECT.

Find the x-coordinate(s) of the point(s) of intersection for the following functions below:

$$f(x) = x^2 - 4x + 3$$

$$g(x) = -2x + 6$$

a) ○ $\left\{1, \frac{3}{2}\right\}$

b) ◉ $\{-1, 3\}$

c) ○ $\{-2, 6\}$

d) ○ $\{1, 5\}$

e) ○ $\{-3, 1\}$

f) ○ None of the above.

$x^2 - 4x + 3 = -2x + 6$

$x^2 - 2x - 3 = 0$

$(x+1)(x-3) = 0$

$x + 1 = 0 \qquad x - 3 = 0$

$x = -1 \qquad x = 3$

Question 10

Your answer is CORRECT.

Find the vertex of the quadratic function

$$f(x) = x^2 - 14x - 3$$

a) ○ (7 , -46)

b) ○ (7 , 46)

c) (-7 , -46)

d) (-7 , -52)

e) (7 , -52)

f) None of the above.

$f(x) = x^2 - 14x + (-7)^2 - 3 - (-7)^2$

$f(x) = (x-7)^2 - 52$

vertex: $(7, -52)$

Question 11

Your answer is CORRECT.

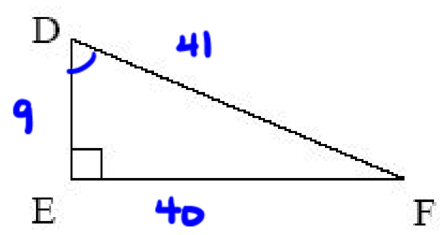
Given triangle DEF as shown below. If $DF = 41$ and $EF = 40$, find $\cos(D)$ and $\tan(F)$.
Note: The triangle may not be drawn to scale.

$40^2 + b^2 = 41^2$

$b^2 = 1681 - 1600$

$b^2 = 81$

$b = 9$



$\cos(\angle D) = \frac{9}{41}$

$\tan(\angle F) = \frac{9}{40}$

a) $\cos(D) = {}^{9}/_{41}$, $\tan(F) = {}^{9}/_{40}$

b) $\cos(D) = {}^{9}/_{41}$, $\tan(F) = {}^{40}/_{9}$

c) $\cos(D) = {}^{9}/_{40}$, $\tan(F) = {}^{9}/_{41}$

d) $\cos(D) = {}^{41}/_{9}$, $\tan(F) = {}^{40}/_{9}$

e) $\cos(D) = {}^{41}/_{9}$, $\tan(F) = {}^{9}/_{40}$

f) None of the above.

Question 12

Your answer is CORRECT.

Evaluate:

$$\cos(330^o)$$

↳ ref $\theta = 30$

$\cos(30) = \sqrt{3}/2$

a) $-\frac{1}{2}\sqrt{3}$

b) $\frac{1}{2}\sqrt{3}$

c) $-\sqrt{3}$

d) $\frac{1}{2}$

e) $-\frac{1}{2}$

f) None of the above.

Question 13

Your answer is CORRECT.

Evaluate:

$$\sec\left(\frac{1}{3}\pi\right) = \frac{1}{\cos(\pi/3)} = \frac{1}{1/2} = 2$$

a) -2

b) $\sqrt{3}$

c) 2

d) $-\frac{2}{3}\sqrt{3}$

e) $\frac{2}{3}\sqrt{3}$

f) None of the above.

Question 14

Your answer is CORRECT.

Evaluate:

$$\cot\left(\frac{11}{6}\pi\right) = \frac{\cos(\pi/6)}{-\sin(\pi/6)} = \frac{\sqrt{3}/2}{-1/2} = \frac{\sqrt{3}}{2} \cdot \frac{-2}{1} = -\sqrt{3}$$

ref $\theta = \frac{\pi}{6}$

a) $\sqrt{3}$

b) $-\sqrt{3}$

c) 3

d) $\frac{1}{3}\sqrt{3}$

e) $-\frac{1}{3}\sqrt{3}$

f) None of the above.

Question 15

Your answer is CORRECT.

To find the length of the arc of a circle, think of the arc length as simply a fraction of the circumference of the circle. If the central angle θ defining the arc is given in degrees, then the arc length can be found using the formula:

$$s = \frac{\theta}{360^\circ} \cdot 2\pi r$$

Use the formula above to find the arc length s, where $\theta = 330^{o}$ and $r = 7$cm.

a) $^{77\pi}/_{24}$ cm

b) $^{77\pi}/_{6}$ cm

c) $^{77\pi}/_{3}$ cm

d) 4620π cm

e) $^{77\pi}/_{12}$ cm

f) None of the above.

$$s = \frac{330}{360} 2\pi(7) = \frac{14\pi(33)}{36}$$

$$= \frac{2 \cdot 7\pi \cdot 3 \cdot 11}{3 \cdot 2 \cdot 2 \cdot 3} = \frac{77\pi}{6}$$

Question 16

Your answer is CORRECT.

Given triangle ABC, the measure of angle A is 60^{o}, the length of AB is 8, and the length of AC is 7. What is the length of side BC?

a) $\sqrt{57}$

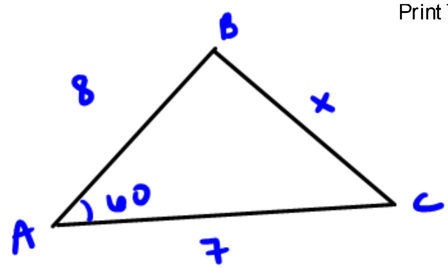
b) 4

c) 57

d) $\sqrt{113}$

e) $\sqrt{106 - \sqrt{2}}$

f) None of the above.



$x^2 = 8^2 + 7^2 - 2(8)(7)\cos 60$

$x^2 = 64 + 49 - 112(1/2)$

$x^2 = 64 + 49 - 56$

$x^2 = 57$

$x = \sqrt{57}$

Question 17

Your answer is CORRECT.

Find the inverse of the given function, if possible.

$$f(x) = x^2 + 5$$
$$\text{where } x \geq 0$$

a) $f^{1}(x) = -\sqrt{x} + 5$

b) $f(x)$ does not have an inverse.

c) $f^{1}(x) = \sqrt{x - 5}$

d) $f^{1}(x) = \sqrt{5 + x}$

e) $f^{1}(x) = \sqrt{x} - 5$

f) None of the above.

$y = x^2 + 5$

$x = y^2 + 5$

$x - 5 = y^2$

$y = \sqrt{x - 5}$

$f^{-1}(x) = \sqrt{x - 5}$

Question 18

Your answer is CORRECT.

A string running from the ground to the top of a fence has an angle of elevation of 45°. The string is 6 feet long. What is the distance between the fence and where the string is pegged to the ground?

a) 12 ft

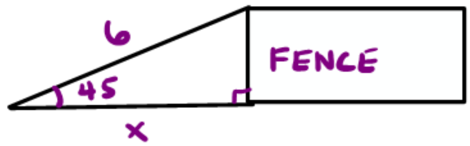
b) $3\sqrt{2}$ ft

c) 3 ft

d) $3\sqrt{3}$ ft

e) $\sqrt{6}$ ft

f) None of the above.



$\cos 45 = \frac{x}{6}$

$\frac{\sqrt{2}}{2} = \frac{x}{6}$

$2x = 6\sqrt{2}$

$x = 3\sqrt{2}$ ft

Question 19

Your answer is CORRECT.

Suppose that θ is an acute angle of a right triangle and $\tan(\theta) = {}^{4\sqrt{2}}/_{5}$. Find $\sin(\theta)$ and $\cos(\theta)$.

a) $\sin(\theta) = \frac{1}{8}\sqrt{114}$, $\cos(\theta) = \frac{1}{5}\sqrt{57}$

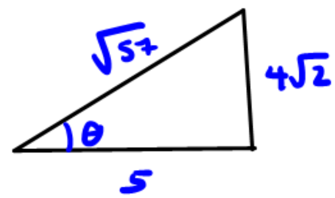
b) $\sin(\theta) = \frac{8}{57}\sqrt{114}$, $\cos(\theta) = \frac{10}{57}\sqrt{57}$

c) $\sin(\theta) = \frac{4}{57}\sqrt{114}$, $\cos(\theta) = \frac{5}{57}\sqrt{57}$

d) $\sin(\theta) = \frac{4}{5}\sqrt{2}$, $\cos(\theta) = \frac{5}{8}\sqrt{2}$

e) $\sin(\theta) = \frac{5}{57}\sqrt{57}$, $\cos(\theta) = \frac{4}{57}\sqrt{114}$

f) None of the above.



$5^2 + (4\sqrt{2})^2 = c^2$

$25 + 16 \cdot 2 = c^2$

$c = \sqrt{57}$

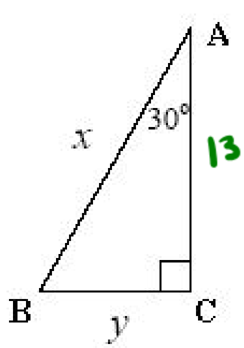
$\sin\theta = \frac{4\sqrt{2}}{\sqrt{57}} \cdot \frac{\sqrt{57}}{\sqrt{57}} = \frac{4\sqrt{114}}{57}$

$\cos\theta = \frac{5}{\sqrt{57}} \cdot \frac{\sqrt{57}}{\sqrt{57}} = \frac{5\sqrt{57}}{57}$

Question 20

Your answer is CORRECT.

Given triangle ABC as shown below. If $AC = 13$, find x and y.



a) $\left\{x=13\sqrt{3}, y=\frac{26}{3}\sqrt{3}\right\}$

b) $\left\{x=\frac{13}{3}\sqrt{3}, y=\frac{26}{3}\sqrt{3}\right\}$

c) $\{x=26, y=26\sqrt{3}\}$

d) $\left\{x=\frac{26}{3}\sqrt{3}, y=\frac{13}{3}\sqrt{3}\right\}$

e) $\{x=13\sqrt{2}, y=13\}$

f) None of the above.

30 : 60 : 90
a $\sqrt{3}a$ $2a$
y   13   x

$\sqrt{3}a = 13$

$a = \frac{13}{\sqrt{3}} = \frac{13\sqrt{3}}{3}$

$y = \frac{13}{3}\sqrt{3}$

$x = \frac{26}{3}\sqrt{3}$

$x = 2a$

$x = 2\left(\frac{13\sqrt{3}}{3}\right)$

$x = \frac{26}{3}\sqrt{3}$

Question 21

Your answer is CORRECT.

Convert the following radian measure to degrees: $^{11\pi}/_{6}$

a) $(^{2160}/_{11})°$

b) $(^{165}/_{2})°$

c) $(^{1100}/_{3})°$

d) 330°

e) 660°

f) None of the above.

$\frac{11\pi}{6} \cdot \frac{180}{\pi} = \frac{11 \cdot 6 \cdot 30}{6} = 330°$

Question 22

Your answer is CORRECT.

For the quadrantal angle $^{-5\pi}/_{2}$, give the coordinates of the point where the terminal side of the angle intersects the unit circle. Then give the sine and cotangent of the angle.

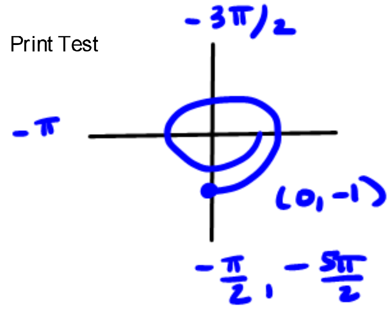
a) (-1, 0), $\sin(^{-5\pi}/_{2}) = -1$, $\cot(^{-5\pi}/_{2}) = 0$

b) (0, -1), $\sin(^{-5\pi}/_{2}) = -1$, $\cot(^{-5\pi}/_{2}) = 0$

c) (0, -1), sin($^{-5\pi}/_2$) = 0, cot($^{-5\pi}/_2$) = -1

d) (-1, 0), sin($^{-5\pi}/_2$) = 0, cot($^{-5\pi}/_2$) = 0

e) (0, 1), sin($^{-5\pi}/_2$) = 0, cot($^{-5\pi}/_2$) = 0



$\sin\left(-\frac{5\pi}{2}\right) = -1$

$\cot\left(-\frac{5\pi}{2}\right) = \frac{x}{y}$

$= \frac{0}{-1} = 0$

Question 23

Your answer is CORRECT.

Find the exact value of the following expression. Do not use a calculator. If undefined, state, "Undefined."

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

$\theta = -\pi/4$

a) $^{-3\pi}/_4$

b) $^{\pi}/_4$

c) Undefined

d) $^{3\pi}/_4$

e) $^{-\pi}/_4$

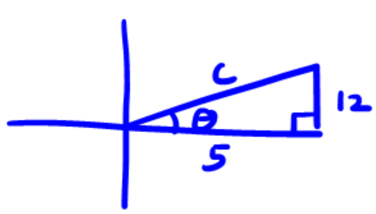
Question 24

Your answer is CORRECT.

Find the exact value of the following expression. Do not use a calculator. If undefined, state, *undefined.*

$$\cos\left(\underbrace{\tan^{-1}\left(\frac{12}{5}\right)}_{\theta}\right)$$

a) *undefined*



$\cos\theta = \frac{5}{13}$

b) $\frac{12}{5}$

c) $\frac{13}{5}$

$5^2 + 12^2 = c^2$

$c^2 = 25 + 144 = 169$

$c = 13$

d) $\frac{5}{13}$

e) $\frac{5}{12}$

f) None of the above.

Question 25

Your answer is CORRECT.

Evaluate

$$\sin\left(\underbrace{\cos^{-1}\left(\frac{1}{5}\right)}_{\theta}\right)$$

a) $\frac{1}{5}\sqrt{106}$

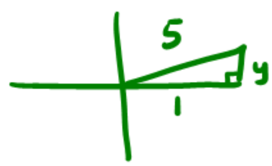
b) $\frac{2}{5}\sqrt{6}$

c) $\frac{4}{5}\sqrt{6}$

d) $\frac{1}{5}\sqrt{6}$

e) $\frac{1}{5}$

f) None of the above.



$\sin(\theta) = \frac{2\sqrt{6}}{5}$

$1^2 + y^2 = 5^2$

$y^2 = 24$

$y = 2\sqrt{6}$

Question 26

Your answer is CORRECT.

Give an equation of the form $f(x) = A\cos(Bx - C) + D$ which could be used to represent the given graph. (Note: C or D may be zero.)

$f(x) = 2\cos(2x - \pi) + 1$

$A = \frac{3-(-1)}{2} = \frac{4}{2} = 2$

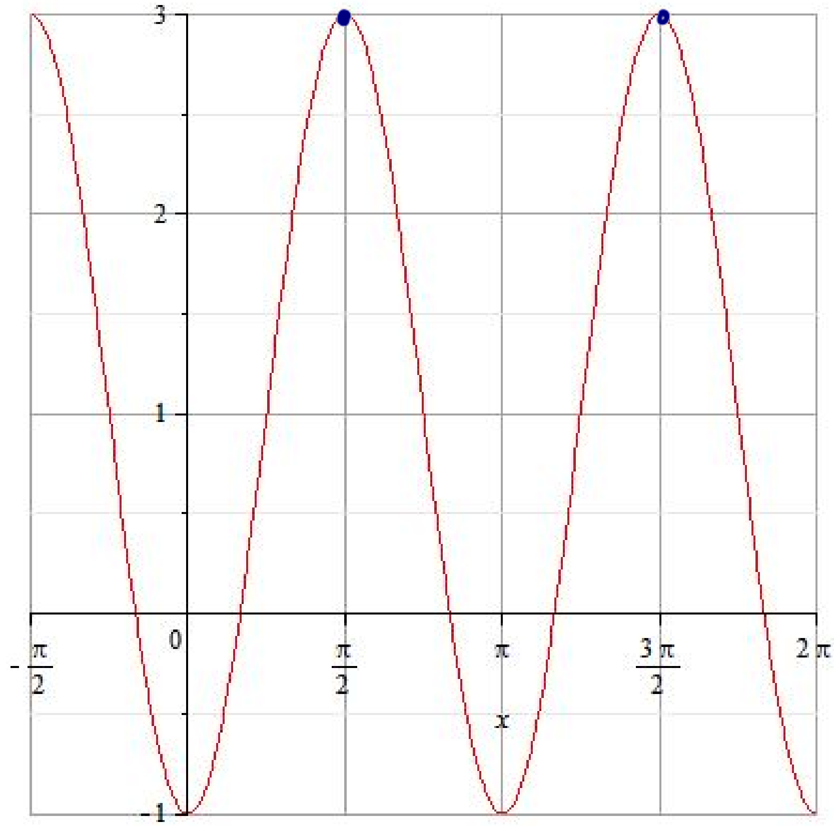
$D = \frac{3+(-1)}{2} = \frac{2}{2} = 1$

Phase Shift:
$\frac{\pi}{2}$ to the left

$\frac{C}{B} = \frac{\pi}{2}$

$\frac{C}{2} = \frac{\pi}{2}$

$C = \pi$



$f(x) = A\cos(Bx - C) + D$

Period $= \pi$

$\frac{2\pi}{B} = \frac{\pi}{1}$

$B\pi = 2\pi$

$B = 2$

a) $f(x) = 2\cos(2x - \pi)$

b) $f(x) = 2\cos(2x - \pi) - 1$

c) $f(x) = 2\cos(2x - \pi) + 1$

d) $f(x) = 4\cos(2x - \pi) - 1$

e) $f(x) = 4\cos(2x - \pi) + 1$

Question 27

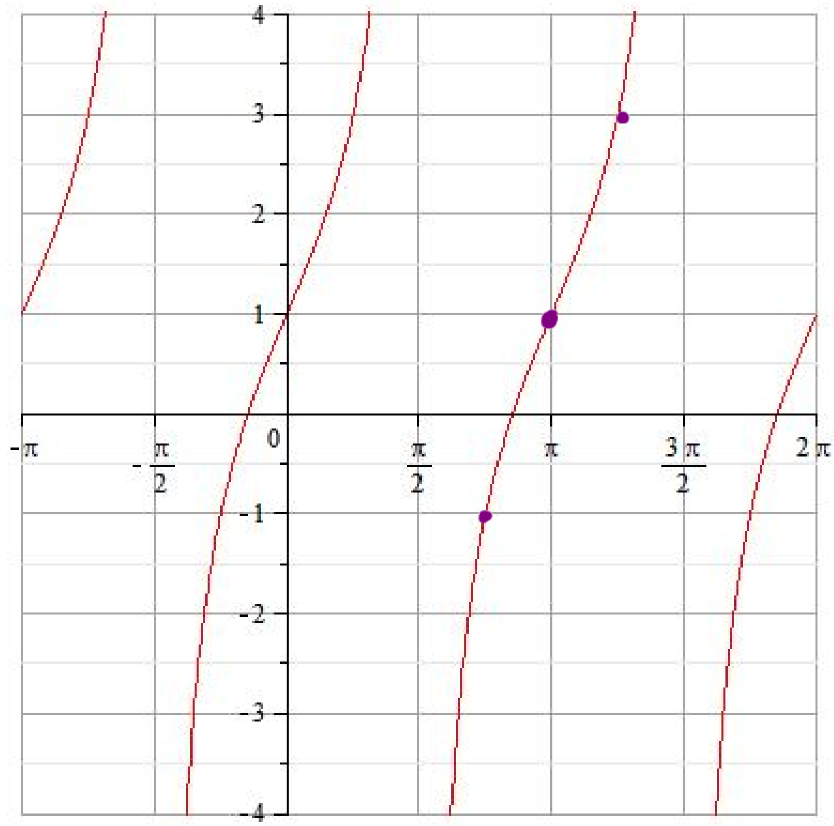
Your answer is CORRECT.

Give an equation of the form $f(x) = A\tan(Bx - C) + D$ which could be used to represent the given graph. (Note: C or D may be zero.),

$f(x) = A\tan(Bx - C) + D$

Phase shift : π to the right

D: 1 up



Period : π

$\frac{\pi}{B} = \frac{\pi}{1}$

$\pi = B\pi$

$B = 1$

$A = \frac{3-(-1)}{2} = \frac{4}{2} = 2$

a) $f(x) = 2\tan(x)$

b) $f(x) = 2\tan(x+1) + 1$

c) $f(x) = 2\tan(x-\pi)$

d) $f(x) = 2\tan(x-\pi) - 1$

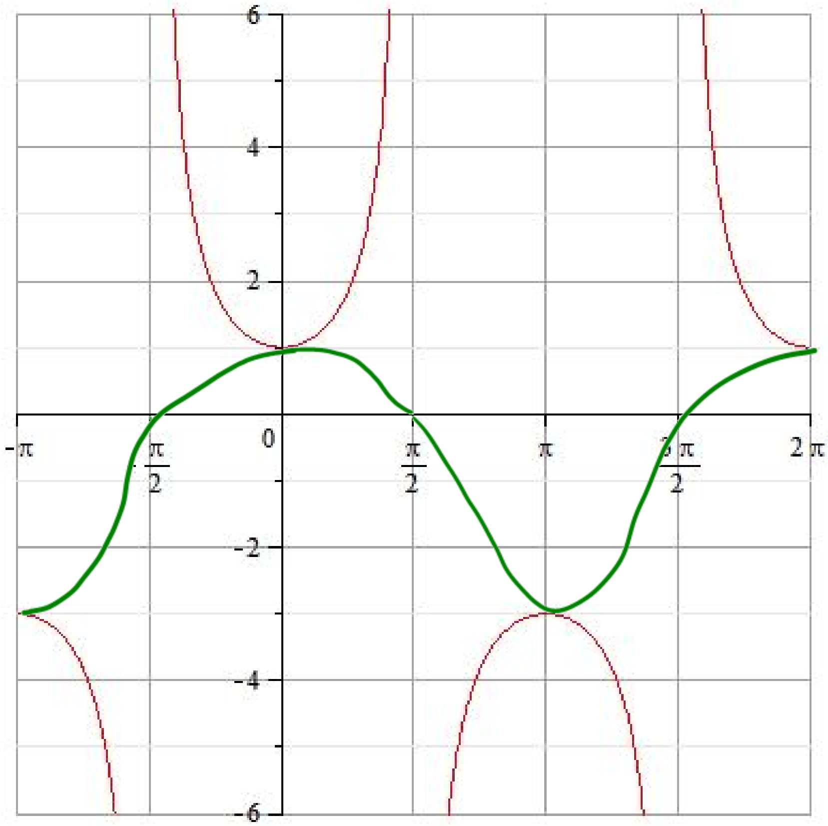
e) $f(x) = 2\tan(x-\pi) + 1$

f) None of the above.

Question 28

Your answer is CORRECT.

Give an equation of the form $f(x) = A\csc(Bx - C) + D$ which could be used to represent the given graph. (Note: C or D may be zero.)



$A = \frac{1-(-3)}{2} = 2$

$D = \frac{1+-3}{2} = \frac{-2}{2} = -1$

a) $f(x) = -2\csc\left(x - \frac{1}{2}\pi\right) + 1$ $\quad \frac{C}{B} : \frac{\pi}{2}$ to the right

b) $f(x) = -4\csc\left(x - \frac{1}{2}\pi\right) + 1$

c) $f(x) = -2\csc\left(x - \frac{1}{2}\pi\right) - 1$

d) $f(x) = -2\csc\left(x - \frac{1}{2}\pi\right)$

e) $f(x) = -4\csc\left(x - \frac{1}{2}\pi\right) - 1$

f) None of the above.

Question 29

Your answer is CORRECT.

Which of these is an equation of one of the asymptotes of the following function?

$$f(x) = 7\sec\left(5\pi x + \frac{1}{6}\pi\right)$$

$\sec(x) = \text{undef}$ at $x = \frac{\pi}{2}$ + $\frac{3\pi}{2}$

$5\pi x + \frac{\pi}{6} = \frac{\pi}{2}$

$5\pi x = \frac{\pi}{3}$

$x = \frac{1}{15}$

$5\pi x + \frac{\pi}{6} = \frac{3\pi}{2}$

$5\pi x = \frac{4\pi}{3}$

$x = \frac{4}{15}$

a) $x = \frac{1}{15}\pi$

b) $x = \frac{1}{60}\pi$

c) $x = \frac{1}{6}$

d) $x = \frac{1}{30}\pi$

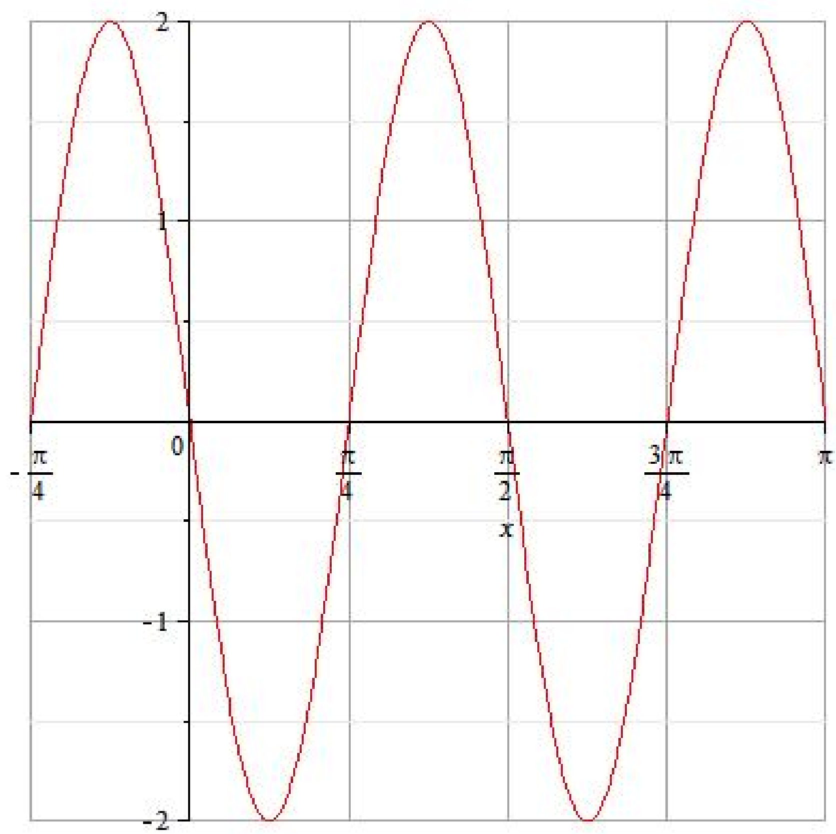
e) $x = \frac{1}{15}$

f) None of the above.

Question 30

Your answer is CORRECT.

Find the amplitude for the following function:



$A = \frac{\max - \min}{2}$

$A = \frac{2-(-2)}{2} = \frac{4}{2} = 2$

a) $\pi/2$

b) 2

c) 4

d) 1

e) $\pi/4$

Question 31

Your answer is CORRECT.

Find the period for the following function:

$$f(x) = 5\cos\left(\frac{1}{4}\pi x - \pi\right) - 2$$

a) $\pi/2$

$\frac{2\pi}{B} = \frac{2\pi}{(\pi/4)} = \frac{2\pi}{1} \cdot \frac{4}{\pi} = 8$

b) 8

c) 8π

d) 4

e) $\pi/4$

Question 32

Your answer is CORRECT.

Find the phase shift for the following function:

$$f(x) = 5\sin\left(\frac{1}{5}\pi x + \pi\right) - 4$$

a) π right

$\frac{C}{B} = \frac{-\pi}{\pi/5} = \frac{-\pi}{1} \cdot \frac{5}{\pi} = -5$

5 to the left

b) π left

c) 4 left

d) 5 right

e) 5 left

Question 33

Your answer is CORRECT.

Solve $\cos(7x) = 1$ on the interval $[\,0\,,\ \pi/2\,]$. $\rightarrow \left[\frac{0}{14}, \frac{7\pi}{14}\right]$

$\cos(x) = 1$

$x = 0,\ 2\pi$

$7x = 0 + 2\pi k$

$x = \frac{0}{7} + \frac{2\pi}{7}k$

$x = \frac{0}{14} + \frac{4\pi}{14}k$

$k=0$ $x = \frac{0}{14}$ ✓ $= 0$

$k=1$

$k=2$ $x = \frac{8\pi}{14}$ ✗

$7x = 2\pi + 2\pi k$

$x = \frac{2\pi}{7} + \frac{2\pi}{7}k$

$x = \frac{4\pi}{14} + \frac{4\pi}{14}k$

$x = \frac{4\pi}{14}$ ✓ $= \frac{2\pi}{7}$

$x = \frac{4\pi}{14} = \frac{2\pi}{7}$

a) $x = \pi/14$

b) $x = 0,\ \ x = 2\pi/7$

c) $x = 0\,,\ \ x = \pi/21$

d) $x = 0\,,\ \ x = \pi/7$

e) $x = 0$

f) None of the above.

Question 34

Your answer is CORRECT.

Solve $\sqrt{3}\cot(x) = -1$ on the interval $[\,0\,,\ 2\pi\,)$.

$\cot(x) = \frac{-1}{\sqrt{3}}$

ref $\theta = \pi/3$

$\tan(x) = -\sqrt{3}$

$x = 2\pi/3,\ 5\pi/3$

a) $x = 5\pi/6\,,\ \ x = 11\pi/6$

b) $x = \pi/3\,,\ \ x = 4\pi/3$

c) $x = \pi/4\,,\ \ x = 5\pi/4$

d) $x = \pi/6\,,\ \ x = 7\pi/6$

e) $x = 2\pi/3\,,\ \ x = 5\pi/3$

f) None of the above.

Question 35

Your answer is CORRECT.

Solve

$$\sin(2x) = -14\cos(x)$$

on the interval $[\,-\pi\,,\ \pi\,]$.

$[-\pi, \pi]$

a) $\textit{No solution}$

b) $\{x = 0,\ x = \pi\}$

c) $x = \frac{1}{2}\pi$

d) $\left\{x = -\frac{1}{2}\pi,\ x = \frac{1}{2}\pi\right\}$

e) $x = -\frac{1}{2}\pi$

$\sin(2x) = -14\cos(x)$

$2\sin(x)\cos(x) + 14\cos(x) = 0$

$2\cos(x)(\sin(x) + 7) = 0$

$2\cos x = 0$

$\cos(x) = 0$

$x = -\frac{\pi}{2}, \frac{\pi}{2}$

$\sin(x) = -7 \leftarrow$ NO SOLUTION

Question 36

Your answer is CORRECT.

Solve the following equation on the interval $[0, 2\pi)$.

$$\sin^2(x) = \sin(x)$$

a) $x = 0,\ x = \pi$

b) $x = \pi/2$

c) $x = \pi/4,\ x = 3\pi/4$

d) $x = 0,\ x = \pi,\ x = 3\pi/2$

e) $x = 0,\ x = \pi/2,\ x = \pi$

f) None of the above.

$\sin^2(x) - \sin(x) = 0$

$\sin(x)(\sin(x) - 1)$

$\sin x = 0$ $\quad$ $\sin(x) = 1$

$x = 0, \pi$ $\quad$ $x = \frac{\pi}{2}$

Question 37

Your answer is CORRECT.

Solve the following equation on the interval $[0, 2\pi)$.

$$4\sin^2(x) + \sin(x) - 5 = 0$$

a) $x = \pi/2$

b) $x = 3\pi/2$

c) $x = 0$

d) $x = \pi/2$, $x = 3\pi/2$

e) $x = \pi$, $x = 3\pi/2$

f) None of the above.

$4\sin^2(x) + \sin(x) - 5 = 0$

$(4\sin(x) + 5)(\sin(x) - 1)$

$\sin(x) = \frac{-5}{4}$ NO SOLUTION

$\sin(x) = 1$

$x = \frac{\pi}{2}$

Question 38

Your answer is CORRECT.

Find the area of triangle XYZ if $\angle Y = 30°$, $z = 9$ and $x = 4$.

a) $18\sqrt{3}$

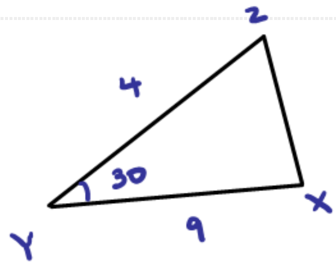
b) 9

c) 4

d) 18

e) $9\sqrt{3}$

f) None of the above.



$A = \frac{1}{2}(4)(9)\sin 30$

$A = \frac{36}{2} \cdot \frac{1}{2} = 18 \cdot 1/2 = 9$

Question 39

Your answer is CORRECT.

Given triangle ABC with the measure of angle A = 60^o, the length of BC = 10, and the length of AC = 20. How many solutions are there for the measure of angle B?

a) 0

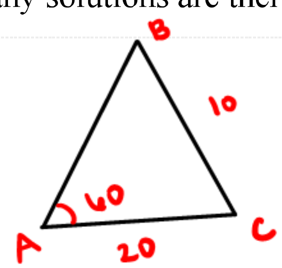
b) 1

c) 4

d) 3

e) 2

f) None of the above.



SSA

$\frac{\sin 60}{10} = \frac{\sin B}{20}$

$\frac{\sqrt{3}/2}{10} = \frac{\sin B}{20}$

$10\sqrt{3} = (\sin B)\,10$

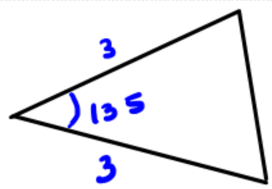
$\sqrt{3} = \sin B$

NO SOLUTION

Question 40

Your answer is CORRECT.

Two cyclists leave the corner of State Street and Main Street simultaneously. State Street and Main Street are not at right angles; the cyclists' paths have an angle of 135° between them. How far apart are the cyclists after they each travel 3 miles? The answers below are given in miles. *Hint: Use the Law of Cosines*



$x^2 = 3^2 + 3^2 - 2(3)(3)\cos 135$

$x^2 = 18 + 18\cos(45)$

$x^2 = 18 + 9\sqrt{2}$

$x^2 = 9(2+\sqrt{2})$

$x = 3\sqrt{2+\sqrt{2}}$

a) $\sqrt{9-\sqrt{3}}$

b) $6-\sqrt{3}$

c) 3

d) $3\sqrt{2+\sqrt{2}}$

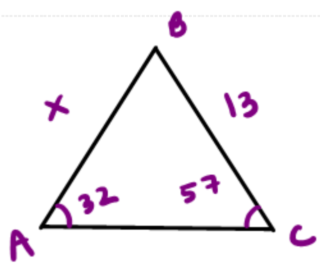
e) 6

f) None of the above.

Question 41

Your answer is CORRECT.

In triangle ABC, $\angle A$ measures 32°. If $\angle C$ measures 57° and BC has length 13, find AB.



$\frac{\sin 32}{13} = \frac{\sin 57}{x}$

$x \sin 32 = 13 \sin 57$

$x = \frac{13 \sin(57)}{\sin(32)}$

a) $\dfrac{13\sin\left(57^{o}\right)}{\sin\left(32^{o}\right)}$

b) $\dfrac{13\sin\left(32^{o}\right)}{\sin\left(57^{o}\right)}$

c) $13\sin\left(\dfrac{57^{o}}{32^{o}}\right)$

d) $\dfrac{13}{2}\sqrt{3}$

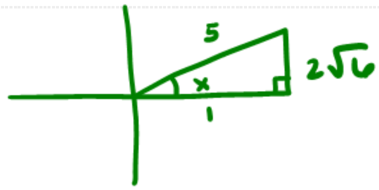
e) $\dfrac{13}{2}$

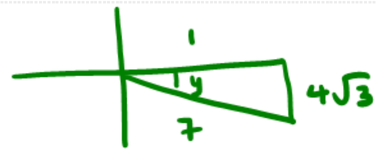
f) None of the above.

Question 42

Your answer is CORRECT.

Given $\cos(x) = {}^1\!/_5$ with $0^o < x < 90^o$, and $\cos(y) = {}^1\!/_7$ with $270^o < y < 360^o$. Find $\cos(x + y)$.





a) $\dfrac{1 + 24\sqrt{2}}{(35)}$

b) $\dfrac{1 - 24\sqrt{2}}{(35)}$

c) $\dfrac{1153}{35}$

d) $\dfrac{1 + 20\sqrt{3}}{(35)}$

e) $\dfrac{1 + 4\sqrt{78}}{(35)}$

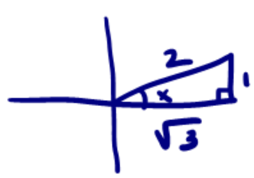
f) None of the above.

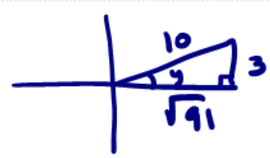
$$\cos(x+y) = \cos x \cos y - \sin x \sin y$$
$$= \left(\frac{1}{5}\right)\left(\frac{1}{7}\right) - \left(\frac{2\sqrt{6}}{5}\right)\left(\frac{-4\sqrt{3}}{7}\right)$$
$$= \frac{1}{35} + \frac{8\sqrt{18}}{35} = \frac{1 + 24\sqrt{2}}{35}$$

Question 43

Your answer is CORRECT.

Given $\sin(x) = {}^1\!/_2$ with $0^o < x < 90^o$, and $\sin(y) = {}^3\!/_{10}$ with $0^o < y < 90^o$. Find $\sin(x + y)$.





a) $\dfrac{\sqrt{7} + 3}{(20)}$

b) $\dfrac{\sqrt{91} + 3\sqrt{3}}{(20)}$

c) $\dfrac{\sqrt{91} - 3\sqrt{3}}{(20)}$

d) $\dfrac{2\sqrt{2}}{(20)}$

e) 5

$$\sin(x+y) = \sin x \cos y + \cos x \sin y$$
$$= \left(\frac{1}{2}\right)\left(\frac{\sqrt{91}}{10}\right) + \left(\frac{\sqrt{3}}{2}\right)\left(\frac{3}{10}\right)$$
$$= \frac{\sqrt{91}}{20} + \frac{3\sqrt{3}}{20} = \frac{\sqrt{91} + 3\sqrt{3}}{20}$$

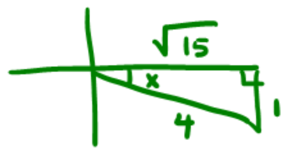
f) None of the above.

Question 44

Your answer is CORRECT.

Given $\csc(x) = -4$ with $270° < x < 360°$. Find $\cos(2x)$. $= \cos^2(x) - \sin^2(x)$

$= \frac{15}{16} - \frac{1}{16} = \frac{14}{16} = \frac{7}{8}$



a) -2

b) ◉ $^7/_8$

c) $\frac{1}{4}(\sqrt{15} - 1)$

$\sin(x) = \frac{-1}{4}$

d) $^{15}/_{16}$

$\cos(x) = \frac{\sqrt{15}}{4}$

e) 1

f) None of the above.

Question 45

Your answer is CORRECT.

Which of the following is equivalent to $\sin^2(\theta) - \sec^2(\theta) + \cos^2(\theta) + \tan^2(\theta)$?

$\underbrace{\sin^2\theta + \cos^2\theta}_{1} + \underbrace{\tan^2\theta - \sec^2\theta}_{+(-1)}$

$1 + (-1) = 0$

a) $\cot(\theta)$

b) -1

c) $\csc^2(\theta)$

d) 1

e) ◉ 0

f) None of the above.

Question 46

Your answer is CORRECT.

Which of the following is equivalent to $\left(1 - \cos(\theta)\right)\left(\csc(\theta) + \cot(\theta)\right)$?

a) $\tan(\theta)$

b) $\dfrac{\cos(\theta) + 1}{\cos(\theta) - 1}$

$$(1-\cos\theta)\left(\frac{1}{\sin\theta} + \frac{\cos\theta}{\sin\theta}\right)$$

$$\frac{1}{\sin\theta} + \frac{\cos\theta}{\sin\theta} - \frac{\cos\theta}{\sin\theta} - \frac{\cos^2\theta}{\sin\theta}$$

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

c) $sec(\theta)$

d) $sin(\theta)$

e) $cos(\theta)$

f) None of the above.

Question 47

$\sin^2\theta + \cos^2\theta = 1$

Your answer is CORRECT.

$\tan^2\theta + 1 = \sec^2\theta$

$\tan^2\theta = \sec^2\theta - 1$

Which of the following is equivalent to

$$\frac{sec^2(\theta) - 1}{sin^2(\theta)} = \frac{\tan^2\theta}{\sin^2\theta}$$

a) $cot^2(\theta)$

$$\frac{\sin^2\theta}{\cos^2\theta} \cdot \frac{1}{\sin^2\theta} = \frac{1}{\cos^2\theta} = \sec^2\theta$$

b) $sin^2(\theta)\, tan^2(\theta)$

c) $sin^2(\theta)$

d) $sec^2(\theta)$

e) $cos^2(\theta)$

f) None of the above.

Question 48

Your answer is CORRECT.

Which of the following is equivalent to

$$\frac{1 - cot^2(\theta)}{1 + cot^2(\theta)} + 2\,cos^2(\text{theta})$$

a) 2

$\sin^2\theta + \cos^2\theta = 1$

$1 + \cot^2\theta = \csc^2\theta$

b) 0

$\frac{1-\cot^2\theta}{\csc^2\theta} + 2\cos^2\theta$

c) 1

$\sin^2\theta - \frac{\cos^2\theta}{\sin^2\theta} \cdot \frac{\sin^2\theta}{1} + 2\cos^2\theta$

d) $-1 + 2\cos^2(\theta)$

$\sin^2\theta - \cos^2\theta + 2\cos^2\theta$

e) $2\sin^2(\theta)$

$\sin^2\theta + \cos^2\theta = 1$

f) None of the above.

Question 49

Your answer is CORRECT.

Solve the following equation on the interval $[0, 2\pi)$.

$$2\sin^2(x) - 11\sin(x) + 5 = 0$$

a) $x = 4\pi/3$, $x = 5\pi/3$

$(2\sin(x) - 1)(\sin(x) - 5) = 0$

b) $x = \pi/6$, $x = 5\pi/6$

$2\sin(x) = 1$ $\sin(x) = 5$

$\sin(x) = 1/2$ NO SOLUTION

c) $x = \pi/2$

$x = \pi/6, 5\pi/6$

d) $x = 7\pi/6$, $x = 11\pi/6$

e) $x = \pi/3$, $x = 2\pi/3$

f) None of the above.

Question 50

Your answer is CORRECT.

Solve

$$\sin\left(\pi x + \left(\frac{1}{3}\pi\right)\right) = 1$$

over the interval $[-1/3, 2/3]$

$\sin(x) = 1$

$\left[-\frac{2}{6}, \frac{4}{6}\right]$

$\pi x + \frac{\pi}{3} = \frac{\pi}{2} + 2\pi k$

a) $\frac{1}{6}\pi$

$\pi x = \frac{\pi}{6} + 2\pi k$

b) $\frac{1}{3}$

$x = \frac{1}{6} + 2k$

c) $\frac{1}{6}$

d) $\frac{1}{4}\pi + \frac{3}{4}$

e) $\frac{5}{6}$

$x = \frac{1}{6} + \frac{12k}{6}$

$k = 0 \quad x = \frac{1}{6}$ ✓

$k = 1 \quad x = \frac{13}{6}$ ✗