

The University of the State of New York
REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA 2/ TRIGONOMETRY

Friday, June 17, 2016 — 9:15 a.m. – 12:15 p.m.

SAMPLE RESPONSE SET

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Question 28

28 Factor $6x^3 + 33x^2 - 63x$ completely.

$$3x(2x^2 + 11x - 21)$$

$$3x(2x - 3)(x + 7)$$

Score: 2 The student gave a complete and correct response.

Question 28

28 Factor $6x^3 + 33x^2 - 63x$ completely.

$$\begin{aligned} & 3x(2x^2 + 11x - 21) \quad ac = -42 < \begin{matrix} 14 \\ -3 \end{matrix} \\ & 3x(2x^2 + 14x - 3x - 21) \\ & 3x(2x^2 + 14x) \quad (-3x - 21) \\ & \quad \downarrow \\ & 3x \quad 2x(x+7) - 3(x+7) \\ & \quad \boxed{3x(2x-3)(x+7)} \end{aligned}$$

Score: 2 The student gave a complete and correct response.

Question 28

28 Factor $6x^3 + 33x^2 - 63x$ completely.

$$3x(2x^2 + 11x - 21)$$

$3x$	$(x+7)$	$(2x-3)$
$\frac{3x=0}{3 \quad 3}$ $x=0$	$x+7=0$ $-7 \quad -7$ $x=-7$	$2x-3=0$ $+3 \quad +3$ <hr style="width: 50%; margin: 0 auto;"/> $\frac{2x=3}{2}$ $x=\frac{3}{2}$

$$x^2 + 11x - 42$$

$$(x+14)(x-3)$$

$$(2x+14)(2x-3)$$

$$(x+7)(2x-3)$$

Score: 1 The student made an error by treating the expression as an equation.

Question 28

28 Factor $6x^3 + 33x^2 - 63x$ completely.

$$3x(2x^2 + 11x - 21)$$

$$3x(2x + 7)(x - 3)$$

Score: 1 The student made one factoring error.

Question 28

28 Factor $6x^3 + 33x^2 - 63x$ completely.

$$3x(2x^2 + 11x - 21)$$

Score: 1 The student did not factor completely.

Question 28

28 Factor $6x^3 + 33x^2 - 63x$ completely.

$$3x \sqrt{2x^2 + 11x - 21} = 0$$

$\frac{3x=0}{3} \quad \frac{0}{3}$	$2x^2 + 11x - 21$
$x=0$	$2(2x-3)(x+7)$
$2x-3=0$ $\frac{2x}{2} = \frac{3}{2}$ $x = \frac{3}{2}$	$x+7=0$ $\frac{-7}{-7} = \frac{-7}{-7}$ $x = -7$
$x = \frac{3}{2}$	

$$\boxed{\{x=0\}}$$

$$\frac{2x^2}{2} = \frac{6x+7x-21}{2}$$

$$2x^2 + 14x - 3x - 21 = 0$$

$$(3(\frac{3}{2})) \left(2(\frac{3}{2})^2 + 11(\frac{3}{2}) - 21 \right) = 0$$

$$15.75 \neq 0$$

$$(3(7)) \left(2(7^2) + 11(7) - 21 \right)$$

$$21(98) + 77 - 21$$

$$2098 + 77 - 21$$

$$214 \neq 0$$

Score: 0 The student factored incorrectly and treated the expression as an equation.

Question 29

29 Five thousand dollars is invested at an interest rate of 3.5% compounded quarterly. No money is deposited or withdrawn from the account. Using the formula below, determine, to the *nearest cent*, how much this investment will be worth in 18 years.

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

A = amount

P = principal

r = interest rate

n = number of times the interest rate compounded annually

t = time in years

$$A = 5000\left(1 + \frac{0.035}{4}\right)^{4 \cdot 18}$$

$$A = \$9362.36$$

Score: 2 The student gave a complete and correct response.

Question 29

29 Five thousand dollars is invested at an interest rate of 3.5% compounded quarterly. No money is deposited or withdrawn from the account. Using the formula below, determine, to the *nearest cent*, how much this investment will be worth in 18 years.

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

A = amount

P = principal

r = interest rate

n = number of times the interest rate compounded annually

t = time in years

$$A = 5,000 \left(1 + 0.35\right)^{18.4}$$

$$A = 5,000 \left(1.035\right)^{72}$$

$$A = \$59,521.68$$

Score: 1 The student did not divide 0.035 by 4 to get the quarterly rate.

Question 29

29 Five thousand dollars is invested at an interest rate of 3.5% compounded quarterly. No money is deposited or withdrawn from the account. Using the formula below, determine, to the *nearest cent*, how much this investment will be worth in 18 years.

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

A = amount

P = principal

r = interest rate

n = number of times the interest rate compounded annually

t = time in years

$$A = 5,000 \left(1 + \frac{.035}{4}\right)^{18}$$

~~$$A = 5,848.890$$~~

$$A = 5,848.895519$$

$$A = \$5,848.90$$

Score: 1 The student did not multiply the number of years by 4.

Question 29

29 Five thousand dollars is invested at an interest rate of 3.5% compounded quarterly. No money is deposited or withdrawn from the account. Using the formula below, determine, to the *nearest cent*, how much this investment will be worth in 18 years.

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

A = amount

P = principal

r = interest rate

n = number of times the interest rate compounded annually

t = time in years

$$5000\left(1 + \frac{3.5}{4}\right)^{18 \times 4}$$

$$2069, 883, 615.22$$

Score: 0 The student gave a completely incorrect response.

Question 30

30 A colony of bacteria grows exponentially. The table below shows the data collected daily.

Day (x)	Population (y)
0	200
1	425
2	570
3	800
4	1035
5	1650
6	2600

State the exponential regression equation for the data, rounding all values to the *nearest hundredth*.

$$a = 239.21$$

$$b = 1.48$$

$$y = 239.21(1.48)^x$$

Score: 2 The student gave a complete and correct response.

Question 30

30 A colony of bacteria grows exponentially. The table below shows the data collected daily.

Day (x)	Population (y)
0	200
1	425
2	570
3	800
4	1035
5	1650
6	2600

State the exponential regression equation for the data, rounding all values to the *nearest hundredth*.

$$y = a * b^x$$

$$a = 239.21 \quad b = 1.48$$

Score: 2 The student gave a complete and correct response.

Question 30

30 A colony of bacteria grows exponentially. The table below shows the data collected daily.

Day (x)	Population (y)
0	200
1	425
2	570
3	800
4	1035
5	1650
6	2600

State the exponential regression equation for the data, rounding all values to the *nearest hundredth*.

$$y = ab^x$$
$$y = 245.95(1.47)^x$$

Score: 1 The student wrote an incorrect exponential regression equation. [The student may have not cleared the frequency on the exponential regression screen on the calculator after doing question number 25.]

Question 30

30 A colony of bacteria grows exponentially. The table below shows the data collected daily.

Day (x)	Population (y)
0	200
1	425
2	570
3	800
4	1035
5	1650
6	2600

State the exponential regression equation for the data, rounding all values to the *nearest hundredth*.

$$239.21(1.48)^x$$

Score: 1 The student wrote an expression instead of an equation.

Question 30

30 A colony of bacteria grows exponentially. The table below shows the data collected daily.

Day (x)	Population (y)
0	200
1	425
2	570
3	800
4	1035
5	1650
6	2600

State the exponential regression equation for the data, rounding all values to the *nearest hundredth*.

$$y = ab^x$$

$$a = 239.2$$

$$b = 1.5$$

$$y = [(239.2)(1.5)]^x$$

Score: 0 The student rounded both values to the nearest tenth and made a conceptual error when writing the equation.

Question 30

30 A colony of bacteria grows exponentially. The table below shows the data collected daily.

Day (x)	Population (y)
0	200
1	425
2	570
3	800
4	1035
5	1650
6	2600

State the exponential regression equation for the data, rounding all values to the *nearest hundredth*.

$$a = 239.211$$

$$b = 1.481$$

$$239.211(1.481)^x$$

Score: 0 The student rounded incorrectly and wrote an expression instead of an equation.

Question 30

30 A colony of bacteria grows exponentially. The table below shows the data collected daily.

Day (x)	Population (y)
0	200
1	425
2	570
3	800
4	1035
5	1650
6	2600

State the exponential regression equation for the data, rounding all values to the *nearest hundredth*.

$$y = ax + b$$

$$a = 361.25$$

$$b = -43.75$$

$$y = 361.25x - 43.75$$

Score: 0 The student made an error by finding a linear regression.

Question 31

31 Express $\frac{2 + \frac{6}{x-3}}{\frac{x}{x-3}}$ in simplest form, when $x \neq 0$ and $x \neq 3$.

$$\frac{2 + \frac{6}{x-3}}{\frac{x}{x-3}} \left(\frac{x-3}{x-3} \right) =$$

$$\frac{2x - 6 + 6}{x} =$$

$$\boxed{2}$$

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

$$2$$

Score: 2 The student gave a complete and correct response.

Question 31

31 Express $\frac{2 + \frac{6}{x-3}}{\frac{x}{x-3}}$ in simplest form, when $x \neq 0$ and $x \neq 3$.

$$\frac{\left(\frac{x-3}{x-3}\right)\frac{2}{1} + \frac{6}{x-3}}{\frac{x}{x-3}}$$

$$\frac{2x - \cancel{6}}{\cancel{x-3}} \cdot \frac{\cancel{x-3}}{x}$$

$$\frac{2x}{x}$$

$$\boxed{2}$$

Score: 2 The student gave a complete and correct response.

Question 31

31 Express $\frac{2 + \frac{6}{x-3}}{\frac{x}{x-3}}$ in simplest form, when $x \neq 0$ and $x \neq 3$.

$$\frac{2 + \frac{6}{x-3} \quad (x-3)}{\frac{x}{x-3} \quad (x-3)}$$
$$\frac{2+6}{x} = \left(\frac{8}{x} \right)$$

Score: 1 The student made an error by not multiplying both terms of the numerator by $(x - 3)$.

Question 31

31 Express $2 + \frac{6}{x-3}$ in simplest form, when $x \neq 0$ and $x \neq 3$.

$$\frac{x-3}{1} \frac{2}{1} + \frac{6}{\cancel{x-3}} \frac{\cancel{x-3}}{1}$$
$$\frac{x}{\cancel{x-3}} \frac{\cancel{x-3}}{1}$$

$$\frac{2x-6+6}{x}$$

$$\frac{2x}{x}$$

Score: 1 The student did not simplify completely.

Question 31

31 Express $\frac{2 + \frac{6}{x-3}}{\frac{x}{x-3}}$ in simplest form, when $x \neq 0$ and $x \neq 3$.

$$\frac{2 + \frac{6}{x-3} \quad (\times-3)}{\frac{x}{x-3} \quad (\times-3)}$$

$$\frac{2+6}{x}$$

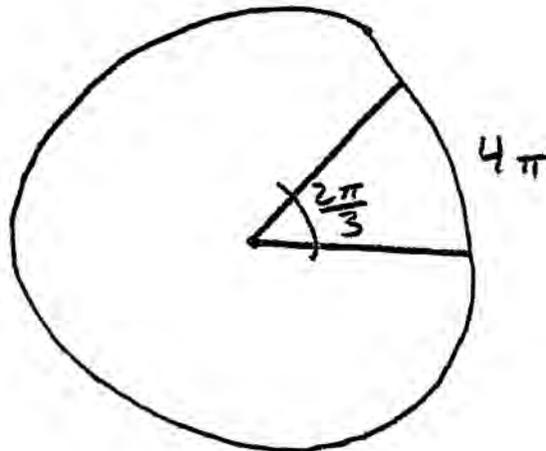
$$\frac{8}{x}$$

$$x = \frac{8}{x}$$

Score: 0 The student made an error by not multiplying both terms of the numerator by $(x - 3)$ and stated the final answer as an equation.

Question 32

- 32 A central angle whose measure is $\frac{2\pi}{3}$ radians intercepts an arc with a length of 4π feet. Find the radius of the circle, in feet.



$$s = \theta r$$

$$s = 4\pi$$

$$\theta = \frac{2\pi}{3}$$

$$\frac{3}{2\pi} \cdot 4\pi = \left(\frac{2\pi}{3}\right) r \cdot \frac{3}{2\pi}$$

$$6 = r$$

$$\textcircled{6}$$

Score: 2 The student gave a complete and correct response.

Question 32

32 A central angle whose measure is $\frac{2\pi}{3}$ radians intercepts an arc with a length of 4π feet.
Find the radius of the circle, *in feet*.

$$\frac{2\pi}{3} \cdot r = 4\pi$$

$$\frac{r}{3} = 2$$

$$r = 6$$

Score: 2 The student gave a complete and correct response.

Question 32

32 A central angle whose measure is $\frac{2\pi}{3}$ radians intercepts an arc with a length of 4π feet.
Find the radius of the circle, *in feet*.

$$\frac{2(180)}{3} = 120$$

$$\frac{120}{360} = \frac{2}{4\pi r}$$

$$\frac{1}{3} = \frac{2}{r}$$

$$r = 6$$

Score: 2 The student gave a complete and correct response.

Question 32

32 A central angle whose measure is $\frac{2\pi}{3}$ radians intercepts an arc with a length of 4π feet.
Find the radius of the circle, *in feet*.

$$\frac{\frac{2\pi}{3}}{2\pi} = \frac{4\pi}{2\pi r}$$

$$8\pi^2 = \frac{4\pi^2 r}{3}$$

$$24\pi^2 = 4\pi^2 r$$

$$6 = r$$

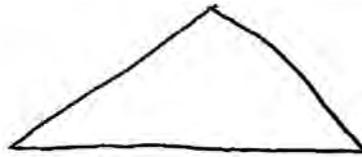
Score: 2 The student gave a complete and correct response.

Question 32

32 A central angle whose measure is $\frac{2\pi}{3}$ radians intercepts an arc with a length of 4π feet.
Find the radius of the circle, *in feet*.



$$\frac{2\pi}{3} \times \frac{1}{4\pi} = \boxed{\frac{1}{6} \text{ (feet)}}$$



Score: 1 The student made an error by dividing $\frac{2\pi}{3}$ by 4π .

Question 32

32 A central angle whose measure is $\frac{2\pi}{3}$ radians intercepts an arc with a length of 4π feet.
Find the radius of the circle, *in feet*.

$$S = \theta r$$

$$\frac{4\pi}{\frac{2\pi}{3}} = \frac{\frac{2\pi}{3} r}{\frac{2\pi}{3}}$$

$$\frac{2}{3} = r$$

Score: 1 The student made an error when dividing by $\frac{2\pi}{3}$.

Question 32

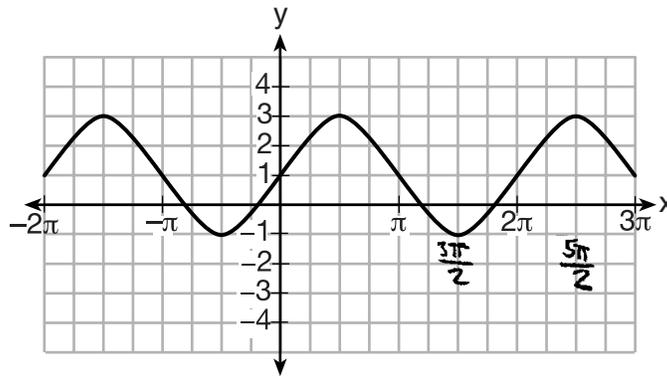
32 A central angle whose measure is $\frac{2\pi}{3}$ radians intercepts an arc with a length of 4π feet.
Find the radius of the circle, *in feet*.

$$S = \theta r$$
$$1 \quad \frac{2\pi}{3} = \frac{4\pi r}{4\pi}$$
$$2 \quad \frac{4\pi}{4\pi}$$
$$r = \frac{3}{2\pi}$$

Score: 0 The student made an error by interchanging the arc length and angle measure, and then made an error when dividing by 4π .

Question 33

33 A sine function is graphed below.



$$\frac{4\pi + \pi}{2} - \frac{4\pi}{2} = \frac{5\pi}{2}$$

Determine and state the amplitude and period of this function.

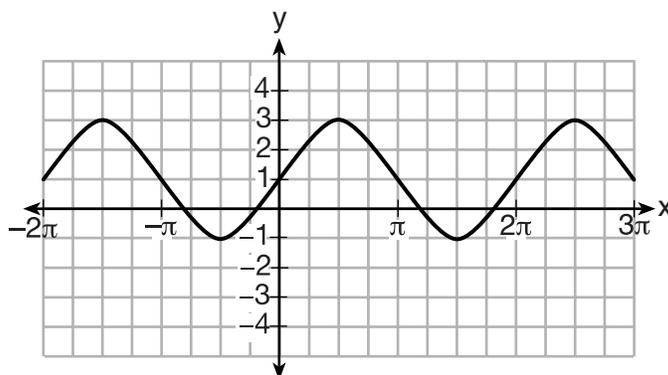
Amplitude : 2

Period : 2π

Score: 2 The student gave a complete and correct response.

Question 33

33 A sine function is graphed below.



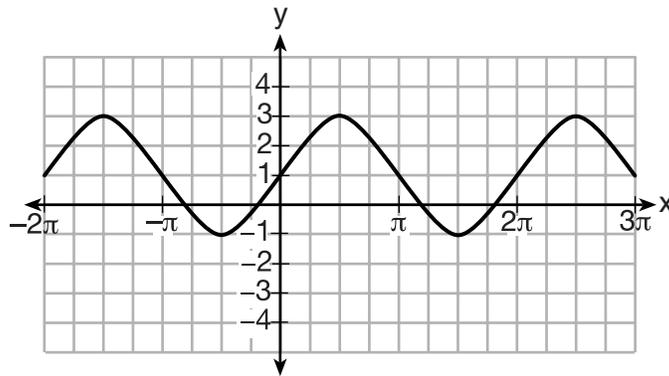
Determine and state the amplitude and period of this function.

~~Handwritten scribbles~~ 1.5
450
Amp = 2
per = ~~2.5π~~ 2.5π

Score: 1 The student stated an incorrect period.

Question 33

33 A sine function is graphed below.



Determine and state the amplitude and period of this function.

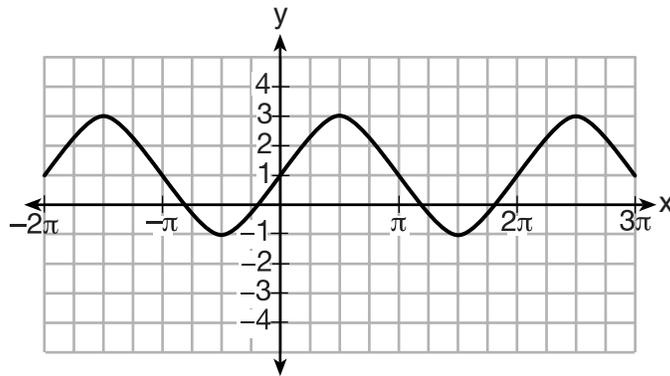
$$\text{Amplitude} = 4$$

$$\text{Period} = 2\pi$$

Score: 1 The student stated an incorrect amplitude.

Question 33

33 A sine function is graphed below.



Determine and state the amplitude and period of this function.

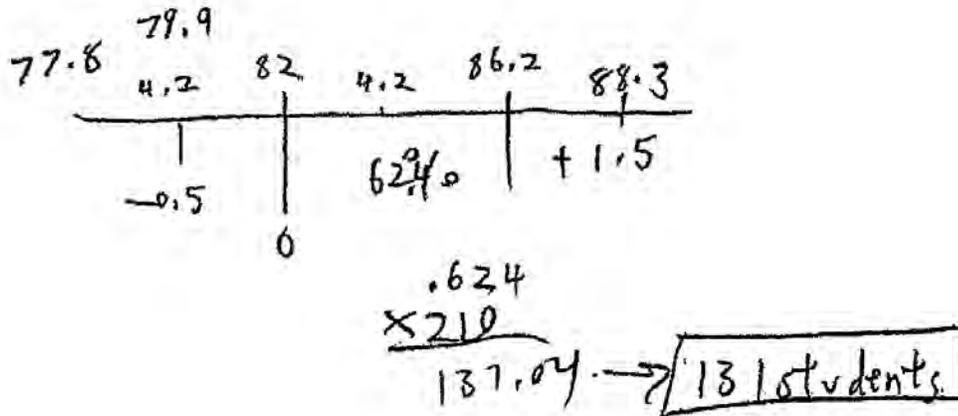
Amplitude - 2.3
Period - $\frac{1}{2}\pi$

Score: 0 The student stated an incorrect amplitude and period.

Question 34

34 On the Algebra 2/Trigonometry midterm at Champion High School, the scores of 210 students were normally distributed with a mean of 82 and a standard deviation of 4.2.

Determine how many students scored between 79.9 and 88.3.

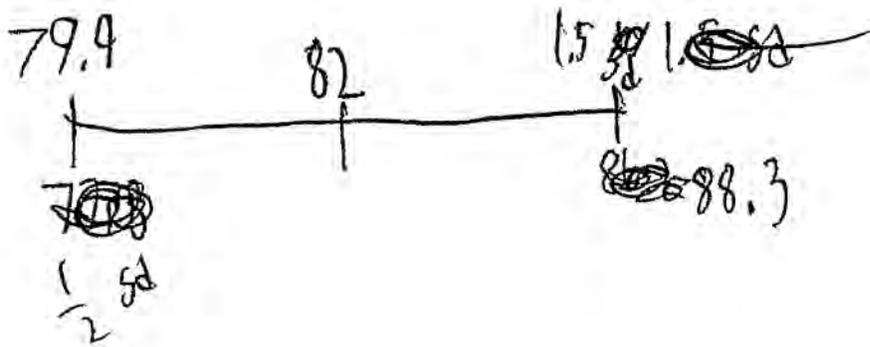


Score: 2 The student gave a complete and correct response.

Question 34

34 On the Algebra 2/Trigonometry midterm at Champion High School, the scores of 210 students were normally distributed with a mean of 82 and a standard deviation of 4.2.

Determine how many students scored between 79.9 and 88.3.



$$\frac{62.4}{100} = \frac{x}{210}$$

$$13,104 = 100x$$

$$x = 131 \text{ students}$$

Score: 2 The student gave a complete and correct response.

Question 34

34 On the Algebra 2/Trigonometry midterm at Champion High School, the scores of 210 students were normally distributed with a mean of 82 and a standard deviation of 4.2.

Determine how many students scored between 79.9 and 88.3.

$$210 * \text{normalcdf}(79.9, 88.3, 82, 4.2)$$

$$131.1776002$$

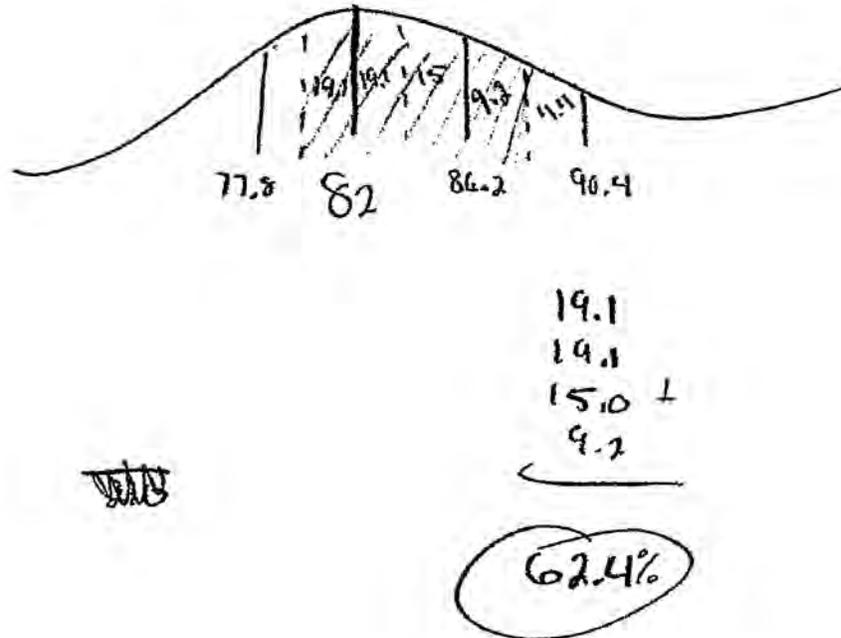
$$\approx 131$$

Score: 2 The student gave a complete and correct response.

Question 34

34 On the Algebra 2/Trigonometry midterm at Champion High School, the scores of 210 students were normally distributed with a mean of 82 and a standard deviation of 4.2.

Determine how many students scored between 79.9 and 88.3.

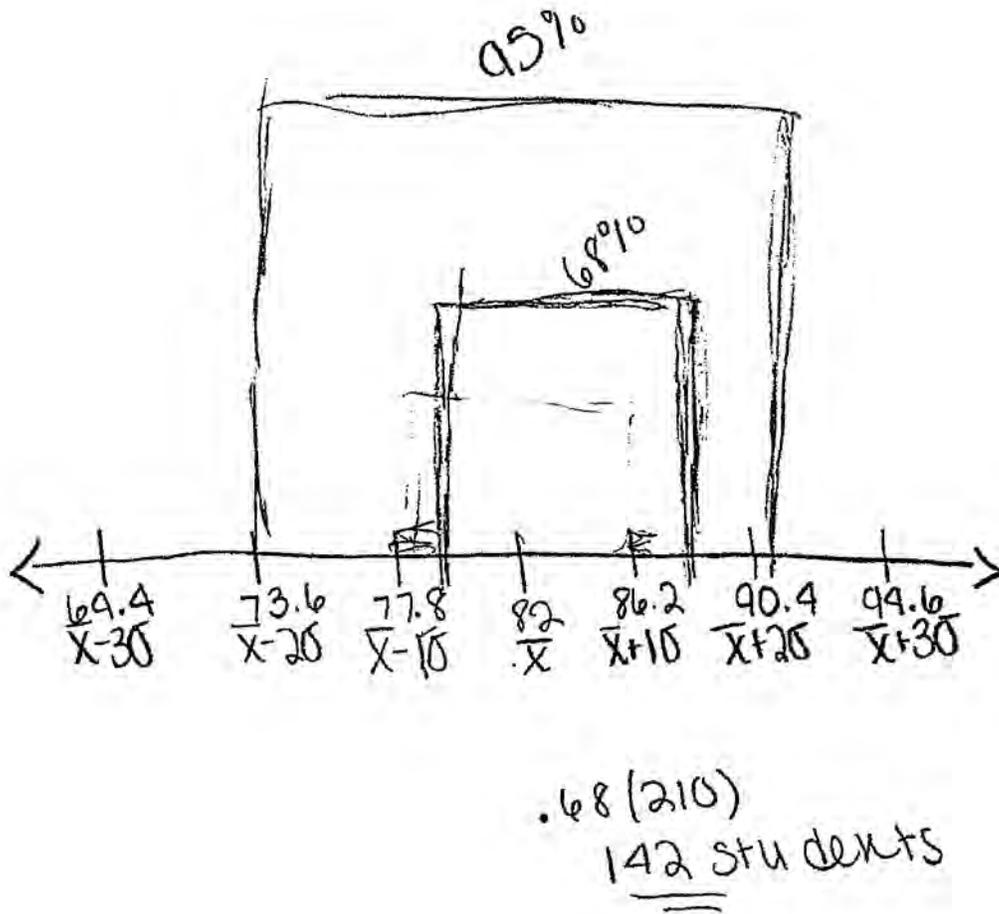


Score: 1 The student did not determine the number of students.

Question 34

34 On the Algebra 2/Trigonometry midterm at Champion High School, the scores of 210 students were normally distributed with a mean of 82 and a standard deviation of 4.2.

Determine how many students scored between 79.9 and 88.3.



Score: 1 The student made an error in finding the percentage.

Question 34

34 On the Algebra 2/Trigonometry midterm at Champion High School, the scores of 210 students were normally distributed with a mean of 82 and a standard deviation of 4.2.

Determine how many students scored between 79.9 and 88.3.

$$\bullet 68 \times 210$$

$$= \boxed{142.8 \text{ students}}$$

Score: 0 The student made an error in calculating the percentage and did not round appropriately.

Question 35

35 Given $\tan \theta = -\frac{5}{12}$ and $\frac{\pi}{2} < \theta < \pi$, determine the *exact* value of the expression $\sin \theta \cot \theta$.

Solowndora

$$\frac{\sin}{\cos} = -\frac{5}{12}$$



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

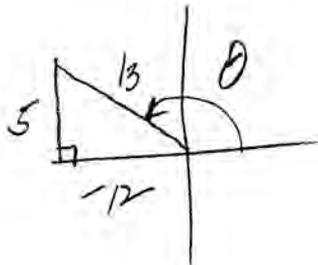
$$\left(\frac{5}{13} \right) \frac{-12}{13} \left(\frac{13}{5} \right)$$

$$\left(\frac{5}{13} \right) \left(\frac{-12}{5} \right) = \boxed{\frac{-60}{65}}$$

Score: 2 The student gave a complete and correct response.

Question 35

35 Given $\tan \theta = -\frac{5}{12}$ and $\frac{\pi}{2} < \theta < \pi$, determine the *exact* value of the expression $\sin \theta \cot \theta$.



$$\tan \theta = -\frac{5}{12}$$

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

$$(\theta = 157.3801351)$$

$$\sin \theta \cot \theta = -0.9230769231$$

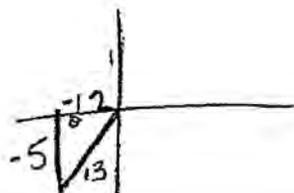
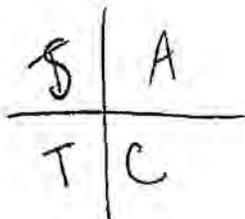
$$= -0.\overline{923076}$$

Score: 2 The student gave a complete and correct response.

Question 35

35 Given $\tan \theta = -\frac{5}{12}$ and $\frac{\pi}{2} < \theta < \pi$, determine the *exact* value of the expression $\sin \theta \cot \theta$.

$$\tan \theta = \frac{-5}{12} \text{ and } \frac{\pi}{2} < \theta < \pi$$

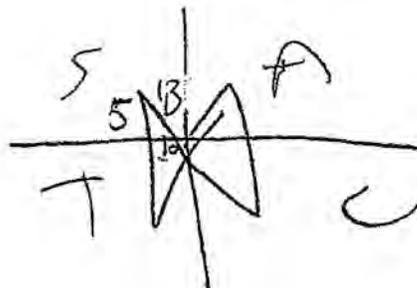


$$\sin \theta \cot \theta$$
$$\left(\frac{-5}{13}\right)\left(\frac{-12}{-5}\right) \quad \left(\frac{60}{-65}\right)$$

Score: 1 The student made an error by placing the angle in Quadrant III.

Question 35

35 Given $\tan \theta = -\frac{5}{12}$ and $\frac{\pi}{2} < \theta < \pi$, determine the *exact* value of the expression $\sin \theta \cot \theta$.



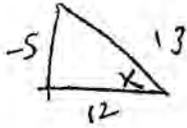
$$\sin \theta = \frac{5}{13}$$

$$\cot = -\frac{12}{5}$$

Score: 1 The student made an error by not finding the product.

Question 35

35 Given $\tan \theta = -\frac{5}{12}$ and $\frac{\pi}{2} < \theta < \pi$, determine the *exact* value of the expression $\sin \theta \cot \theta$.
90 180



$$\sin X = \frac{-5}{13}$$
$$\cot = -\frac{12}{5}$$

$$\left(-\frac{5}{13}\right)\left(-\frac{12}{5}\right) = \frac{60}{65}$$

Score: 1 The student labeled the triangle incorrectly.

Question 35

35 Given $\tan \theta = -\frac{5}{12}$ and $\frac{\pi}{2} < \theta < \pi$, determine the *exact* value of the expression $\sin \theta \cot \theta$.

$\frac{180}{2} \rightarrow 90 < \theta < 180 \rightarrow Q2$

sin
csc

All
6 positive

tan
cot

cos
sec

5

-12

θ

13

$a^2 + b^2 = c^2$
 $(12)^2 + (5)^2 = c^2$
 $144 + 25 = c^2$
 $\sqrt{169} = \sqrt{c^2}$
 $13 = c$

SOH CAH TOA

$\tan \theta = -\frac{5}{12}$
 $\sin \theta = \frac{5}{13}$
 $\cos \theta = -\frac{12}{13}$

$\cot = \frac{1}{\tan} = \frac{1}{-5/12}$

$\sin \theta \cot \theta$
 $(\frac{5}{13})(\frac{-12}{5}) \rightarrow 1 \cdot \frac{-2}{5} = \frac{-2}{5}$
 $(\frac{5}{13})(\frac{-2}{5})$
 $\frac{-10}{65} \leftarrow \text{GCF} = 5$
 $\frac{-2}{13}$
.15

Score: 0 The student made a transcription error when expressing $\cot \theta$ and did not express the exact value as the final answer.

Question 35

35 Given $\tan \theta = -\frac{5}{12}$ and $\frac{\pi}{2} < \theta < \pi$, determine the *exact* value of the expression $\sin \theta \cot \theta$.

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

$$\theta = -22.61986495$$

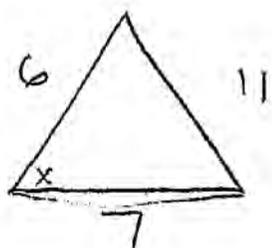
$$(\sin(-22.619\dots)) \left(\frac{1}{\sin(-22.619\dots)}\right)$$

$$\boxed{1}$$

Score: 0 The student gave a completely incorrect response.

Question 36

36 The lengths of the sides of a triangle are 6 cm, 11 cm, and 7 cm. Determine, to the *nearest tenth of a degree*, the measure of the largest angle of the triangle.



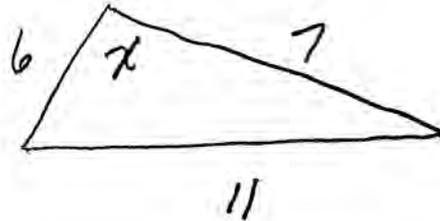
$$11^2 = 6^2 + 7^2 - 2(6)(7)\cos A$$

115.4°

Score: 4 The student gave a complete and correct response.

Question 36

36 The lengths of the sides of a triangle are 6 cm, 11 cm, and 7 cm. Determine, to the *nearest tenth of a degree*, the measure of the largest angle of the triangle.



$$x = \cos^{-1} \left(\frac{6^2 + 7^2 - 11^2}{2(6)(7)} \right)$$

$$x = 115.3769335$$

$$x \approx 115.4$$

Score: 4 The student gave a complete and correct response.

Question 36

36 The lengths of the sides of a triangle are 6 cm, 11 cm, and 7 cm. Determine, to the nearest tenth of a degree, the measure of the largest angle of the triangle.

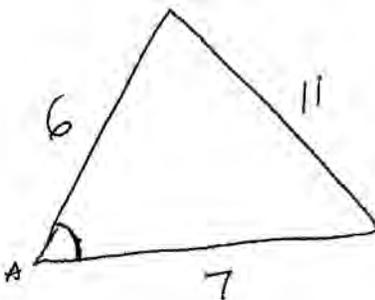
$$\begin{aligned} 11^2 &= (6^2) + (7^2) - 2(6)(7)(\cos X) \\ 121 &= 85 - 84 \cos X \\ -85 &= -85 - 84 \cos X \\ 36 &= \frac{84 \cos X}{84} \\ \frac{36}{84} &= \cos X \end{aligned}$$

$X = 64.6$

Score: 3 The student made an error by dividing by 84 instead of -84 .

Question 36

36 The lengths of the sides of a triangle are 6 cm, 11 cm, and 7 cm. Determine, to the nearest tenth of a degree, the measure of the largest angle of the triangle.



$$\begin{aligned} 11^2 &= 6^2 + 7^2 - 2(6)(7) \cos A \\ 121 &= 85 - 84 \cos A \\ \hline -85 & \quad -85 \\ 36 &= 84 \cos A \\ \hline \cancel{84} & \quad -84 \\ \cos A &= -.4285714286 \\ A &= 2.01 \\ \boxed{A=2.0} \end{aligned}$$

Score: 2 The student made an error by finding the measure of angle A in radians.

Question 36

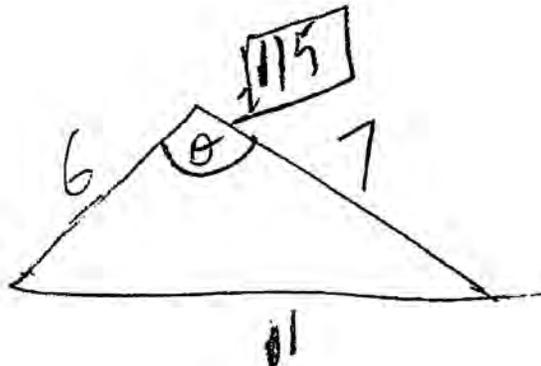
36 The lengths of the sides of a triangle are 6 cm, 11 cm, and 7 cm. Determine, to the *nearest tenth of a degree*, the measure of the largest angle of the triangle.

$$\begin{aligned} 11^2 &= 6^2 + 7^2 - 2(6)(7) \sin A \\ 121 &= \cancel{85} - 84 \sin A \\ -85 & \quad -85 \\ \hline 36 &= \frac{-84 \sin A}{-84} \\ \hline \frac{36}{-84} &= \sin A \\ \sin^{-1}\left(\frac{36}{-84}\right) \\ A &= -25.4 \end{aligned}$$

Score: 2 The student made a transcription error by using sine instead of cosine, and did not recognize that -25.4 is not a viable solution.

Question 36

36 The lengths of the sides of a triangle are 6 cm, 11 cm, and 7 cm. Determine, to the nearest tenth of a degree, the measure of the largest angle of the triangle.



$$\cos \theta = 115.3$$

$$11^2 = 6^2 + 7^2 - 2(6)(7)\cos \theta$$

$$121 = 36 + 49 - 84\cos \theta$$

$$-84\cos \theta = 36 - 85$$

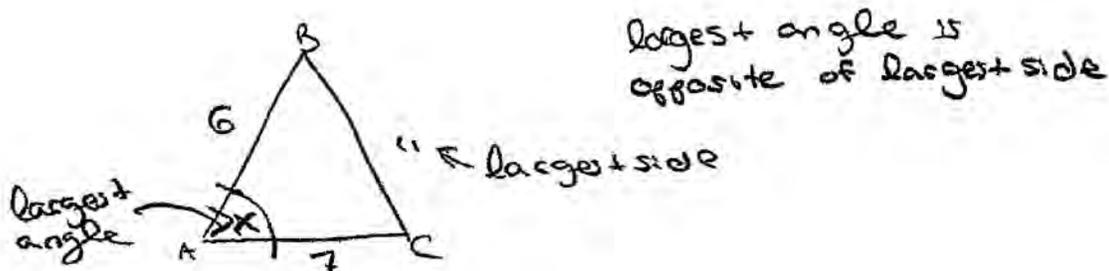
$$36 = -84\cos \theta$$

$$\cos \theta = -.42857$$

Score: 2 The student stated $\cos \theta = 115.3$ and did not round properly.

Question 36

36 The lengths of the sides of a triangle are 6 cm, 11 cm, and 7 cm. Determine, to the nearest tenth of a degree, the measure of the largest angle of the triangle.



Law of Cosine

$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$11^2 = 7^2 + 6^2 - 2(7)(6) \cos X$$

$$121 = 49 + 36 - 84 \cos X$$

$$121 = 85 - 84 \cos X$$

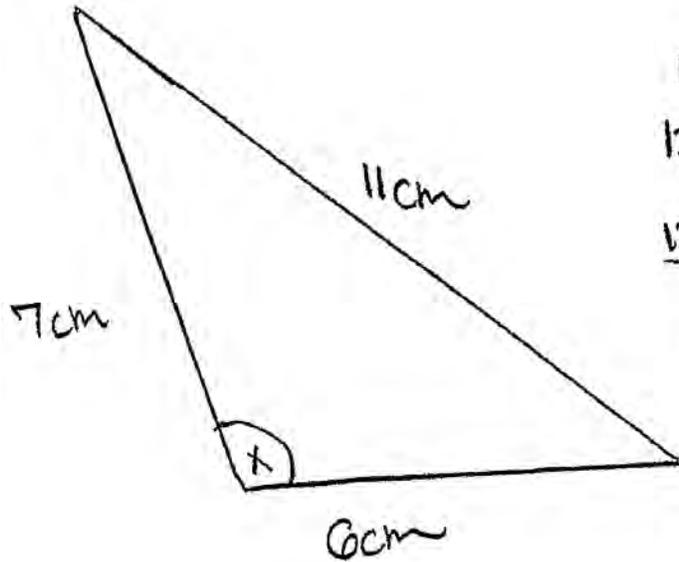
$$36 = -84 \cos X$$

$$-.43 = \cos X$$

Score: 2 The student rounded prematurely and did not solve for x .

Question 36

36 The lengths of the sides of a triangle are 6 cm, 11 cm, and 7 cm. Determine, to the nearest tenth of a degree, the measure of the largest angle of the triangle.



$$11^2 = 6^2 + 7^2 - 2(6)(7)\cos A$$

$$121 = 36 + 49 - 84\cos A$$

$$\frac{121}{1} = \frac{1}{1}\cos A$$

$$121 = \cos A$$

$$121^\circ$$

Score: 1 The student made a correct substitution into the Law of Cosines.

Question 36

36 The lengths of the sides of a triangle are 6 cm, 11 cm, and 7 cm. Determine, to the *nearest tenth of a degree*, the measure of the largest angle of the triangle.

$$\begin{aligned}6^2 &= 7^2 + 11^2 - 2(7)(11) \cos x \\36 &= 49 + 121 - 154 \cos x \\36 &= 170 - 154 \cos x \\-170 &\quad -170 \\ \hline -134 &= -154 \cos x \\ \hline -154 &\quad -154 \\ \cos x &= .8701298701 \\ x &= 29.53^\circ\end{aligned}$$

Score: 1 The student made an error by finding the smallest angle and rounding incorrectly.

Question 36

36 The lengths of the sides of a triangle are 6 cm, 11 cm, and 7 cm. Determine, to the *nearest tenth of a degree*, the measure of the largest angle of the triangle.

$$\frac{6}{\sin 7} = \frac{11}{\sin x}$$

$$\frac{\cancel{6} \sin x}{\cancel{6}} = \frac{11 \cdot \sin 7}{6}$$

$$\sin x = .2234 \dots$$

$$\sin^{-1}(.2234 \dots) = \textcircled{12.9}$$

Score: 0 The student made an error by using the Law of Sines and treated the 7 as an angle.

Question 37

37 Solve algebraically for c :

$$\left| \frac{3}{2}c - 10 \right| - 9 \leq -1$$

+9 +9

$$\begin{array}{r} \frac{3}{2}c - 10 \leq 8 \\ \hline \frac{3}{2}c \leq 18 \\ \frac{3}{2}c \leq \frac{18}{1} \end{array}$$

$$\begin{array}{r} 3c \leq 36 \\ \hline 3 \quad 3 \\ c \leq 12 \end{array}$$

$$\begin{array}{r} \frac{3}{2}c - 10 \geq -8 \\ \hline \frac{3}{2}c \geq 2 \end{array}$$

$$\frac{3}{2}c \geq \frac{2}{1}$$

$$\begin{array}{r} 3c \geq 4 \\ \hline 3 \quad 3 \\ c \geq \frac{4}{3} \end{array}$$

$$c \geq \frac{4}{3}$$

~~$c \geq 12$~~ $12 \geq c \geq \frac{4}{3}$

Score: 4 The student gave a complete and a correct response.

Question 37

37 Solve algebraically for c :

$$\left| \frac{3}{2}c - 10 \right| - 9 \leq -1$$

~~+9~~ +9

$$\left| \frac{3}{2}c - 10 \right| \leq 8$$

$$\frac{3}{2}c - 10 \leq 8$$

+10 +10

$$\frac{3}{2} \left(\frac{2}{3} \right) \leq (18) \frac{2}{3}$$

$$c \leq 12$$

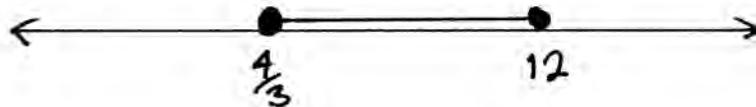
$$-\left(\frac{3}{2}c - 10 \right) \leq 8$$

$$-\frac{3}{2}c + 10 \leq 8$$

-10 -10

$$-\frac{2}{3} \left(-\frac{3}{2}c \right) \leq (-2) \frac{-2}{3}$$

$$c \geq \frac{4}{3}$$



Score: 4 The student gave a complete and correct response.

Question 37

37 Solve algebraically for c :

$$\left| \frac{3}{2}c - 10 \right| - 9 \leq -1$$

$$\frac{3}{2}c - 10 \leq 8 \quad \boxed{12 \Rightarrow c \geq 1.3}$$

+10 +10

$$\frac{2}{3} \cdot \frac{3}{2}c \leq 18 \cdot \frac{2}{3}$$
$$c \leq 12$$

$$\frac{3}{2}c - 10 \geq -8$$

+10 +10

$$\frac{2}{3} \cdot \frac{3}{2}c \geq 2 \cdot \frac{2}{3}$$
$$c \geq 1.3$$

Score: 3 The student made an error by expressing $\frac{4}{3}$ as 1.3 instead of $1.\bar{3}$.

Question 37

37 Solve algebraically for c :

$$\left| \frac{3}{2}c - 10 \right| - 9 \leq -1$$

$$\frac{3}{2}c - 10 - 9 \leq -1$$

$$\frac{3}{2}c - 19 \leq -1$$

$$\frac{3}{2}c \leq 18$$

$$c \leq 12$$

$$-\frac{3}{2}c + 10 - 9 \leq -1$$

$$\left\{ \frac{4}{3}, 12 \right\}$$

$$-\frac{3}{2}c + 1 \leq -1$$

$$-\frac{3}{2}c \leq -2$$

$$\frac{3}{2}c \geq 2$$

$$c \geq \frac{4}{3}$$

Score: 3 The student made an error by not stating the solution as a conjunction.

Question 37

37 Solve algebraically for c :

$$\left| \frac{3}{2}c - 10 \right| - 9 \leq -1$$

+9 +9

$$\left| \frac{3}{2}c - 10 \right| < 8$$

$$\frac{3}{2}c - 10 < 8$$

$$\begin{array}{r} \frac{3}{2}c - 10 < 8 \\ +10 \quad +10 \\ \hline \frac{3}{2}c < 18 \\ \frac{3}{2} \quad \frac{3}{2} \\ \hline c < 12 \end{array}$$

$$c < 12$$

$$-\frac{3}{2}c + 10 < 8$$

-10 -10

$$\begin{array}{r} -\frac{3}{2}c < -2 \\ \frac{-3}{2} \quad \frac{-3}{2} \\ \hline -\frac{3}{2}c < -\frac{3}{2} \end{array}$$

$$c > 1.\overline{33}$$

Score: 2 The student made an error when writing the inequality symbol and did not write the solution as a conjunction.

Question 37

37 Solve algebraically for c :

$$\left| \frac{3}{2}c - 10 \right| - 9 \leq -1$$

$$\begin{array}{l} \left(\frac{3}{2}c - 10 \right) - 9 \leq -1 \\ \quad \quad \quad +9 \quad +9 \\ \frac{3}{2}c - 10 \leq 8 \\ \quad \quad \quad +10 \quad +10 \\ \frac{2}{3} \cdot \frac{3}{2}c \leq 18 \cdot \frac{2}{3} \\ \boxed{c \leq 12} \end{array} \quad \left| \begin{array}{l} \left(-\frac{3}{2}c + 10 \right) - 9 \leq -1 \\ \quad \quad \quad +9 \quad +9 \\ -\frac{3}{2}c + 10 \leq 8 \\ \quad \quad \quad -10 \quad -10 \\ -\frac{2}{3} \cdot -\frac{3}{2}c \leq -2 \cdot -\frac{2}{3} \\ \boxed{c \leq \frac{4}{3}} \end{array} \right.$$

Score: 2 The student did not reverse the inequality sign and did not write the solution as a conjunction.

Question 37

37 Solve algebraically for c :

$$\left| \frac{3}{2}c - 10 \right| - 9 \leq -1$$

+9 +9

$$\frac{3}{2}c - 10 \leq 8$$

+10 +10

$$\left(\frac{3}{2}\right) \frac{3}{2}c \leq 18 \left(\frac{3}{2}\right)$$

$c \leq 27$

$$\frac{3}{2}c - 10 \geq -8$$

+10 +10

$$\left(\frac{3}{2}\right) \frac{3}{2}c \geq 2 \left(\frac{3}{2}\right)$$

$c \geq 3$

Score: 1 The student made a conceptual error by multiplying by $\frac{3}{2}$ and then did not state the solution as a conjunction.

Question 37

37 Solve algebraically for c :

$$\left| \frac{3}{2}c - 10 \right| - 9 \leq -1$$

$$\begin{array}{r} +9 +9 \\ \hline \left| \frac{3}{2}c - 10 \right| \leq 8 \end{array}$$

$$\begin{array}{r} \frac{3}{2}c - 10 \leq 8 \\ +10 +10 \end{array}$$

$$\frac{3}{2}c \leq 18 \quad \div \frac{3}{2}$$

$$c \leq 12$$

Score: 1 The student made an error by only solving for $c \leq 12$.

Question 37

37 Solve algebraically for c :

$$\left| \frac{3}{2}c - 10 \right| - 9 \leq -1$$

$$\frac{3}{2}c + 10 - 9 \leq -1$$

$$\frac{3}{2}c + 1 \leq -1$$

$$\frac{3}{2}c \leq -2$$

$$c \leq -\frac{4}{3}$$

$$-\frac{3}{2}c - 10 - 9 \leq -1$$

$$-\frac{3}{2}c - 19 \leq -1$$

$$-\frac{3}{2}c \leq 18$$

$$c \geq -12$$

Score: 0 The student gave a completely incorrect response.

Question 37

37 Solve algebraically for c :

$$\left| \frac{3}{2}c - 10 \right| - 9 \leq -1$$

$$\left| \frac{3}{2}c - 10 \right| \leq 8$$

$$\frac{3}{2}c - 10 \leq 8$$

$$\frac{3}{2}c \leq \frac{18}{3/2}$$

$$c \leq 8 \cdot \frac{2}{3}$$

$$c \leq \frac{16}{3}$$

$$c \leq 5.\overline{3}$$

$$c \leq 5.3$$

Score: 0 The student attempted to solve only one inequality and made a transcription error.

Question 38

38 Solve $2\cos^2 \theta = \cos \theta$ for all values of θ in the interval $0^\circ \leq \theta < 360^\circ$.

$$\begin{aligned} 2\cos^2 \theta - \cos \theta &= 0 \\ \cos \theta (2\cos \theta - 1) &= 0 \\ \cos \theta = 0 & \quad \left| \quad \cos \theta = \frac{1}{2} \right. \\ \theta = 90, 270 & \quad \left. \theta = 60, 300 \right. \end{aligned}$$

Score: 4 The student gave a complete and correct response.

Question 38

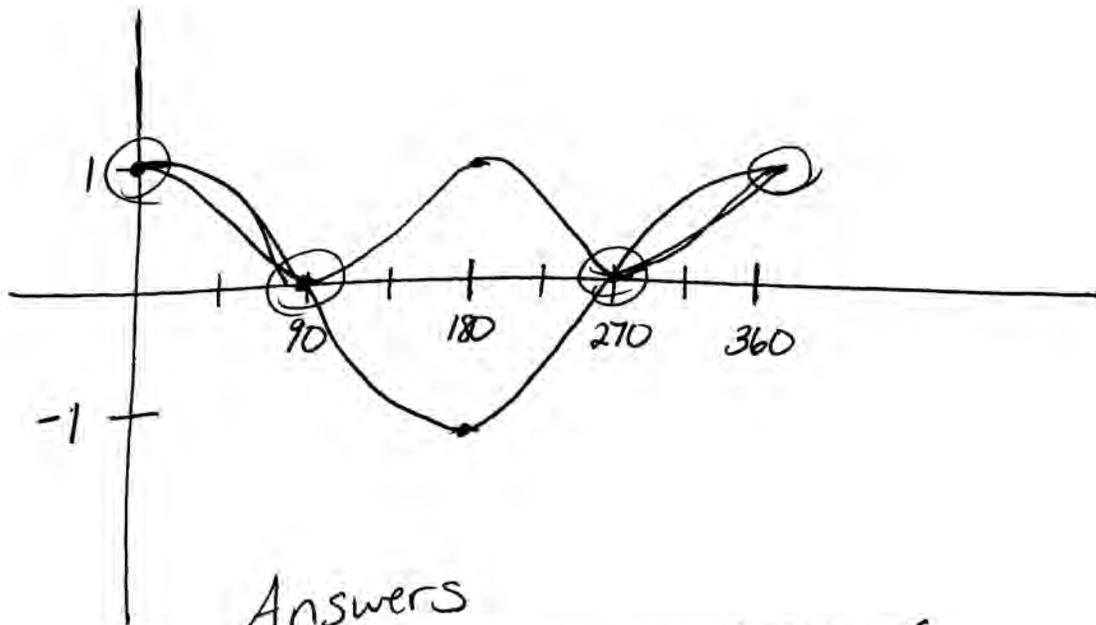
38 Solve $2\cos^2 \theta = \cos \theta$ for all values of θ in the interval $0^\circ \leq \theta < 360^\circ$.

$$\begin{array}{l}
 2\cos^2 \theta = \cos \theta \\
 \hline
 -\cos \theta - \cos \theta \\
 \hline
 2\cos^2 \theta - \cos \theta = 0 \\
 \cos \theta (2\cos \theta - 1) = 0 \\
 \begin{array}{l}
 \cos \theta = 0 \\
 \boxed{90^\circ, 180^\circ}
 \end{array}
 \quad
 \begin{array}{l}
 2\cos \theta - 1 = 0 \\
 \hline
 2\cos \theta = 1 \\
 \hline
 \cos \theta = \frac{1}{2} \\
 \text{ref } \angle = 60^\circ \\
 \begin{array}{l}
 \text{I} = 60^\circ \\
 \text{IV} = 300^\circ
 \end{array}
 \end{array}
 \end{array}$$

Score: 3 The student made an error by stating 180° instead of 270° .

Question 38

38 Solve $2\cos^2 \theta = \cos \theta$ for all values of θ in the interval $0^\circ \leq \theta < 360^\circ$.



Answers

$0^\circ, 90^\circ, 270^\circ, \cancel{360^\circ}$

Score: 3 The student made a graphing error by graphing $\cos^2 \theta$ instead of $2\cos^2 \theta$.

Question 38

38 Solve $2\cos^2 \theta = \cos \theta$ for all values of θ in the interval $0^\circ \leq \theta < 360^\circ$.

$$\frac{2 \cos^2 \theta}{\cancel{\cos \theta}} = \frac{\cancel{\cos \theta}}{\cancel{\cos \theta}}$$

$$\frac{2 \cos \theta}{2} = \frac{1}{2}$$

$$\cos \theta = \frac{1}{2}$$

$$\theta = 60^\circ \text{ and } 300^\circ$$

Score: 2 The student made a conceptual error by dividing both sides by $\cos \theta$.

Question 38

38 Solve $2\cos^2 \theta = \cos \theta$ for all values of θ in the interval $0^\circ \leq \theta < 360^\circ$.

$$\cos = a$$

$$2a^2 - a = 0$$

$$a(2a - 1) = 0$$

$$a = 0$$

$$\begin{array}{r} 2a - 1 = 0 \\ +1 \quad +1 \\ \hline 2a = 1 \\ \hline a = \frac{1}{2} \end{array}$$

$$a = \frac{1}{2}$$

S A
T C

$$\cos \theta = \frac{1}{2}$$

$$\theta = 60^\circ$$

Q₁

Q₄

60°

300°

(60° and 300°)

Score: 2 The student did not use $a = 0$.

Question 38

38 Solve $2\cos^2 \theta = \cos \theta$ for all values of θ in the interval $0^\circ \leq \theta < 360^\circ$.

$$2\cos^2 \theta - \cos \theta = 0$$

$$\cos \theta (2\cos \theta - 1) = 0$$

$$\cos \theta = 0 \quad 2\cos \theta - 1 = 0$$

$$\cos \theta = 0 \quad \cos \theta = \frac{1}{2}$$

$$\theta = 60^\circ \quad \theta = 90^\circ$$

Score: 2 The student only found the two angles.

Question 38

38 Solve $2\cos^2 \theta = \cos \theta$ for all values of θ in the interval $0^\circ \leq \theta < 360^\circ$.

$$2\cos^2 \theta = \cos \theta$$

$$2\cos \theta = 1$$

$$\cos \theta = \frac{1}{2}$$

$$\theta = 60$$

Score: 1 The student made a conceptual error by dividing both sides by $\cos \theta$, and then only found the one angle.

Question 38

38 Solve $2\cos^2 \theta = \cos \theta$ for all values of θ in the interval $0^\circ \leq \theta < 360^\circ$.

$$2\cos^2 \theta = \cos \theta$$

$$2\cos \theta = 1$$

$$\cos \theta = \frac{1}{2}$$

$$\cos \theta = 60^\circ$$

Score: 0 The student made a conceptual error by dividing by $\cos \theta$ and then stated $\cos \theta = 60$, and did not find 300.

Question 39

39 Solve for p algebraically: $\log_{16}(p^2 - p + 4) - \log_{16}(2p + 11) = \frac{3}{4}$

$$\log_{16} \frac{p^2 - p + 4}{2p + 11} = \frac{3}{4}$$

$$16^{\frac{3}{4}} = \frac{p^2 - p + 4}{2p + 11}$$

$$(2p + 11) 8 = \frac{p^2 - p + 4}{2p + 11} (2p + 11)$$

$$\begin{array}{r} 16p + 88 = p^2 - p + 4 \\ -16p - 88 \quad -16p - 88 \\ \hline 0 = p^2 - 17p - 84 \end{array}$$

$$0 = (p^2 - 21p) + 4p - 84$$

$$0 = p(p - 21) + 4(p - 21)$$

$$0 = (p + 4)(p - 21)$$

$p + 4 = 0$	$p - 21 = 0$
$p = -4$	$p = 21$

$$p = \{-4, 21\}$$

Score: 6 The student gave a complete and correct response.

Question 39

39 Solve for p algebraically: $\log_{16}(p^2 - p + 4) - \log_{16}(2p + 11) = \frac{3}{4}$

$$\log_{16} \frac{(p^2 - p + 4)}{(2p + 11)} = \frac{3}{4}$$

$$16^{\frac{3}{4}} = \frac{(p^2 - p + 4)}{2p + 11}$$

$$\frac{8}{1} = \frac{p^2 - p + 4}{(2p + 11)}$$

$$p^2 - p + 4 = 16p + 88$$

$$p^2 - 17p - 84 = 0$$

$$p = \frac{17 \pm \sqrt{17^2 - 4(-84)}}{2}$$

$$p = \frac{17 \pm \sqrt{625}}{2}$$

$$p = 21 \quad p = -4$$

Score: 6 The student gave a complete and correct response.

Question 39

39 Solve for p algebraically: $\log_{16}(p^2 - p + 4) - \log_{16}(2p + 11) = \frac{3}{4}$

$$\log_{16} \left(\frac{p^2 - p + 4}{2p + 11} \right) = \frac{3}{4}$$

$$16^{\frac{3}{4}} = \frac{p^2 - p + 4}{2p + 11}$$

$$16^{\frac{3}{4}}(2p + 11) = p^2 - p + 4$$

$$8(2p + 11) = p^2 - p + 4$$

$$16p + 88 = p^2 - p + 4$$

$$0 = p^2 - 17p - 84$$

$$p^2 - 17p - 84 = 0$$

$$(p - 21)(p + 4) = 0$$

$$~~p = 21~~, p = -4$$

Score: 5 The student made an error by rejecting $p = 21$.

Question 39

39 Solve for p algebraically: $\log_{16}(p^2 - p + 4) - \log_{16}(2p + 11) = \frac{3}{4}$

$\log_8(25) = 2$
 $5^2 = 25$

$$\log_{16}\left(\frac{p^2 - p + 4}{2p + 11}\right) = \frac{3}{4}$$

$$16^{\frac{3}{4}} = \frac{p^2 - p + 4}{2p + 11}$$

$$8 = \frac{p^2 - p + 4}{2p + 11}$$

$$8(2p + 11) = p^2 - p + 4$$

$$16p + 88 = p^2 - p + 4$$

$$-p^2 - p + 16p + 88 - 4 = 0$$

$$p^2 + p - 16p - 88 + 4 = 0$$

$$p^2 - 15p - 84 = 0$$

$$p = \frac{15 \pm \sqrt{225 + 336}}{2} < \frac{15 + \sqrt{561}}{2}$$

$$p = \frac{15 - \sqrt{561}}{2}$$

Score: 5 The student made a sign error when moving p to the other side of the equation.

Question 39

39 Solve for p algebraically: $\log_{16}(p^2 - p + 4) - \log_{16}(2p + 11) = \frac{3}{4}$

$$\log_{16} \frac{p^2 - p + 4}{2p + 11} = \frac{3}{4}$$

$$16^{3/4} = \frac{p^2 - p + 4}{2p + 11}$$

$$(2p + 11)8 = \frac{p^2 - p + 4}{2p + 11} (2p + 11)$$

$$2p + 88 = p^2 - p + 4$$

$$0 = p^2 - 3p - 84$$

$$x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(1)(-84)}}{2(1)}$$

$$x = \frac{3 \pm \sqrt{9 + 336}}{2}$$

$$x = \frac{3 \pm \sqrt{345}}{2}$$

$$x = \frac{3 \pm \sqrt{345}}{2}$$

Score: 4 The student made an error using the distributive property and did not reject

$$\frac{3 - \sqrt{345}}{2}$$

Question 39

39 Solve for p algebraically: $\log_{16}(p^2 - p + 4) - \log_{16}(2p + 11) = \frac{3}{4}$

$$\log_{16} \frac{p^2 - p + 4}{2p + 11} = \frac{3}{4}$$

$$\frac{p^2 - p + 4}{2p + 11} = 16^{\frac{3}{4}} = (\sqrt[4]{16})^3 = 2^3 = 8$$

$$p^2 - p + 4 = 16p + 88$$

$$p^2 - 17p - 84 = 0$$

$$p = \frac{17 \pm \sqrt{289 - (-336)}}{2}$$

Score: 4 The student made a correct substitution into the quadratic formula, but showed no further work.

Question 39

39 Solve for p algebraically: $\log_{16}(p^2 - p + 4) - \log_{16}(2p + 11) = \frac{3}{4}$

$$\log_{16} \frac{p^2 - p + 4}{2p + 11} = \frac{3}{4}$$

$$16^{\frac{3}{4}} = \frac{p^2 - p + 4}{2p + 11}$$

$$16p + 88 = p^2 - p + 4$$

$$0 = p^2 - 17p - 84$$

+1 ± -15

Score: 3 The student wrote a correct quadratic equation.

Question 39

39 Solve for p algebraically: $\log_{16}(p^2 - p + 4) - \log_{16}(2p + 11) = \frac{3}{4}$

$$\log_{16} p^2 - 3p - 7 = \frac{3}{4}$$

$$16^{\frac{3}{4}} = p^2 - 3p - 7$$

$$\cancel{8} = p^2 - 3p - 7$$

$$\hline p^2 - 3p - 15 = 0$$

$$p = \frac{3 \pm \sqrt{(-3)^2 - 4 \cdot 1 \cdot (-15)}}{2 \cdot 1}$$

$$p = \frac{3 \pm \sqrt{69}}{2}$$

Score: 3 The student made a conceptual error by subtracting the polynomials instead of dividing them.

Question 39

39 Solve for p algebraically: $\log_{16}(p^2 - p + 4) - \log_{16}(2p + 11) = \frac{3}{4}$

$$\log_{16} \frac{p^2 - p + 4}{2p + 11} = \frac{3}{4}$$

$$16^{\frac{3}{4}} = \frac{p^2 - p + 4}{2p + 11}$$

~~Ans~~ ↑
(Into calc

~~Ans~~ 8

$$y = 8 \rightarrow x = \textcircled{21}$$

Score: 2 The student stated the equation in exponential form, but did not obtain 21 by an algebraic method.

Question 39

39 Solve for p algebraically: $\log_{16}(p^2 - p + 4) - \log_{16}(2p + 11) = \frac{3}{4}$

$$\log_{16} \frac{(p^2 - p + 4)}{2p + 11} = \frac{3}{4}$$

$$16^{\frac{3}{4}} = \frac{(p^2 - p + 4)}{(2p + 11)}$$

Score: 2 The student stated the equation correctly in exponential form.

Question 39

39 Solve for p algebraically: $\log_{16} (p^2 - p + 4) - \log_{16} (2p + 11) = \frac{3}{4}$

$$\log_{16} \left(\frac{p^2 - p + 4}{2p + 11} \right) = \frac{3}{4}$$

$$\log_{16} \frac{3}{4} \frac{p^2 - p + 4}{2p + 11}$$

Score: 1 The student rewrote the log equation correctly.

Question 39

39 Solve for p algebraically: $\log_{16}(p^2 - p + 4) - \log_{16}(2p + 11) = \frac{3}{4}$

$$\log_{16} \frac{2p+11}{p^2-p+4} = \frac{3}{4}$$

$$16^{3/4} = \frac{2p+11}{p^2-p+4}$$

$$p^2 - p + 4 (8) = \left(\frac{2p+11}{p^2-p+4} \right) p^2 - p + 4$$

$$8p^2 - 8p + 32 = 2p + 11$$
$$-2p - 11 \quad 2p - 11$$

$$(8p^2 - 10p) + 21 = 0$$

$$m=168$$
$$a=-10$$

Score: 1 The student made a conceptual error in rewriting the log equation, but did write an appropriate exponential equation.

Question 39

39 Solve for p algebraically: $\log_{16}(p^2 - p + 4) - \log_{16}(2p + 11) = \frac{3}{4}$

$$\sqrt[4]{16} = 2^{\frac{3}{4}} = 8$$

$$16^{\frac{3}{4}} = (p^2 - p + 4)(2p + 11)$$

$$16^{\frac{3}{4}} = 2p^2 + 11p^2 - 2p^2 - 11p + 8p + 44$$

$$8 = 2p^3 + 9p^2 - 3p + 44$$

$$2p^3 + 9p^2 - 3p + 36 = 0$$

$$p^2(2p^2 + 9) - 3(p + 12) = 0$$

$$p(2p + 3)(p - 3)$$

$$(-3 + p) + (2p + 3)(p - 3)(p + 2) = 0$$

Score: 0 The student wrote a completely incorrect response. No credit is given for finding 8.

Question 39

39 Solve for p algebraically: $\log_{16}(p^2 - p + 4) - \log_{16}(2p + 11) = \frac{3}{4}$

$$17 = \frac{p^2 - p + 4}{2p + 11}$$

$$24p + 132 = p^2 - p + 4$$

$$p^2 - 23p - 128 = 0$$

$$(p - 32)(p + 4) = 0$$

$$p = -32 \text{ or } p = -4$$

Score: 0 The student made a conceptual error by evaluating $16\left(\frac{3}{4}\right)$ followed by several computational errors, a factoring error, and did not reject $p = -32$.