The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA II

Tuesday, August 18, 2026 — 12:30 to 3:30 p.m., only

MODEL RESPONSE SET

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Question 25

25 In order to keep the store properly stocked with produce, a grocery store manager wants to determine the most popular day of the week for people to buy apples and oranges. She randomly collects a sample of sales records for each day for three consecutive weeks. Is this type of data collection method a survey, an observational study, or an experiment? Explain your reasoning.

it is an observational Study because she isn't doing an experiment with a control group and experimentation group, she isn't surveying people on when they enter the store or buy apples, but is just collecting data that she observes in the store

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

Question 25

25 In order to keep the store properly stocked with produce, a grocery store manager wants to determine the most popular day of the week for people to buy apples and oranges. She randomly collects a sample of sales records for each day for three consecutive weeks. Is this type of data collection method a survey, an observational study, or an experiment? Explain your reasoning.

It's an observational study, because the manager isn't asking anyone about their preferences neither he is changing conditions of the experiment, so I can eliminate these two options. What I'm left with is an observational study.

Answer: observational study.

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

Question 25

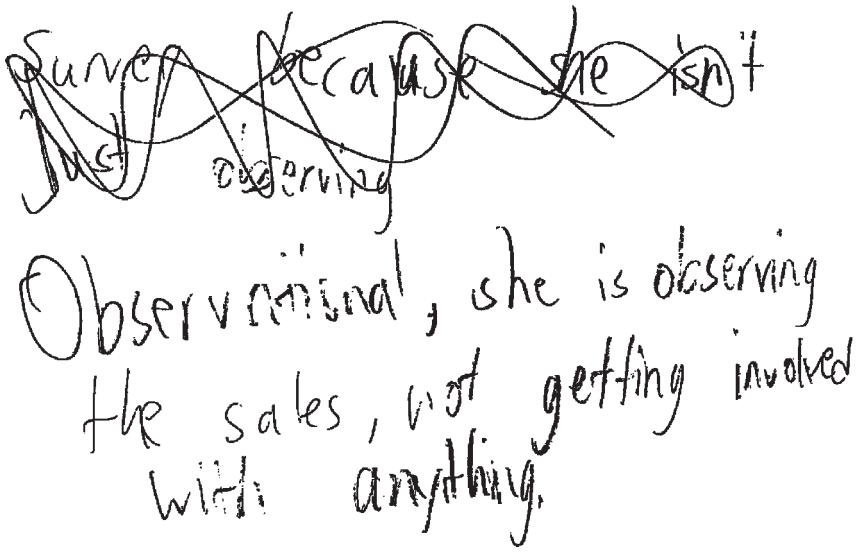
25 In order to keep the store properly stocked with produce, a grocery store manager wants to determine the most popular day of the week for people to buy apples and oranges. She randomly collects a sample of sales records for each day for three consecutive weeks. Is this type of data collection method a survey, an observational study, or an experiment? Explain your reasoning.

This study is an observational study because she is not changing any variables.

Score 1: The student's explanation is incomplete.

Question 25

25 In order to keep the store properly stocked with produce, a grocery store manager wants to determine the most popular day of the week for people to buy apples and oranges. She randomly collects a sample of sales records for each day for three consecutive weeks. Is this type of data collection method a survey, an observational study, or an experiment? Explain your reasoning.



Score 1: The student's explanation is incomplete.

Question 25

25 In order to keep the store properly stocked with produce, a grocery store manager wants to determine the most popular day of the week for people to buy apples and oranges. She randomly collects a sample of sales records for each day for three consecutive weeks. Is this type of data collection method a survey, an observational study, or an experiment? Explain your reasoning.

Experiment because they are collecting data of a certain item for each day for three consecutive weeks so it is an experiment cause you are trying to find something out by using data over a certain period of time.

Score 0: The student did not satisfy the criteria for one or more credits.

Question 25

25 In order to keep the store properly stocked with produce, a grocery store manager wants to determine the most popular day of the week for people to buy apples and oranges. She randomly collects a sample of sales records for each day for three consecutive weeks. Is this type of data collection method a survey, an observational study, or an experiment? Explain your reasoning.

This is a survey because she is trying to figure out what she needs to do not what is happening (observ. & exper.)

She needs this information to do something not just study it

Score 0: The student did not satisfy the criteria for one or more credits.

Question 26

26 Given the following functions $f(x) = 2x^2 + 3x - 7$ and $g(x) = 2x - 5$, determine $f(x) - g(x)$, and express the result in standard form.

$f(x) - g(x) = (2x^2+3x-7)-(2x-5)$

$= 2x^2+3x-7-2x+5$

$= 2x^2+x-2$

$\boxed{2x^2+x-2}$

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

Question 26

26 Given the following functions $f(x) = 2x^2 + 3x - 7$ and $g(x) = 2x - 5$, determine $f(x) - g(x)$, and express the result in standard form.

$(2x^2+3x-7)-(2x-5)$

$2x^2+3x-7$

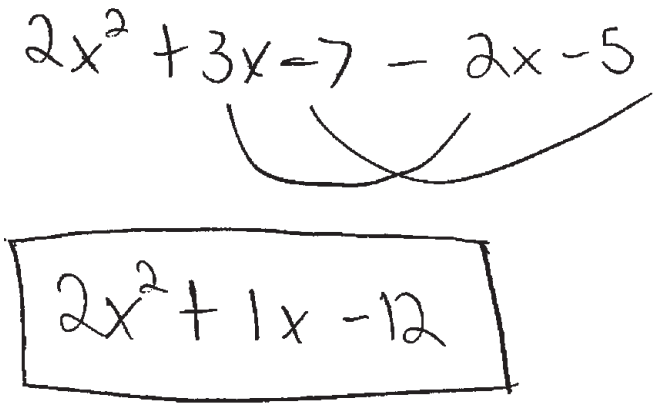
$-2x+5$

$2x^2+x-2$

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

Question 26

26 Given the following functions $f(x) = 2x^2 + 3x - 7$ and $g(x) = 2x - 5$, determine $f(x) - g(x)$, and express the result in standard form.



Score 1: The student made a computational error.

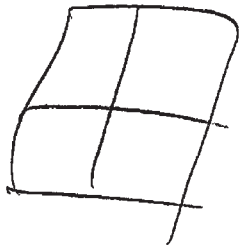
Question 26

26 Given the following functions $f(x) = 2x^2 + 3x - 7$ and $g(x) = 2x - 5$, determine $f(x) - g(x)$, and express the result in standard form.

$(2x^2+3x-7)-(2x-5)$

$2x^2+3x-7-2x+10$

$2x^2+x+3$



Score 1: The student made a computational error.

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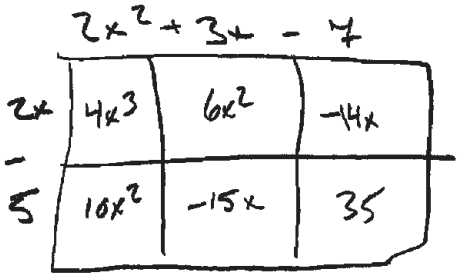


$4x^3 + 6x^2 - 14x + 10x^2 - 15x + 35$

$4x^3 + 16x^2$

Score 0: The student made multiple errors.

Question 26

26 Given the following functions $f(x) = 2x^2 + 3x - 7$ and $g(x) = 2x - 5$, determine $f(x) - g(x)$, and express the result in standard form.

$2x^2+3x-7=0$

$-(2x-5)$

$2x^2+5x-2=0$

$\frac{-(5)\pm\sqrt{(5)^2-4(2)(-2)}}{2(2)}$

$\frac{-5\pm\sqrt{9}}{4}$

$\frac{-5\pm3}{4}$

$\frac{-5}{4}\pm\frac{3}{4}$

$-\frac{5}{4}+\frac{3}{4}$ $\quad -\frac{5}{4}-\frac{3}{4}$

$\frac{-2}{4}$ $\quad \frac{-8}{4}$

$-\frac{1}{2}$ $\quad -2$

$2(-2)-5=-9$

$2(-2)^2+3(-2)-7=-5$

$2(-\frac{1}{2})^2+3(-\frac{1}{2})+7=6$

$2(-\frac{1}{2})-5=-6$

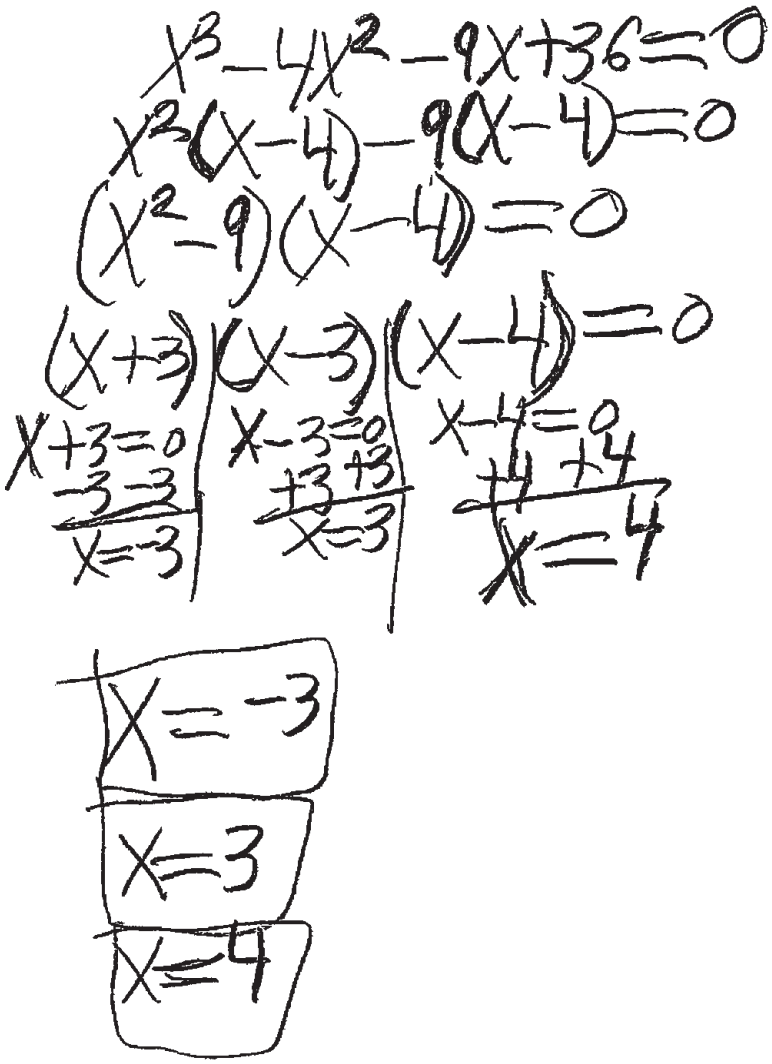
$6-(-6)=12$

$-5-(9)\cdot 4$

Score 0: The student did not satisfy the criteria for one or more credits.

Question 27

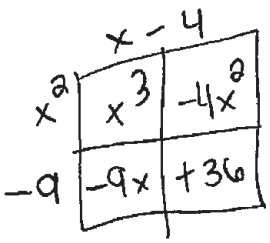
27 Determine algebraically the zeros of $f(x) = x^3 - 4x^2 - 9x + 36$.



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

Question 27

27 Determine algebraically the zeros of $f(x) = x^3 - 4x^2 - 9x + 36$.



$f(x) = x^3 - 4x^2 - 9x + 36$

$(x-4)(x^2-9)$

$0 = (x-4)(x+3)(x-3)$

$x-4=0$ $\quad x+3=0$ $\quad x-3=0$

$+4\ +4$ $\quad -3\ -3$ $\quad +3\ +3$

$x=4$ $\quad x=-3$ $\quad x=3$

$f(4) = 4^3 - 4(4)^2 - 9(4) + 36 = 0$

$f(-3) = -3^3 - 4(-3)^2 - 9(-3) + 36 = 0$

$f(3) = 3^3 - 4(3)^2 - 9(3) + 36 = 0$

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

Question 27

27 Determine algebraically the zeros of $f(x) = x^3 - 4x^2 - 9x + 36$.

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $a = 1$ $b = -4$

	x	-4
x^2	x^3	$-4x^2$
-9	$-9x$	$+36$

$(x-4)(x^2-9)$

$(x-4)(x-3)(x+3)$

$x+4 \quad x-3 \quad x+3$

$\{-4, +3, -3\}$

Score 1: The student reached a benchmark for one credit.

Question 27

27 Determine algebraically the zeros of $f(x) = x^3 - 4x^2 - 9x + 36$.

$x^3 - 4x^2 - 9x + 36 = 0$

$x^2(x-4) - 9(x-4) = 0$

$(x^2 - 9)(x-4) = 0$

$(x+3)(x-3)(x-4) = 0$

$\{\pm 3, 4.0\}$

Score 1: The student incorrectly included zero as part of the solution.

Question 27

27 Determine algebraically the zeros of $f(x) = x^3 - 4x^2 - 9x + 36$.

$x^3 - 4x^2$

$x^2(x - 4)$

$x^2(x+2)(x-2)$

$-9x + 36$

$-9(x - 4)$

$-9(x+2)(x-2)$

$(x^2-9)(x+2)(x-2)(x+2)(x-2)$

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

$x-2=0$ $x-3=0$ $x+2=0$ $x+3=0$

$+2$ $+3$ -2 -3

$x=2$ $x=3$ $x=-2$ $x=-3$

Score 0: The student made multiple errors.

Question 27

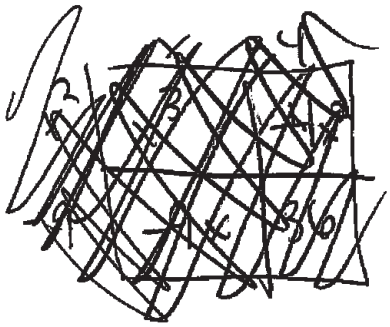
27 Determine algebraically the zeros of $f(x) = x^3 - 4x^2 - 9x + 36$.

x^2 x^2 -9 -9

$x^2(x-4)-9(x-4)$

$(\sqrt{x^2}+\sqrt{9})(x-4)$

$(x-9)(x+9)$



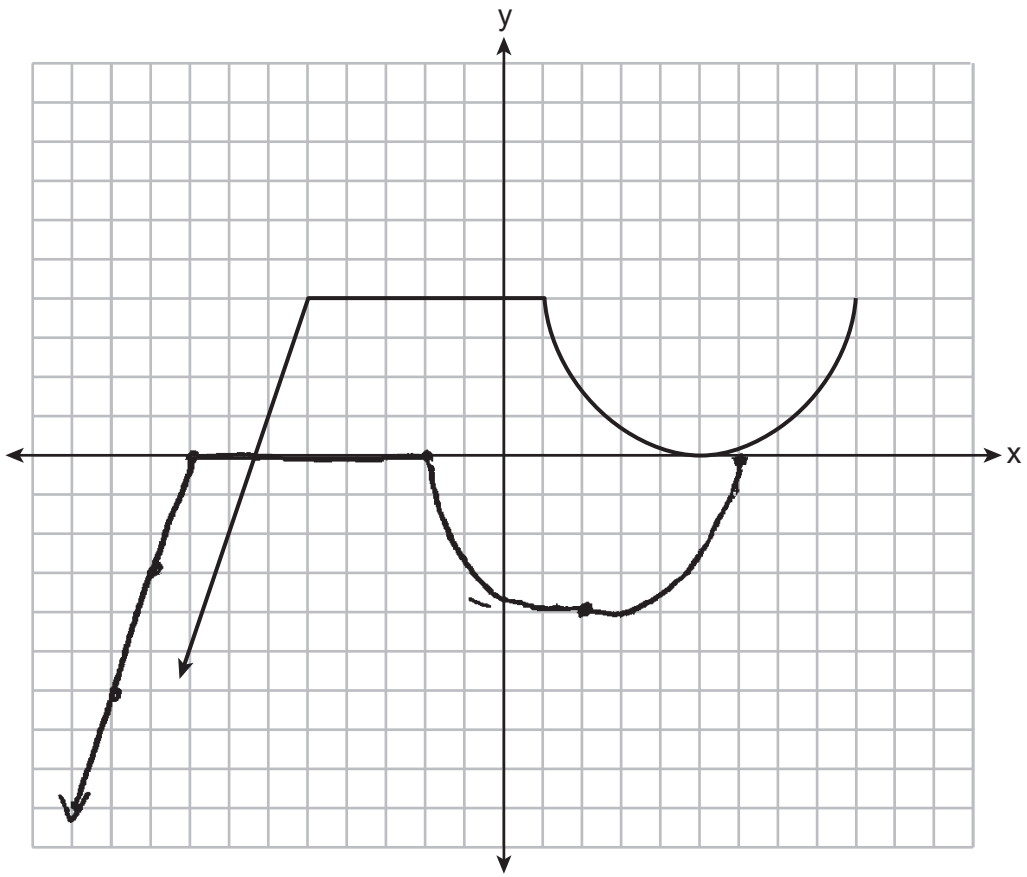
$x=9$

$x=-9$

Score 0: The student did not satisfy the criteria for one or more credits.

Question 28

28 The graph of $y = f(x)$ is shown below. On the same set of axes, graph $y = f(x + 3) - 4$.

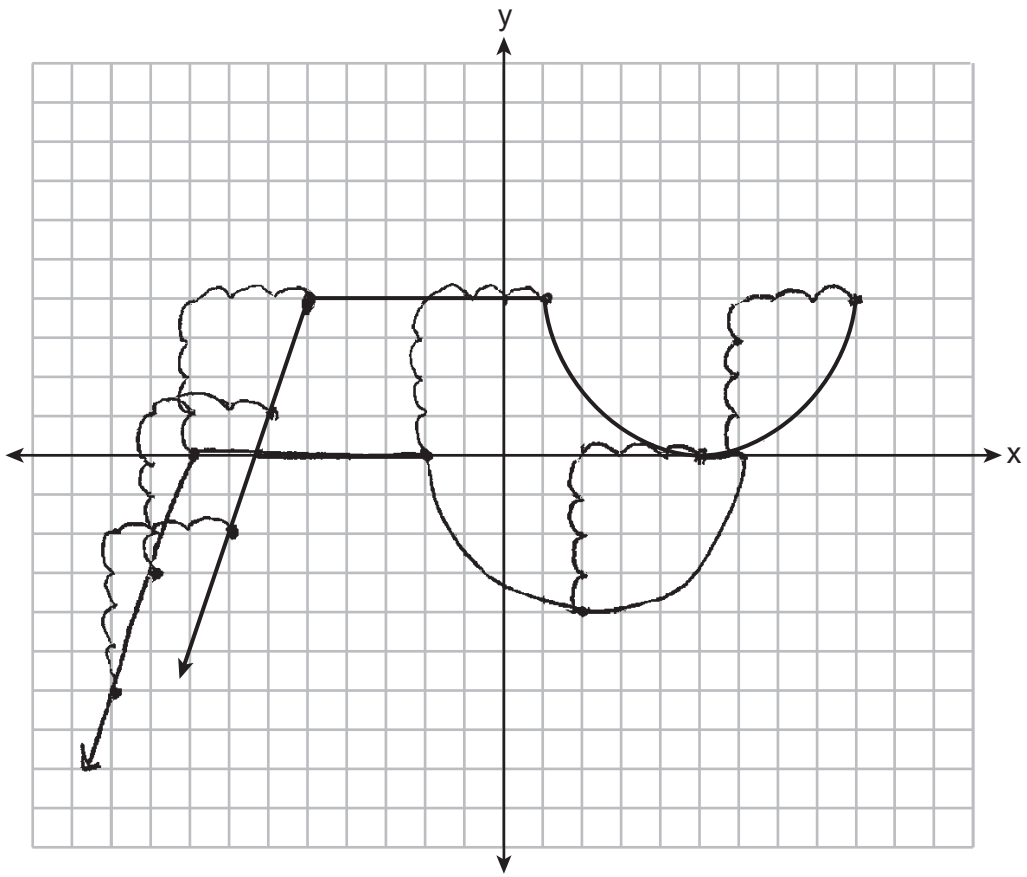


left 3 down 4

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

Question 28

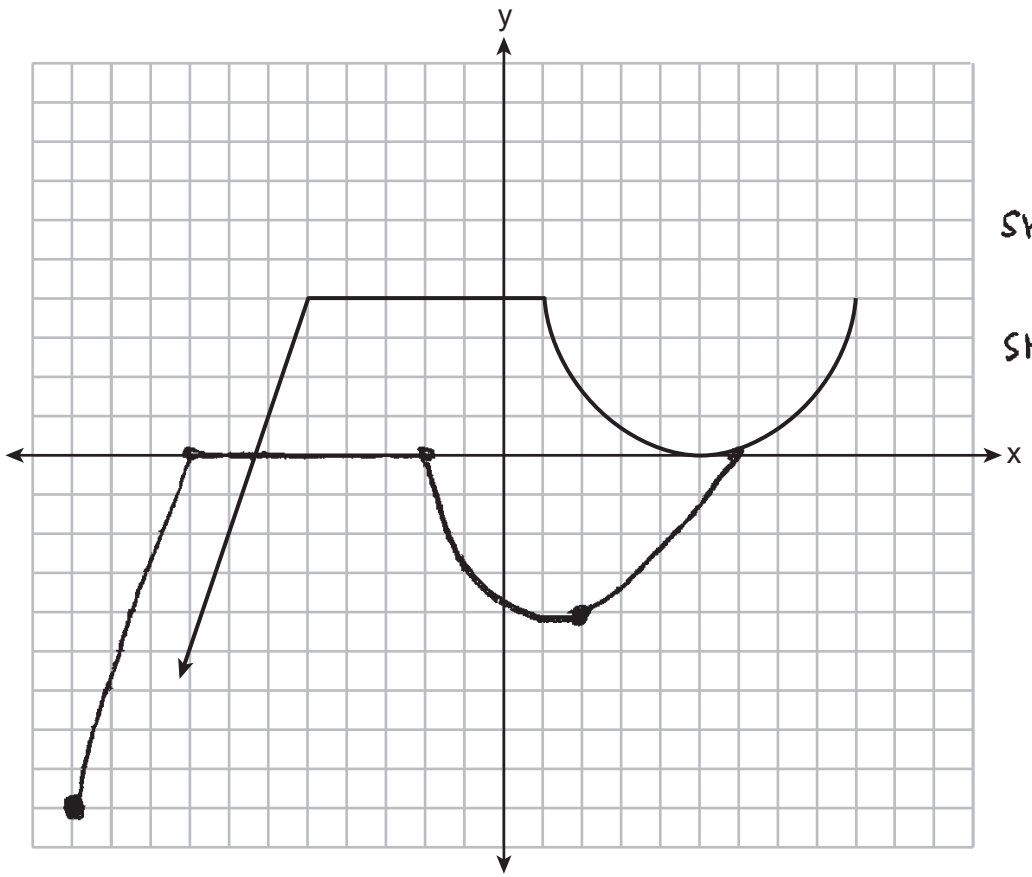
28 The graph of $y = f(x)$ is shown below. On the same set of axes, graph $y = f(x + 3) - 4$.



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

Question 28

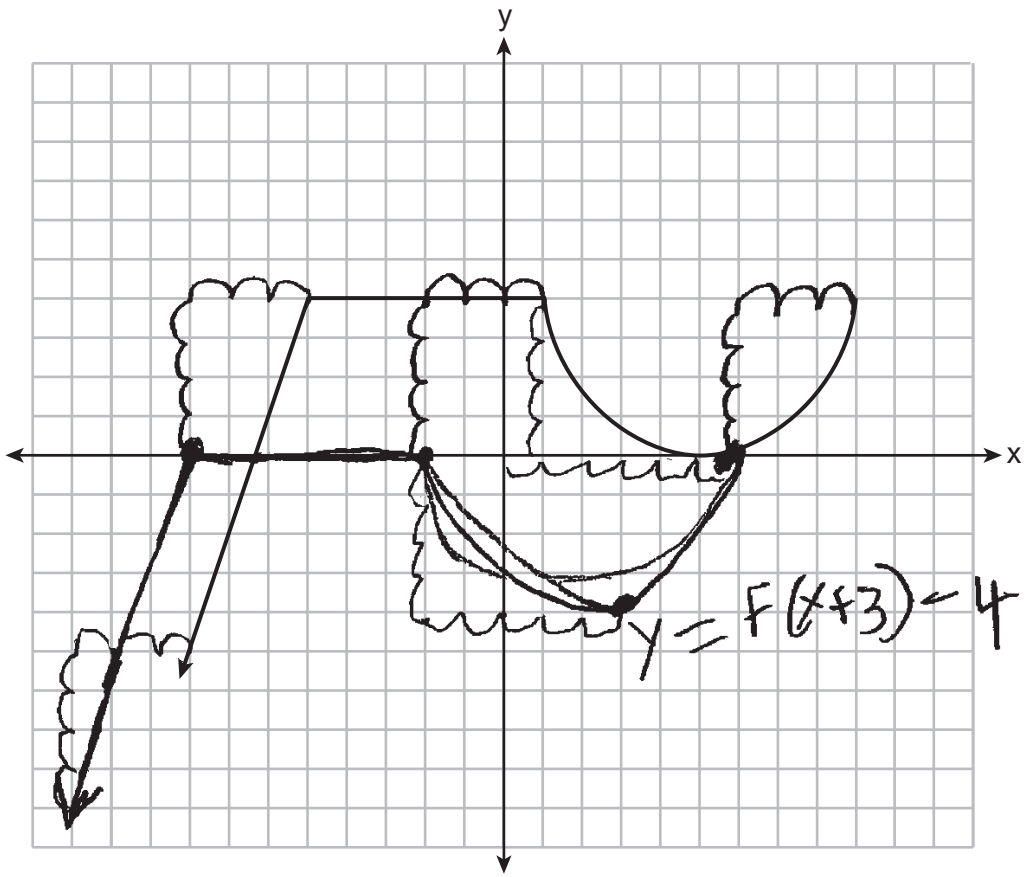
28 The graph of $y = f(x)$ is shown below. On the same set of axes, graph $y = f(x + 3) - 4$.



Score 1: The student did not draw an arrow.

Question 28

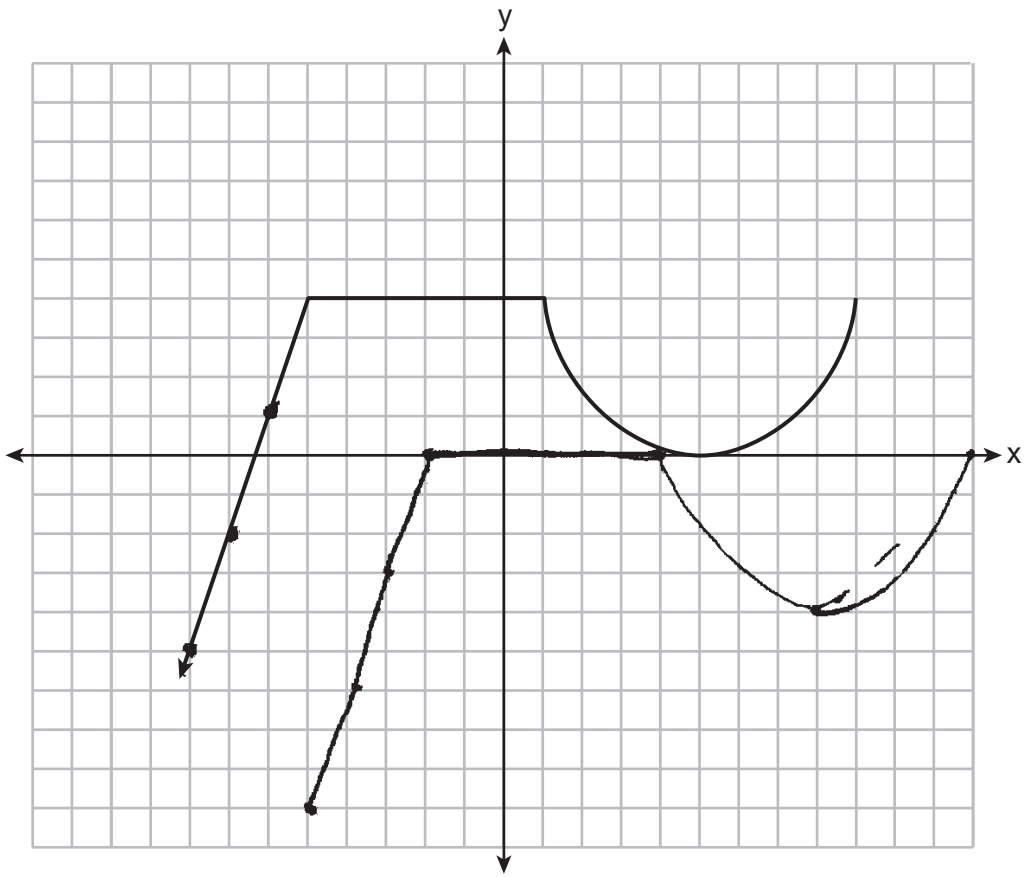
28 The graph of $y = f(x)$ is shown below. On the same set of axes, graph $y = f(x + 3) - 4$.



Score 1: The student made a graphing error translating the semicircle.

Question 28

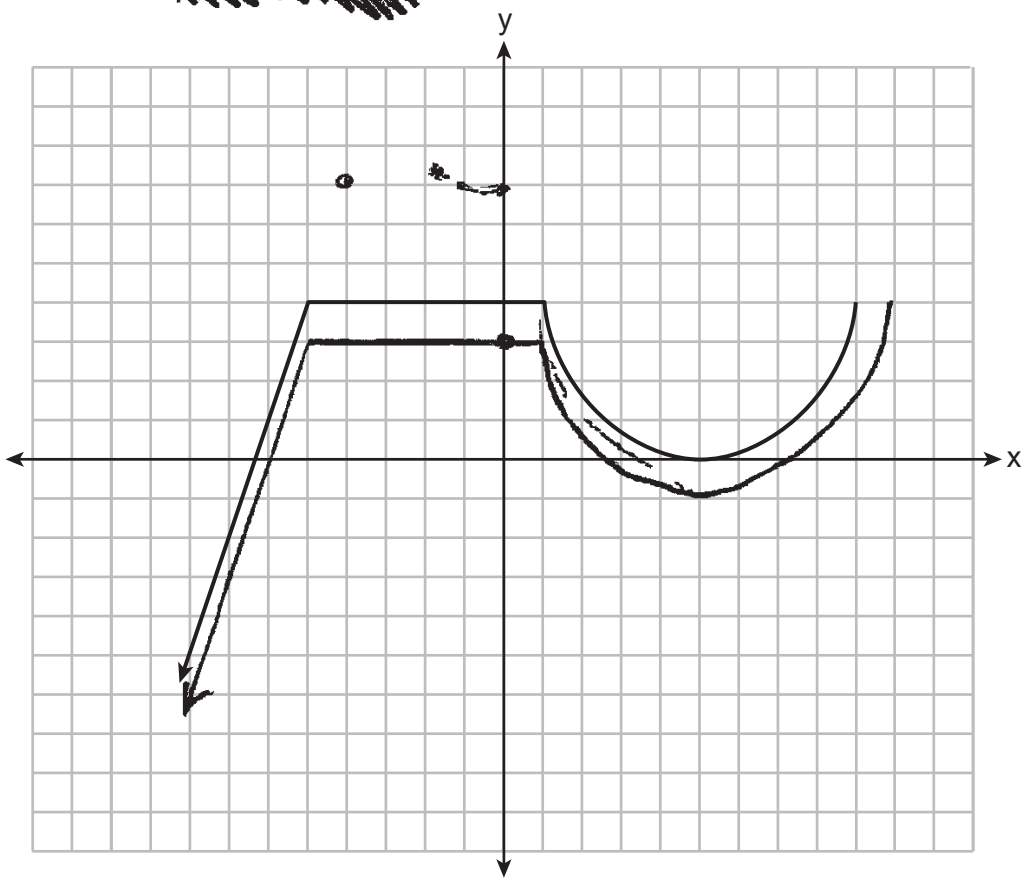
28 The graph of $y = f(x)$ is shown below. On the same set of axes, graph $y = f(x + 3) - 4$.



Score 0: The student made multiple graphing errors.

Question 28

28 The graph of $y = f(x)$ is shown below. On the same set of axes, graph $y = f(x + 3) - 4$.



Score 0: The student made multiple graphing errors.

Question 29

29 Express $\left(-2 + \sqrt{-25}\right)^2$ in simplest $a + bi$ form. Justify your answer.

$(-2+5i)^2$

$(-2+5i)(-2+5i)$

$4 - 10i - 10i + 25i^2$

$-21 + (-20i)$

$25i^2 - 20i + 4$

$-25 - 20i + 4$

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

Question 29

29 Express $\left(-2 + \sqrt{-25}\right)^2$ in simplest $a + bi$ form. Justify your answer.

$(-2+5i)^2$

$(-2+5i)(-2+5i)$

$4 - 10i - 10i - 25$

$-20i - 21$

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

Question 29

29 Express $\left(-2 + \sqrt{-25}\right)^2$ in simplest $a + bi$ form. Justify your answer.

$(-2 + \sqrt{-25})(-2 + \sqrt{-25})$

$4 - 2\sqrt{-25} - 2\sqrt{-25} - 25$

$-4\sqrt{-25} - 21$

$-4i(5) - 21$

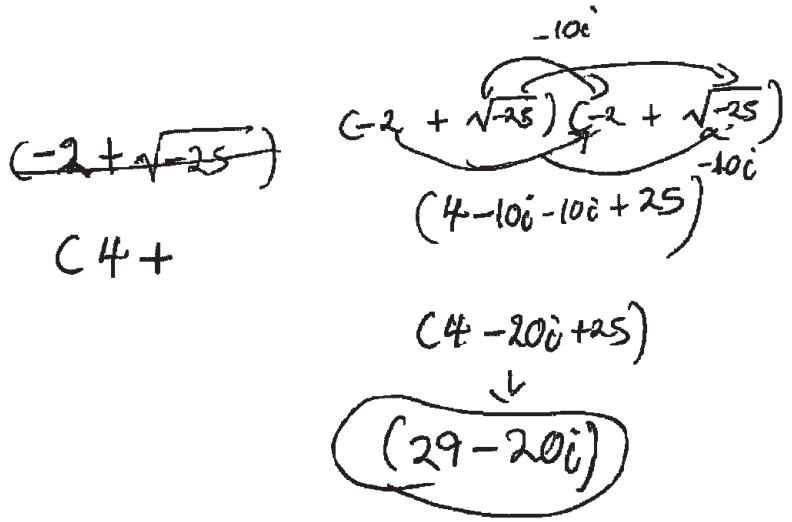
$-21 - 20i$

$21 + 20i$

Score 1: The student's final answer is incorrect.

Question 29

29 Express $\left(-2 + \sqrt{-25}\right)^2$ in simplest $a + bi$ form. Justify your answer.



Score 1: The student made a computational error.

Question 29

29 Express $\left(-2 + \sqrt{-25}\right)^2$ in simplest $a + bi$ form. Justify your answer.

$a+bi$

$(-2+\sqrt{-25})^2$

$-2+5i^2$

$-2+25i$

Score 0: The student did not satisfy the criteria for one or more credits.

Question 29

29 Express $\left(-2 + \sqrt{-25}\right)^2$ in simplest $a + bi$ form. Justify your answer.

$(-2 + -\sqrt{-25})(-2+\sqrt{-25})$

$\sqrt{-1}\ \sqrt{25}$

$(-2 + i\sqrt{25})(-2+i\sqrt{25})$

$(-2 5i)(-25i)$

$425i^2$

Score 0: The student made multiple errors.

Question 30

30 The most common radioactive form of cesium is cesium-137. The half-life of cesium-137 is 30 years.

Suppose 2.7 micrograms of cesium-137 are found in a soil sample. Write a function for the amount of cesium-137 remaining, $c(t)$, in micrograms, in terms of the number of years, t, since the soil sample was taken.

$A = A_0\left(\frac{1}{2}\right)^{\frac{t}{h}}$

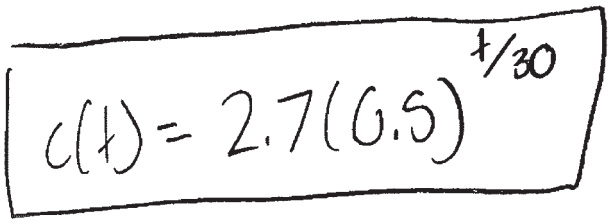
$C(t) = 2.7\left(\frac{1}{2}\right)^{\frac{t}{30}}$

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

Question 30

30 The most common radioactive form of cesium is cesium-137. The half-life of cesium-137 is 30 years.

Suppose 2.7 micrograms of cesium-137 are found in a soil sample. Write a function for the amount of cesium-137 remaining, $c(t)$, in micrograms, in terms of the number of years, t, since the soil sample was taken.



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

Question 30

30 The most common radioactive form of cesium is cesium-137. The half-life of cesium-137 is 30 years.

Suppose 2.7 micrograms of cesium-137 are found in a soil sample. Write a function for the amount of cesium-137 remaining, $c(t)$, in micrograms, in terms of the number of years, t, since the soil sample was taken.

$y = 2.7\left(\frac{1}{2}\right)^{\frac{x}{30}}$

Score 1: The student used incorrect notation.

Question 30

30 The most common radioactive form of cesium is cesium-137. The half-life of cesium-137 is 30 years.

Suppose 2.7 micrograms of cesium-137 are found in a soil sample. Write a function for the amount of cesium-137 remaining, $c(t)$, in micrograms, in terms of the number of years, t, since the soil sample was taken.

$2.7(0.5)^{\frac{t}{30}}$

2.7 = initial rate

0.5 = half life

30 yrs = one half life

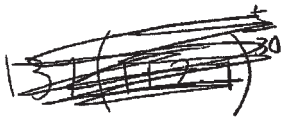
t = years

Score 1: The student wrote an expression.

Question 30

30 The most common radioactive form of cesium is cesium-137. The half-life of cesium-137 is 30 years.

Suppose 2.7 micrograms of cesium-137 are found in a soil sample. Write a function for the amount of cesium-137 remaining, $c(t)$, in micrograms, in terms of the number of years, t, since the soil sample was taken.



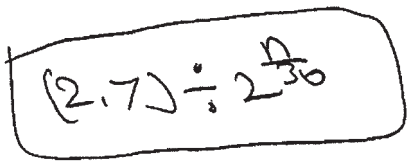
$$137 = 30\left(\frac{1}{2}\right)^{\frac{t}{30}}$$

Score 0: The student made multiple errors.

Question 30

30 The most common radioactive form of cesium is cesium-137. The half-life of cesium-137 is 30 years.

Suppose 2.7 micrograms of cesium-137 are found in a soil sample. Write a function for the amount of cesium-137 remaining, $c(t)$, in micrograms, in terms of the number of years, t, since the soil sample was taken.



Score 0: The student made multiple errors.

Question 31

31 Solve algebraically for x:

$$\sum_{a=0}^{4} (ax - 3) = 5$$

$(0x-3)+(1x-3)+(2x-3)+(3x-3)+(4x-3)=5$

$-3+x-3+2x-3+3x-3+4x-3=5$

$10x-15=5$

$\frac{10x}{10}=\frac{20}{10}$

$x=2$

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

Question 31

31 Solve algebraically for x:

$$\sum_{a=0}^{4}(ax-3)=5$$

$a=0$
$a=1$
$a=2$
$a=3$
$a=4$
} 5

$S_n = \frac{n(a_1 + a_n)}{2}$

$0(x)-3=$
$1(x)-3=$
$2(x)-3=$
$3(x)-3=$
$4(x)-3=$
} 5

$5 = \frac{5(-3+4x-3)}{2}$

$10 = \frac{5}{2}(-3+4x-3)$

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

$2 = (4x-6)$

$8 = 4x$

$x = 2$

$-3+(x)-3+2x-3+3x-3+4x-3=5$

$-15+10x=5$

$10x=20$

$x=2$

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

Question 31

31 Solve algebraically for x:

$$\sum_{a=0}^{4} (ax - 3) = 5$$

$(0x-3) = -5$

$(1x-3) = -5$

$(2x-3) = -5$

$(3x-3) = -5$

$(4x-3) = -5$

$+$

$(10x-15) = -25$

$+15 \quad +15$

$\frac{10x = 40}{10} \quad x = 4$

Score 1: The student made a conceptual error.

Question 31

31 Solve algebraically for x:

$$\sum_{a=0}^{4} (ax - 3) = 5$$

$x=2$

$(0x-3) = -3$

$(1x-3) = -1$

$(2x-3) = 1$

$(3x-3) = 3$

$(4x-3) = 5$

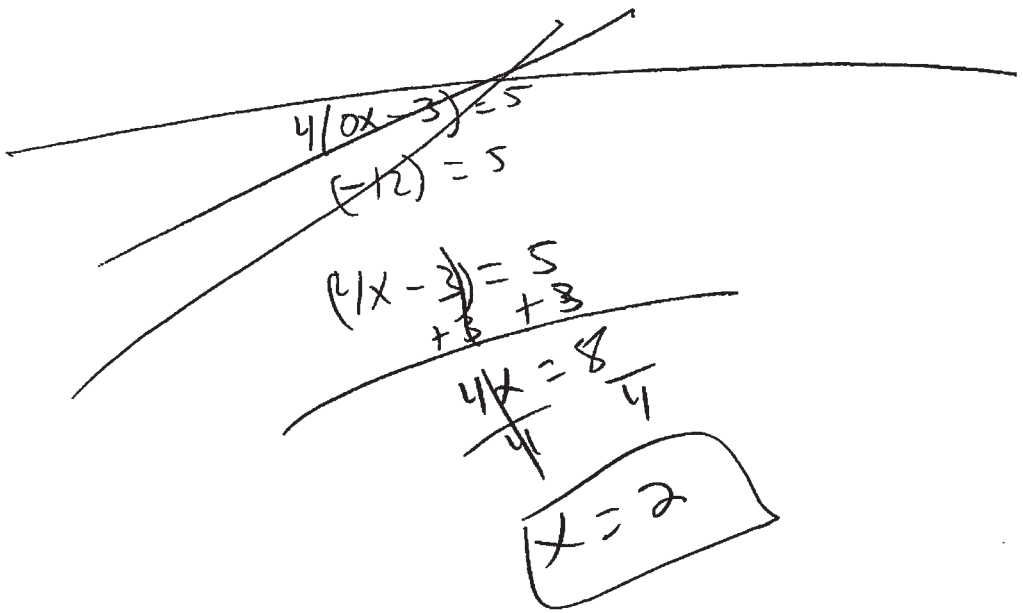
$x=2$

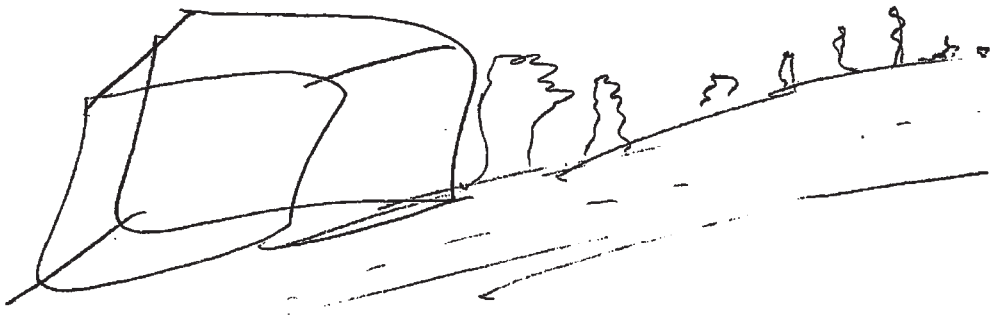
Score 1: The student used a method other than algebraic.

Question 31

31 Solve algebraically for x:

$$\sum_{a=0}^{4} (ax - 3) = 5$$



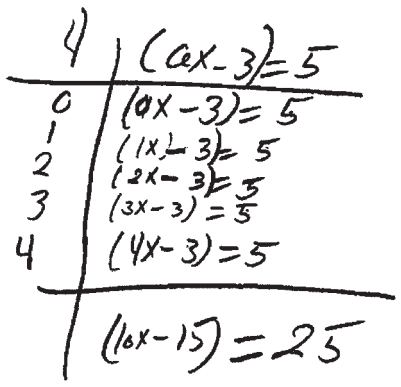


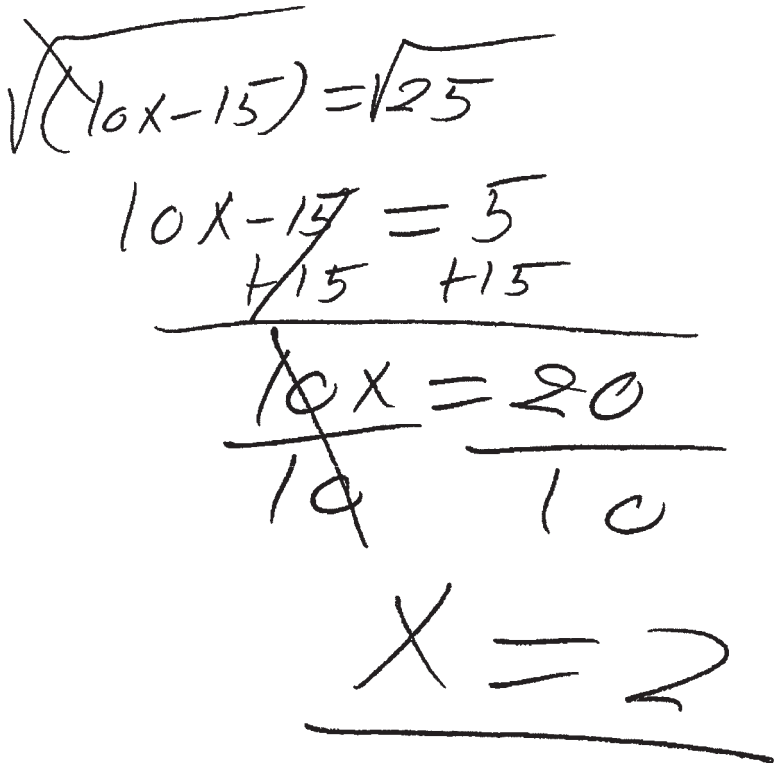
Score 0: The student obtained a correct response by an obviously incorrect procedure.

Question 31

31 Solve algebraically for x:

$$\sum_{a=0}^{4} (ax - 3) = 5$$





Score 0: The student made multiple errors and obtained a correct response by an obviously incorrect procedure.

Question 32

32 Given the exponential function $y = 5.381e^{0.214x}$, rewrite the function in the form of $y = a(b)^x$, rounding values to the *nearest thousandth*.

$y = 5.381(1.239)^x$

$e^{0.214} = 1.239$

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

Question 32

32 Given the exponential function $y = 5.381e^{0.214x}$, rewrite the function in the form of $y = a(b)^x$, rounding values to the *nearest thousandth*.

$y = 5.381(1.239)^x$

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

Question 32

32 Given the exponential function $y = 5.381e^{0.214x}$, rewrite the function in the form of $y = a(b)^x$, rounding values to the *nearest thousandth*.

$y = 5.381(e)^{0.214x}$

$y = 14.627^{0.214x}$

$y = 1.778^x$

$y = 5.381 \cdot 1.239^x$

Score 1: The student did not clearly indicate their final answer.

Question 32

32 Given the exponential function $y = 5.381e^{0.214x}$, rewrite the function in the form of $y = a(b)^x$, rounding values to the *nearest thousandth*.

$5.381e^{0.214x}$

$5.381e^{0.214(1)} = 6.665028$

$5.381(b)^x = 5.381e^{0.214x}$

$\frac{6.665028}{5.381} = 1.2386$

$5.381(1.239)^x = 5.381e^{0.214x}$

$a^{bc} = (a^b)^c$

$5.381e^{0.214x} = (5.381e^{0.214})^x$

Score 1: The student wrote an expression.

Question 32

32 Given the exponential function $y = 5.381e^{0.214x}$, rewrite the function in the form of $y = a(b)^x$, rounding values to the *nearest thousandth*.

$f(x) = 5.381(1.2386)^x$

$f(x) = 6.665^x$

Score 0: The student made a conceptual and notational error.

Question 32

32 Given the exponential function $y = 5.381e^{0.214x}$, rewrite the function in the form of $y = a(b)^x$, rounding values to the *nearest thousandth*.

$14.627^{.214x}$

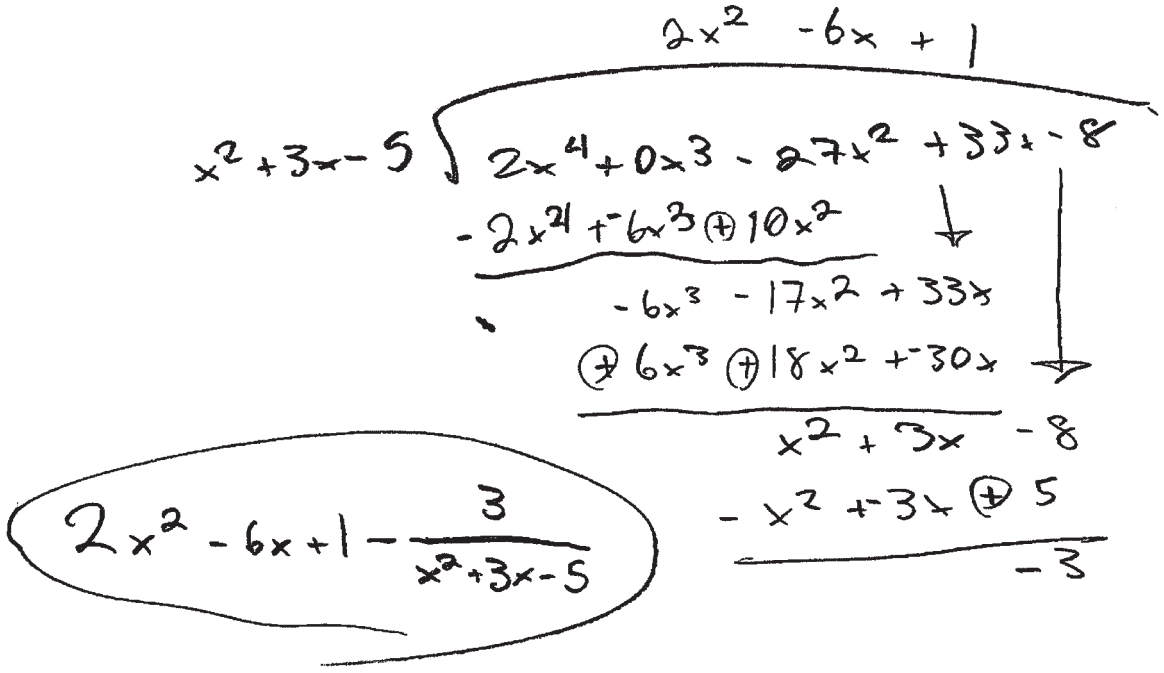
Score 0: The student made multiple errors.

Question 33

33 Determine the quotient and remainder of the expression below.

$$\frac{2x^4 - 27x^2 + 33x - 8}{x^2 + 3x - 5}$$

Express the result in the form $q(x) + \frac{r(x)}{d(x)}$.



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

Question 33

33 Determine the quotient and remainder of the expression below.

$$\frac{2x^4 - 27x^2 + 33x - 8}{x^2 + 3x - 5}$$

Express the result in the form $q(x) + \frac{r(x)}{d(x)}$.

$$x^2+3x-5 \overline{)\,2x^4-27x^2+33x-8}$$

$2x^2-6x+1$

$=2x^4-6x^3+10x^2$

$-6x^3-17x^2+33x-8$

$+6x^3+18x^2-30x$

x^2+3x-8

$-x^2-3x+5$

-3

$$\frac{2x^4-27x^2+33x-8}{x^2+3x-5} = 2x^2-6x+1+\left(\frac{-3}{x^2+3x-5}\right)$$

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

Question 33

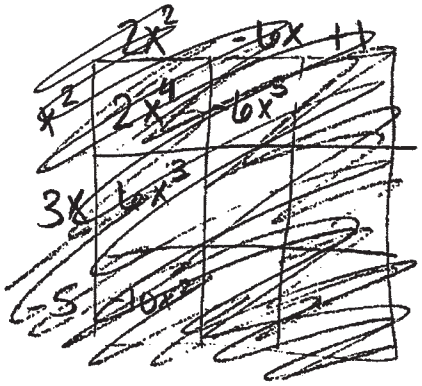
33 Determine the quotient and remainder of the expression below.

$$\frac{2x^4 - 27x^2 + 33x - 8}{x^2 + 3x - 5}$$

Express the result in the form $q(x) + \frac{r(x)}{d(x)}$.

$$\begin{array}{r} 2x^2 - 6x + 1 \\ x^2+3x-5 \overline{)\,2x^4 + 0x^3 - 27x^2 + 33x - 8} \\ +\,\cancel{-2x^4 \mp 6x^3 + 10x^2} \\ \hline -6x^3 - 17x^2 + 33x \\ +\,\cancel{+6x^3 + 18x^2 + 30x} \\ \hline x^2 + 63x - 8 \\ +\,\cancel{-x^2 \mp 3x + 5} \\ \hline 60x - 3 \end{array}$$

$$2x^2 - 6x + 1 + \frac{60x - 3}{x^2 + 3x - 5}$$



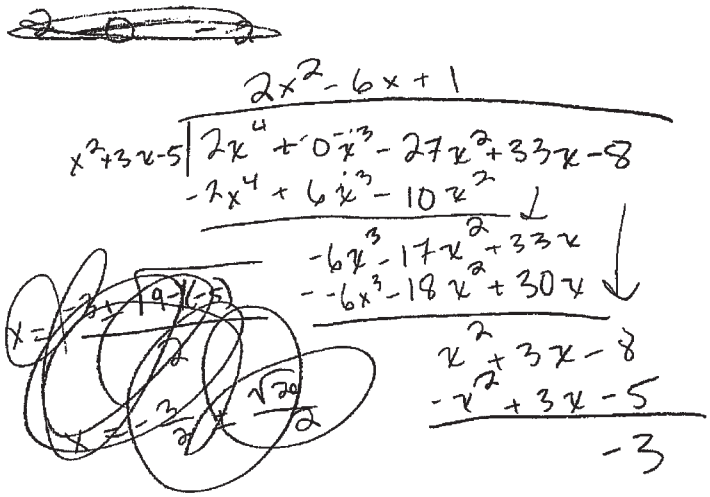
Score 3: The student made one computational error.

Question 33

33 Determine the quotient and remainder of the expression below.

$$\frac{2x^4 - 27x^2 + 33x - 8}{x^2 + 3x - 5}$$

Express the result in the form $q(x) + \frac{r(x)}{d(x)}$.



Score 3: The student did not express the result in $q(x) + \frac{r(x)}{d(x)}$ form.

Question 33

33 Determine the quotient and remainder of the expression below.

$$\frac{2x^4 - 27x^2 + 33x - 8}{x^2 + 3x - 5}$$

Express the result in the form $q(x) + \frac{r(x)}{d(x)}$.

$$2x^2 - 6x + 1 + \frac{-6x - 3}{2x^4 - 27x^2 + 33x - 8}$$

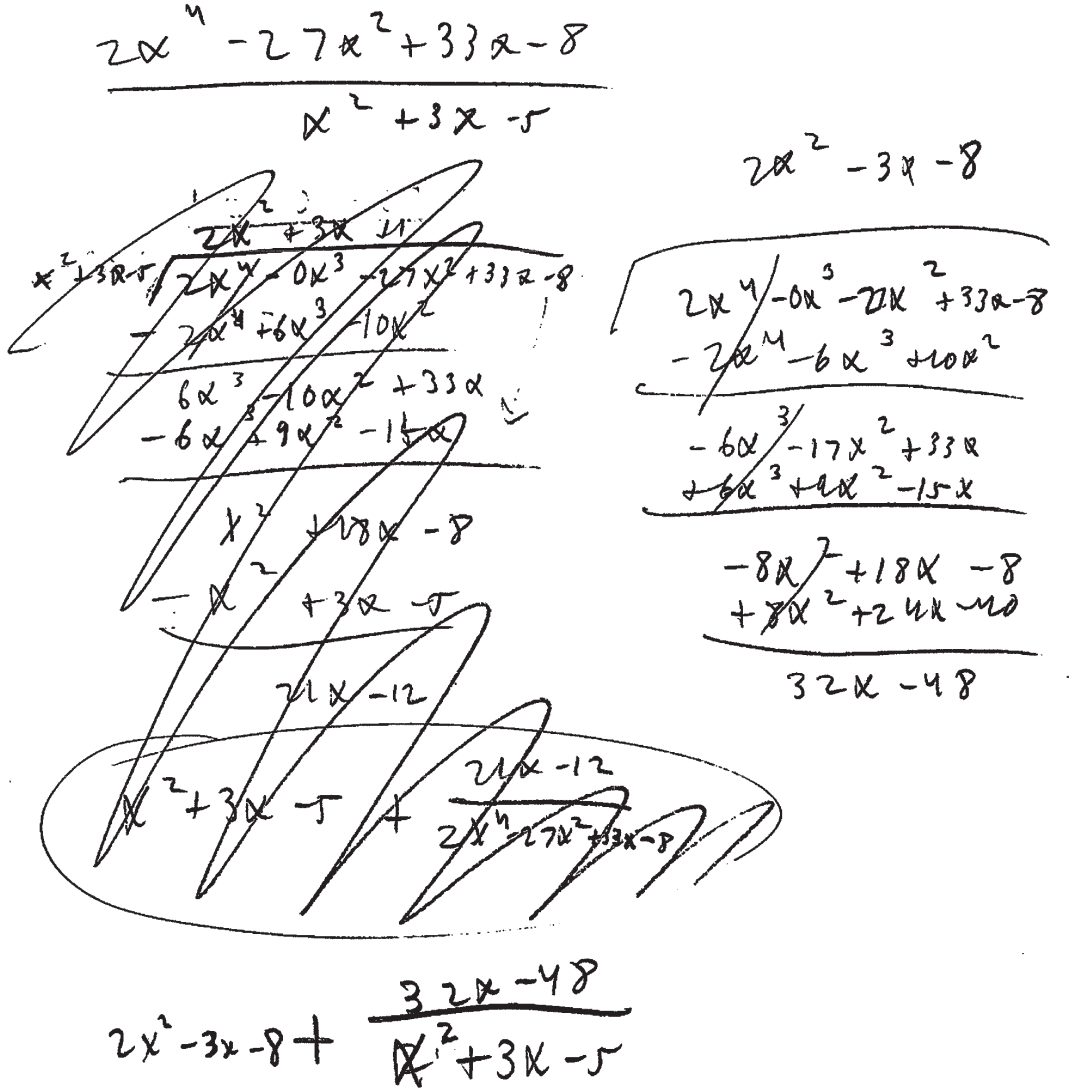
Score 2: The student made a computational error and wrote an incorrect $d(x)$.

Question 33

33 Determine the quotient and remainder of the expression below.

$$\frac{2x^4 - 27x^2 + 33x - 8}{x^2 + 3x - 5}$$

Express the result in the form $q(x) + \frac{r(x)}{d(x)}$.



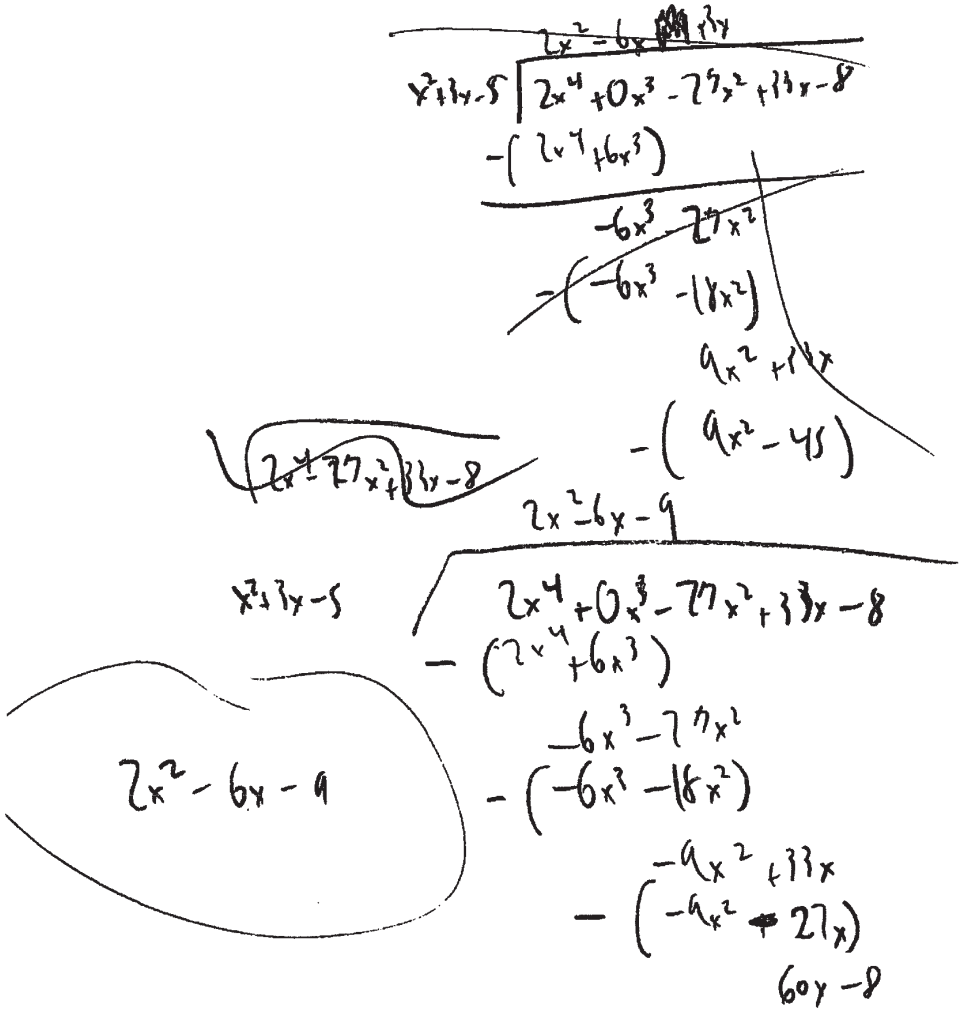
Score 2: The student made two unique computational errors.

Question 33

33 Determine the quotient and remainder of the expression below.

$$\frac{2x^4 - 27x^2 + 33x - 8}{x^2 + 3x - 5}$$

Express the result in the form $q(x) + \frac{r(x)}{d(x)}$.



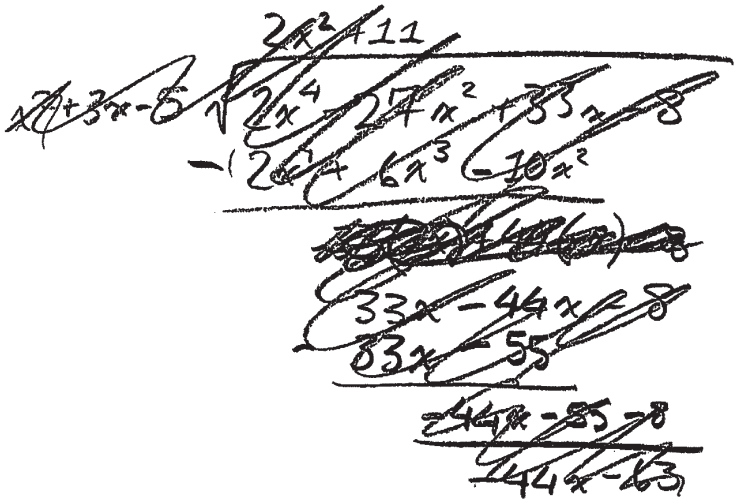
Score 1: The student made the same conceptual error distributing, and did not express their result in $q(x) + \frac{r(x)}{d(x)}$ form.

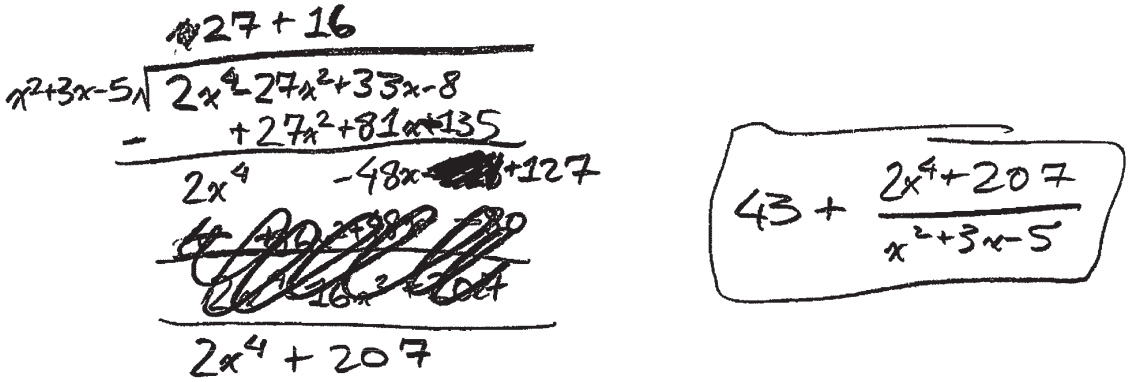
Question 33

33 Determine the quotient and remainder of the expression below.

$$\frac{2x^4 - 27x^2 + 33x - 8}{x^2 + 3x - 5}$$

Express the result in the form $q(x) + \frac{r(x)}{d(x)}$.





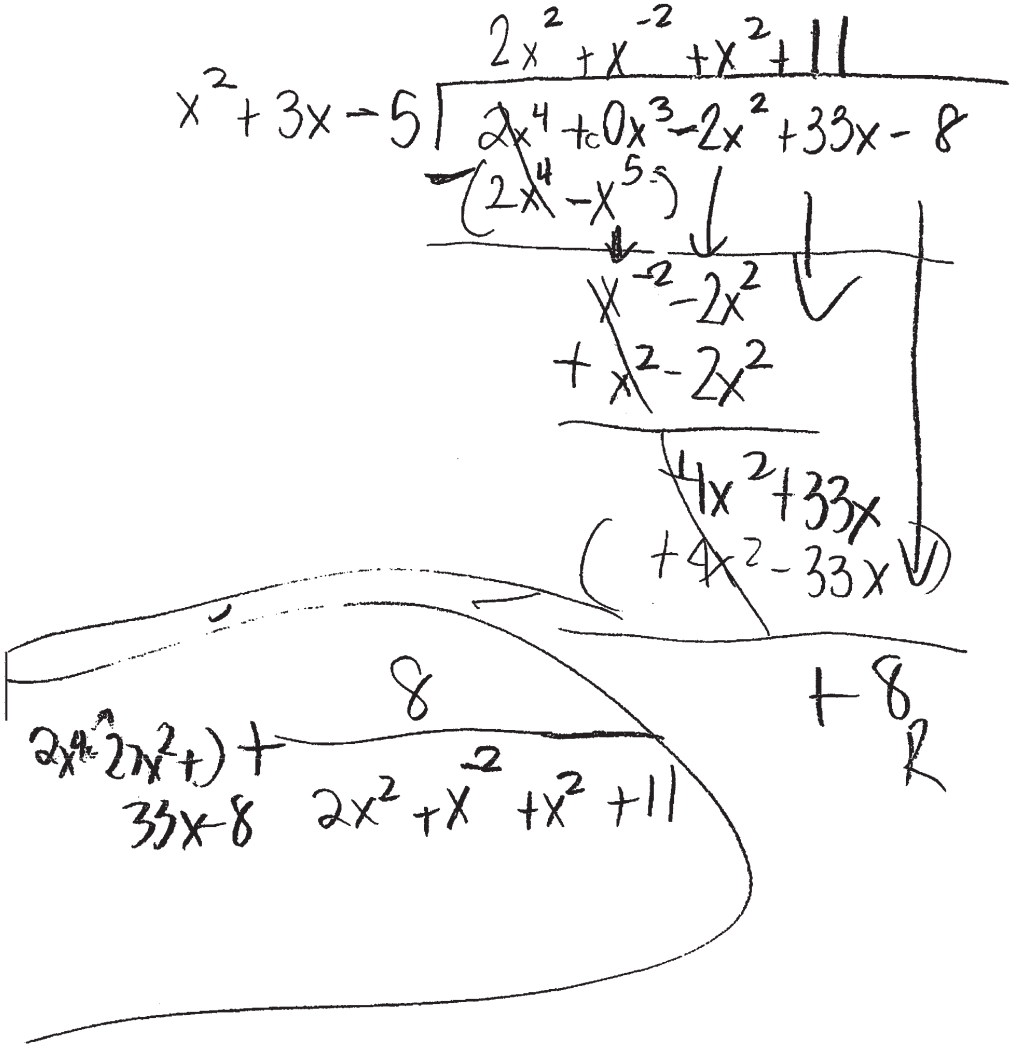
Score 0: The student's response did not contain enough relevant course-level work to receive any credit.

Question 33

33 Determine the quotient and remainder of the expression below.

$$\frac{2x^4 - 27x^2 + 33x - 8}{x^2 + 3x - 5}$$

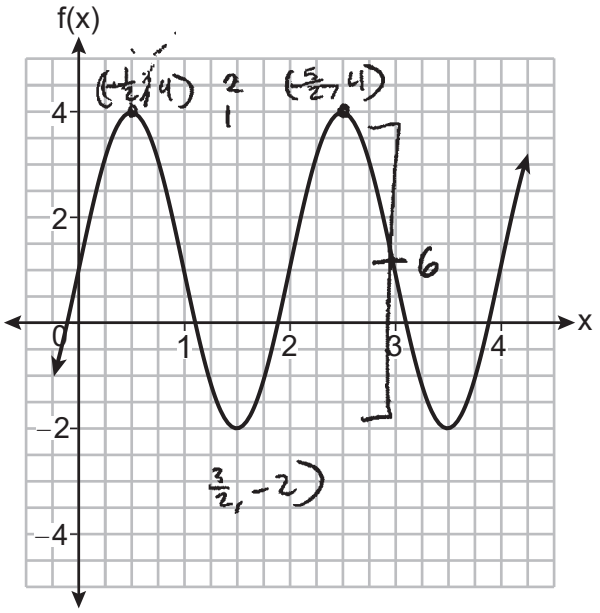
Express the result in the form $q(x) + \frac{r(x)}{d(x)}$.



Score 0: The student did not satisfy the criteria for one or more credits.

Question 34

34 The sinusoidal function f is graphed below.



$a = \frac{6}{2} = 3$

State the period of the function f.

$\frac{5}{2} - \frac{1}{2} = 2$

Period of function f is 2

State the amplitude of the function f.

Amplitude of function f is 3

Write the equation in the form $f(x) = A \sin(Bx) + D$ to represent the sinusoidal function.

$f(x) = 3\sin(\pi x) + 1$

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

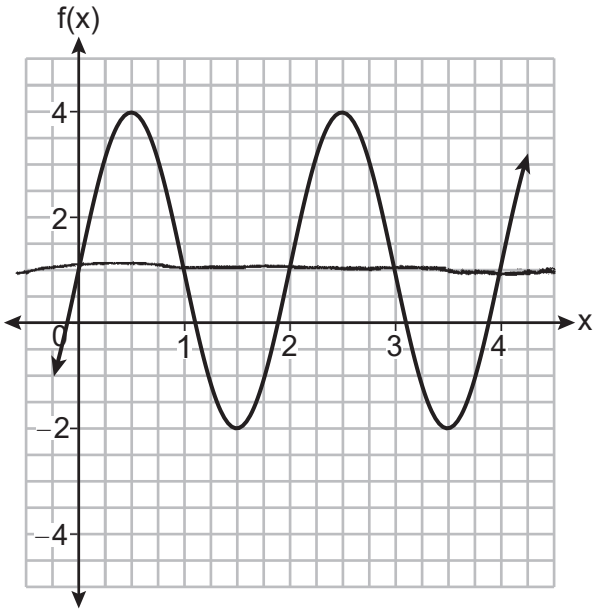
$\frac{2\pi}{2} = \frac{2B}{2}$

$B = \pi$

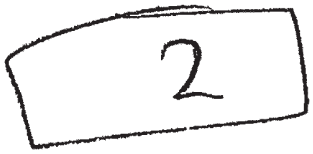
Score 4: The student gave a complete and correct response.

Question 34

34 The sinusoidal function f is graphed below.

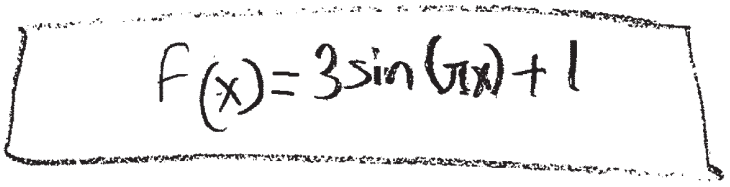


State the period of the function f.



State the amplitude of the function f.

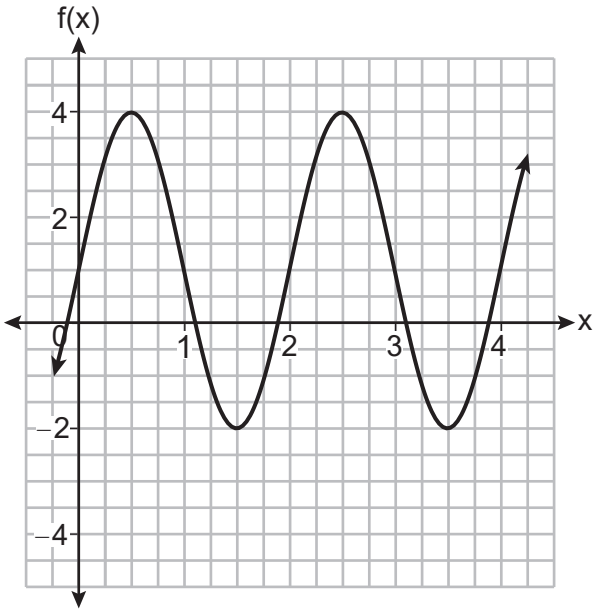
Write the equation in the form $f(x) = A \sin(Bx) + D$ to represent the sinusoidal function.



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

Question 34

34 The sinusoidal function f is graphed below.



State the period of the function f.

P = 2.5

State the amplitude of the function f.

A = 3

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

$A = \frac{4 - -2}{2} = 3$

Write the equation in the form $f(x) = A \sin(Bx) + D$ to represent the sinusoidal function.

$f(x) = 3\sin(0.8\pi x) + 1$

$A = 3$

$D = \frac{max + min}{2} = \frac{4 + -2}{2} = 1$

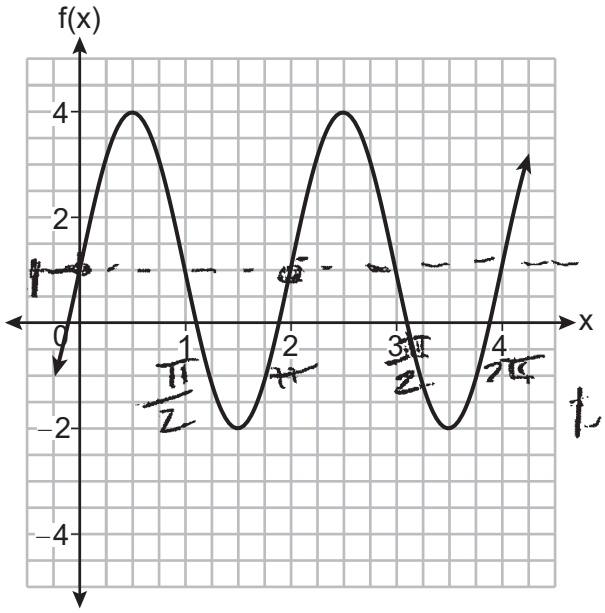
$D = 1$

$B = \frac{2\pi}{2.5} = 0.8\pi$

Score 3: The student made an error calculating the period.

Question 34

34 The sinusoidal function f is graphed below.



up 6 down 6

1 is the midline

State the period of the function f.

2 is the period

State the amplitude of the function f.

3...something idk no specific units

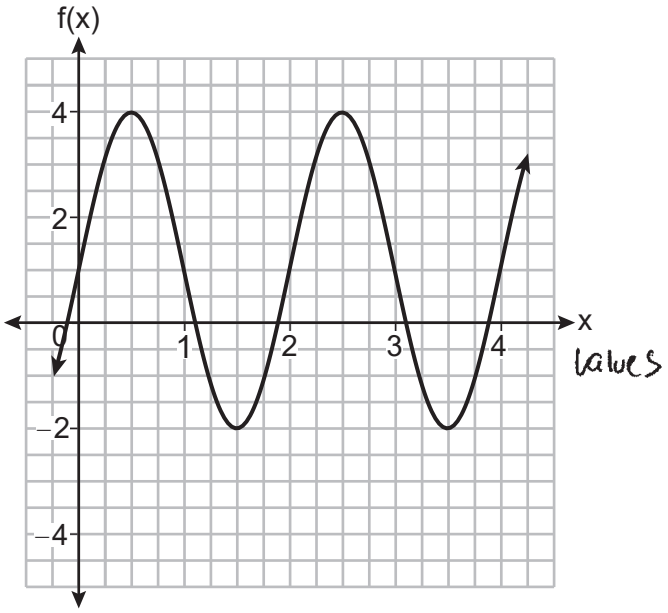
Write the equation in the form $f(x) = A\sin(Bx) + D$ to represent the sinusoidal function.

$f(x) = 3\sin(x) + 1$

Score 3: The student wrote an incorrect B value.

Question 34

34 The sinusoidal function f is graphed below.



State the period of the function f.

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

Period = 2

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

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

$x = \pi$

B

State the amplitude of the function f.

4

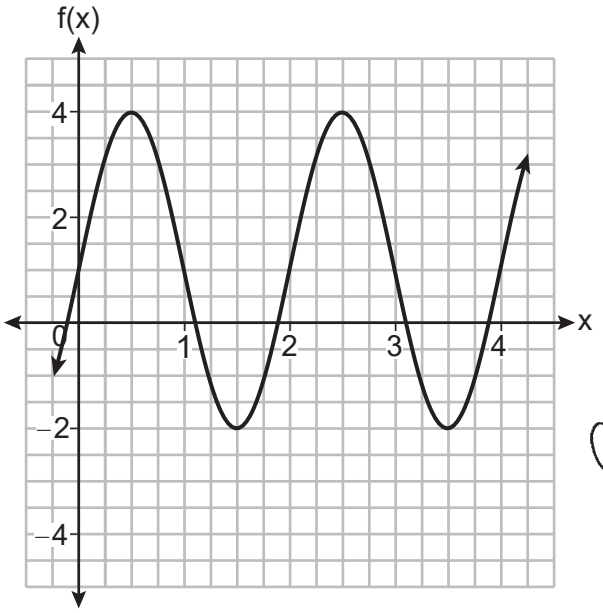
Write the equation in the form $f(x) = A\sin(Bx) + D$ to represent the sinusoidal function.

$f(x) = 4\sin \pi x + 2$

Score 2: The student stated an incorrect amplitude and midline.

Question 34

34 The sinusoidal function f is graphed below.



2π

$6\pi \div 3$
$\frac{6\pi}{3} \div 3$

$6 \div 360 \left(\frac{\pi(1)}{180}\right)$
$6 \div$

State the period of the function f.

2π

State the amplitude of the function f.

The amplitude = 3

a
b
P
d

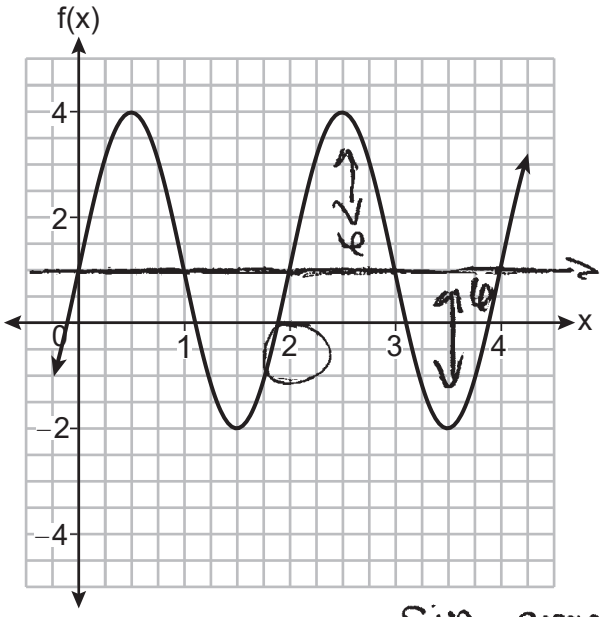
Write the equation in the form $f(x) = A \sin(Bx) + D$ to represent the sinusoidal function.

$f(x) = 3\sin(2x) + 1$

Score 2: The student incorrectly determined the period and B.

Question 34

34 The sinusoidal function f is graphed below.



midline 1
amplitude
|A| = 6
y = 1
B · P = 2π
P = 2
B · P = 2π
$\frac{2}{2} \cdot P = \frac{2\pi}{2}$
π
$\frac{\pi}{4}$ — count on x-axis
Sin grap

State the period of the function f.

P = 2

State the amplitude of the function f.

Amplitude is 6

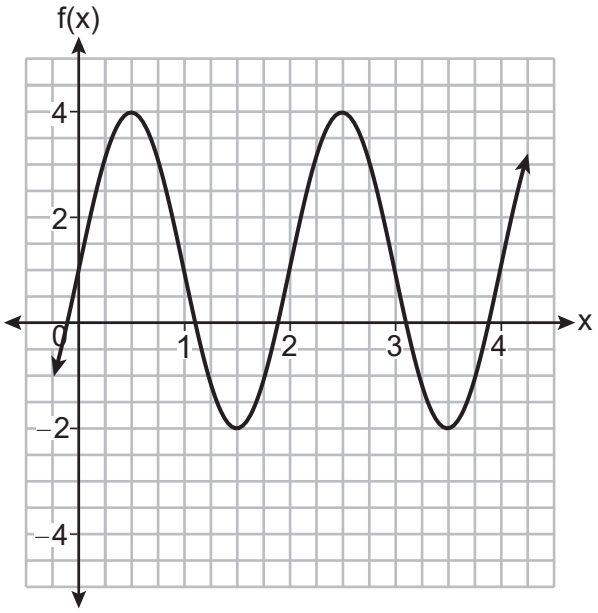
Write the equation in the form $f(x) = A \sin(Bx) + D$ to represent the sinusoidal function.

y = 6sin(.1x)+2

Score 1: The student correctly determined the period.

Question 34

34 The sinusoidal function f is graphed below.



State the period of the function f.

Per: $\frac{2\pi}{b} = \frac{2\pi}{3} = \frac{2\pi}{3}$ $a = 6$ $6 \div 2$ 3

State the amplitude of the function f.

$a = 6$

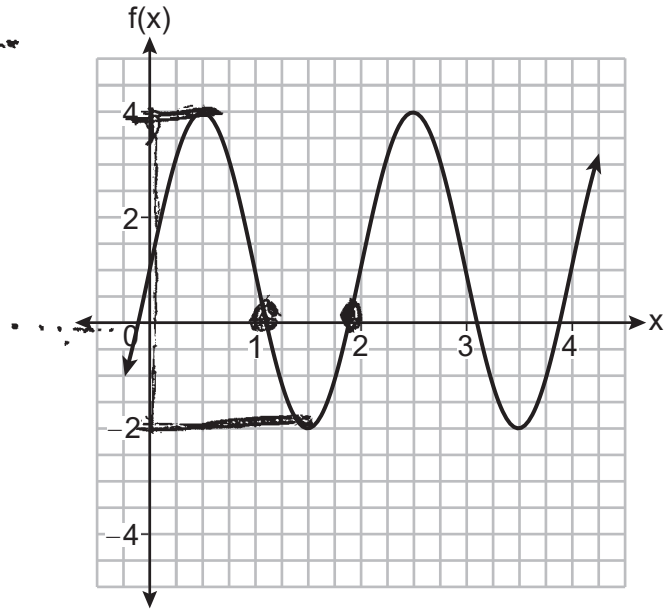
Write the equation in the form $f(x) = A \sin(Bx) + D$ to represent the sinusoidal function.

$f(x) = 6 \sin\left(\frac{2\pi}{3}(x)\right) + 1$

Score 1: The student earned one credit for the equation.

Question 34

34 The sinusoidal function f is graphed below.



State the period of the function f.

2π

State the amplitude of the function f.

4

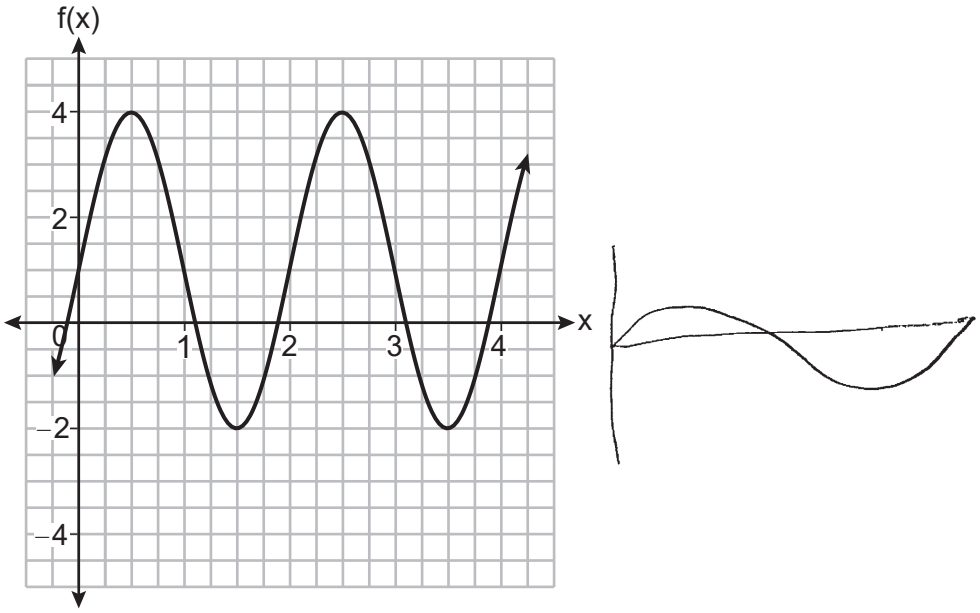
Write the equation in the form $f(x) = A\sin(Bx) + D$ to represent the sinusoidal function.

$4\sin\left(\frac{\pi}{2}x\right) + 6$

Score 0: The student did not satisfy the criteria for one or more credits.

Question 34

34 The sinusoidal function f is graphed below.



State the period of the function f.

The period of the function is 4.

State the amplitude of the function f.

Amp = 6

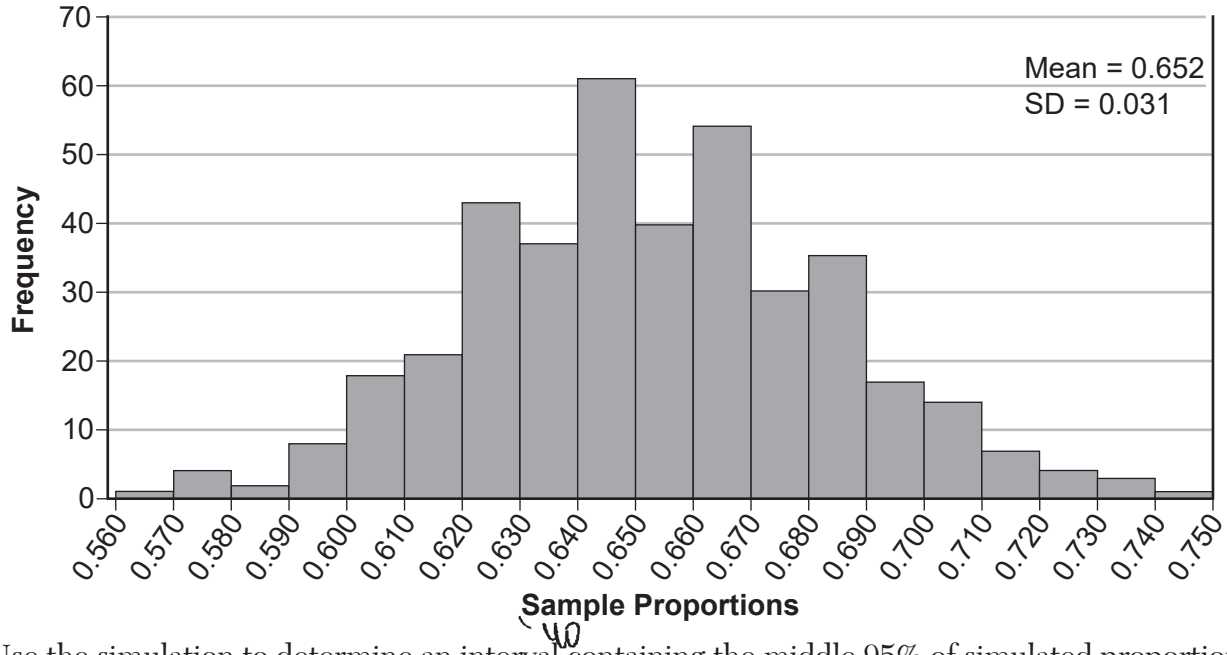
Write the equation in the form $f(x) = A \sin(Bx) + D$ to represent the sinusoidal function.

$f(x) = 6\cos(\pi x) - 2$

Score 0: The student did not satisfy the criteria for one or more credits.

Question 35

35 A principal wonders what percentage of parents at her large high school restrict their child's cell phone privileges. The school surveys a random sample of 250 parents at the school and finds that 65% of them restrict their child's cell phone privileges. The school runs a simulation with 400 samples of 250 parents, assuming that 65% of them restrict cell phone privileges. The simulation results are shown below.



Use the simulation to determine an interval containing the middle 95% of simulated proportions. Justify your answer. Round all values to the *nearest hundredth*.

0.031 · 2 = 0.062
0.652 − 0.062 = 0.59
0.652 + 0.062 = 0.714
0.59 − 0.71

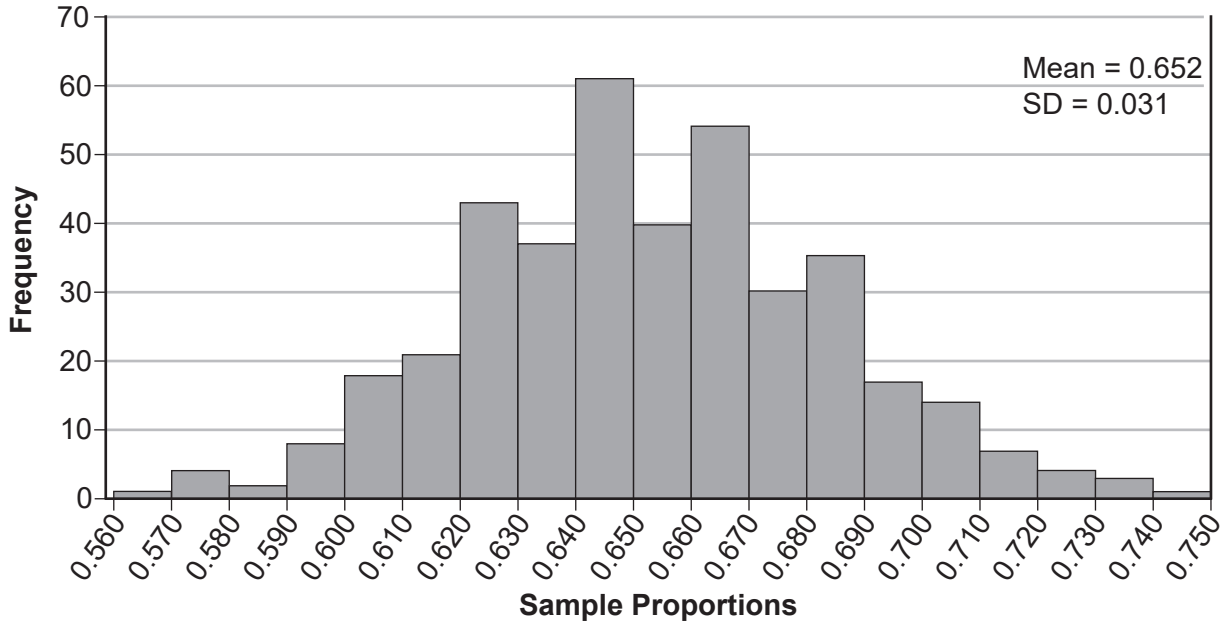
The school district's superintendent worries that less than half of parents restrict their child's cell phone privileges. Do the simulation results support the superintendent's concern? Explain.

No because the lowest the sample proportions go is 0.560 which is still more than half so anything less than 0.5 would be miniscule.

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

Question 35

35 A principal wonders what percentage of parents at her large high school restrict their child's cell phone privileges. The school surveys a random sample of 250 parents at the school and finds that 65% of them restrict their child's cell phone privileges. The school runs a simulation with 400 samples of 250 parents, assuming that 65% of them restrict cell phone privileges. The simulation results are shown below.



Use the simulation to determine an interval containing the middle 95% of simulated proportions. Justify your answer. Round all values to the *nearest hundredth*.

$0.652 \pm 2(0.031)$

$(.59, .714)$ $(.59, .71)$

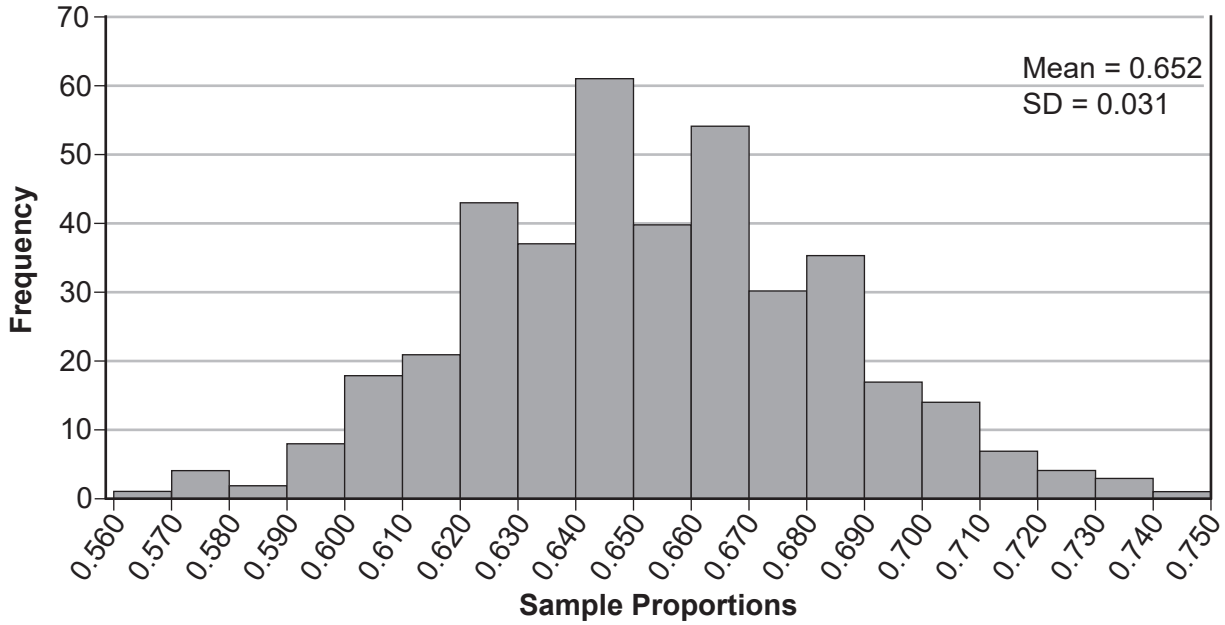
The school district's superintendent worries that less than half of parents restrict their child's cell phone privileges. Do the simulation results support the superintendent's concern? Explain.

no because 50% falls below the 59%–71% interval.

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

Question 35

35 A principal wonders what percentage of parents at her large high school restrict their child's cell phone privileges. The school surveys a random sample of 250 parents at the school and finds that 65% of them restrict their child's cell phone privileges. The school runs a simulation with 400 samples of 250 parents, assuming that 65% of them restrict cell phone privileges. The simulation results are shown below.



Use the simulation to determine an interval containing the middle 95% of simulated proportions. Justify your answer. Round all values to the *nearest hundredth*.

.59 to .71

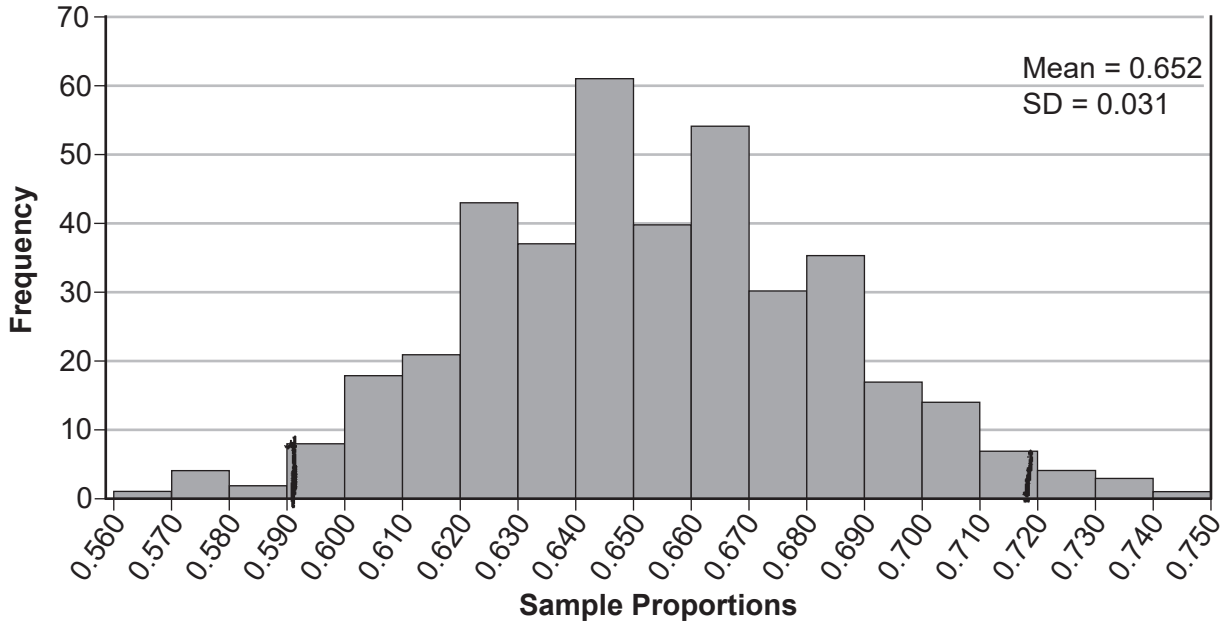
The school district's superintendent worries that less than half of parents restrict their child's cell phone privileges. Do the simulation results support the superintendent's concern? Explain.

No.
The plausible outcomes are all more than 50%, so it would be statistically significant for less than ½ to restrict.

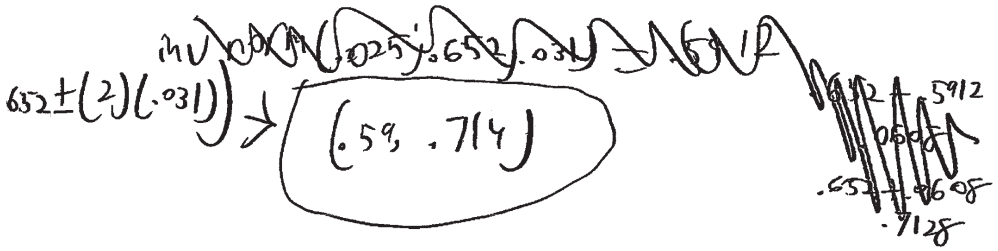
Score 3: The student did not show work to determine the interval.

Question 35

35 A principal wonders what percentage of parents at her large high school restrict their child's cell phone privileges. The school surveys a random sample of 250 parents at the school and finds that 65% of them restrict their child's cell phone privileges. The school runs a simulation with 400 samples of 250 parents, assuming that 65% of them restrict cell phone privileges. The simulation results are shown below.



Use the simulation to determine an interval containing the middle 95% of simulated proportions. Justify your answer. Round all values to the *nearest hundredth*.



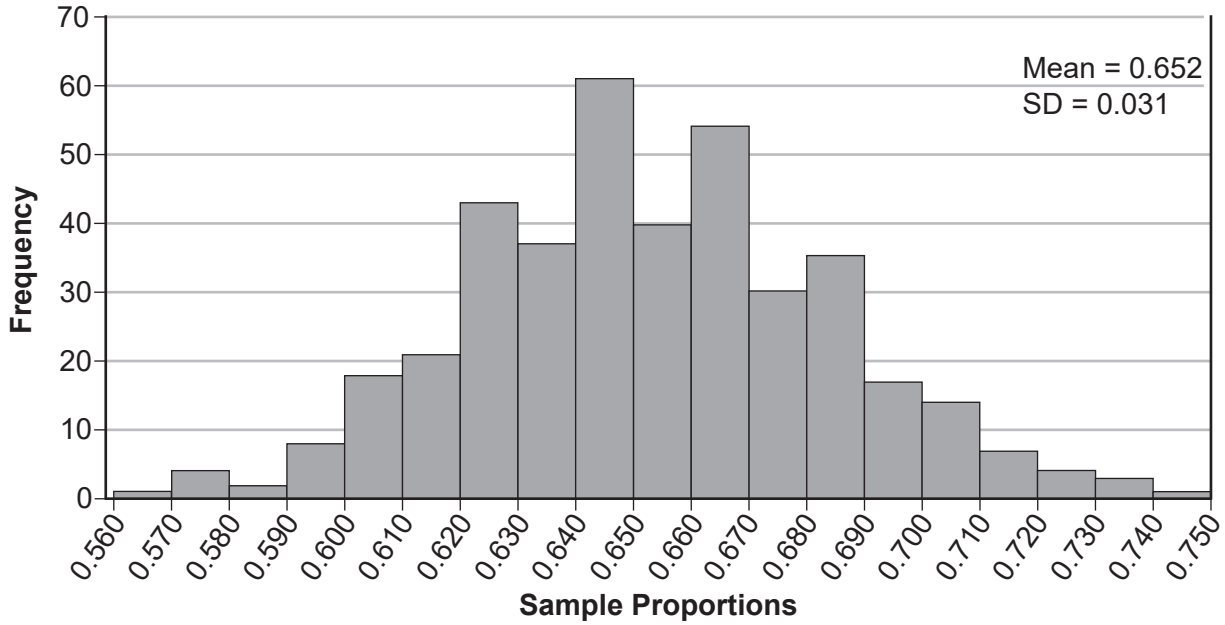
The school district's superintendent worries that less than half of parents restrict their child's cell phone privileges. Do the simulation results support the superintendent's concern? Explain.

no, since every number in the 95% interval is above .5 we have statistical evidence that the majority of parents restrict their child's cell phone privileges

Score 3: The student did not round to the nearest hundredth.

Question 35

35 A principal wonders what percentage of parents at her large high school restrict their child's cell phone privileges. The school surveys a random sample of 250 parents at the school and finds that 65% of them restrict their child's cell phone privileges. The school runs a simulation with 400 samples of 250 parents, assuming that 65% of them restrict cell phone privileges. The simulation results are shown below.



Use the simulation to determine an interval containing the middle 95% of simulated proportions. Justify your answer. Round all values to the *nearest hundredth*.

(.59, .71)

$0.652 \pm 2(0.031)$

$0.652 \pm .062$

$0.652 + .062$ $\quad$ $0.652 - .062$

$.714$ $\quad$ $.59$

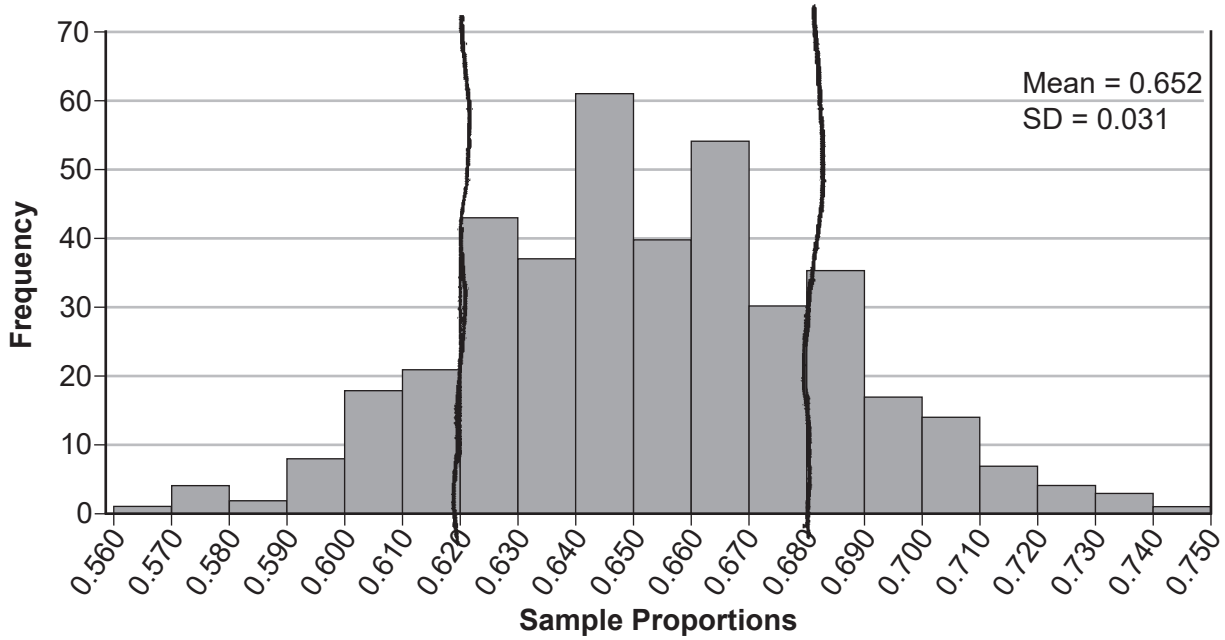
The school district's superintendent worries that less than half of parents restrict their child's cell phone privileges. Do the simulation results support the superintendent's concern? Explain.

Yes because the interval of 95% is less than half.

Score 2: The student's explanation is incorrect.

Question 35

35 A principal wonders what percentage of parents at her large high school restrict their child's cell phone privileges. The school surveys a random sample of 250 parents at the school and finds that 65% of them restrict their child's cell phone privileges. The school runs a simulation with 400 samples of 250 parents, assuming that 65% of them restrict cell phone privileges. The simulation results are shown below.



Use the simulation to determine an interval containing the middle 95% of simulated proportions. Justify your answer. Round all values to the *nearest hundredth*.

$1.95 = 250(t - 250)$ (0.62, 0.68)

$0.652 + 0.031 = 0.683$

$0.652 - 0.031 = 0.621$

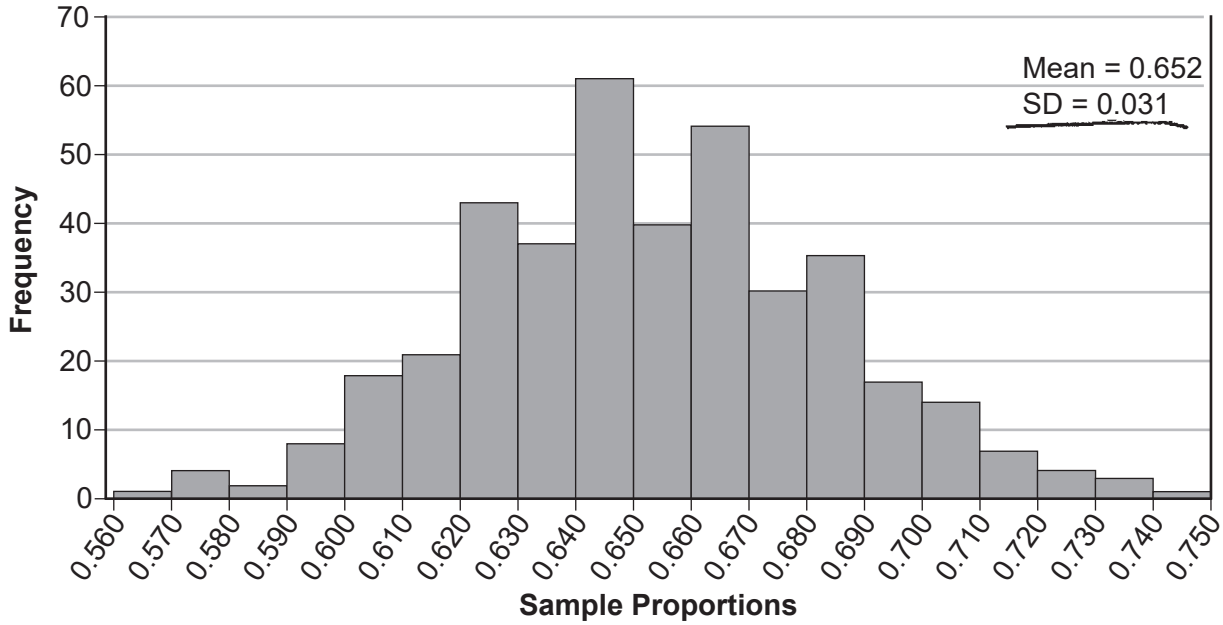
The school district's superintendent worries that less than half of parents restrict their child's cell phone privileges. Do the simulation results support the superintendent's concern? Explain.

The simulation results does not support the superintedent concern because I compared 50% to the interval.

Score 2: The student calculated an incorrect interval and their explanation was incomplete.

Question 35

35 A principal wonders what percentage of parents at her large high school restrict their child's cell phone privileges. The school surveys a random sample of 250 parents at the school and finds that 65% of them restrict their child's cell phone privileges. The school runs a simulation with 400 samples of 250 parents, assuming that 65% of them restrict cell phone privileges. The simulation results are shown below.



Use the simulation to determine an interval containing the middle 95% of simulated proportions. Justify your answer. Round all values to the *nearest hundredth*.

$\bar{x} \pm 2 \cdot \sigma_{\bar{x}}$

$0.652 + 2(0.031) = 0.714 = 71.4\%$

$0.652 - 2(0.031) = 0.59 = 59\%$

0.59 – 0.714

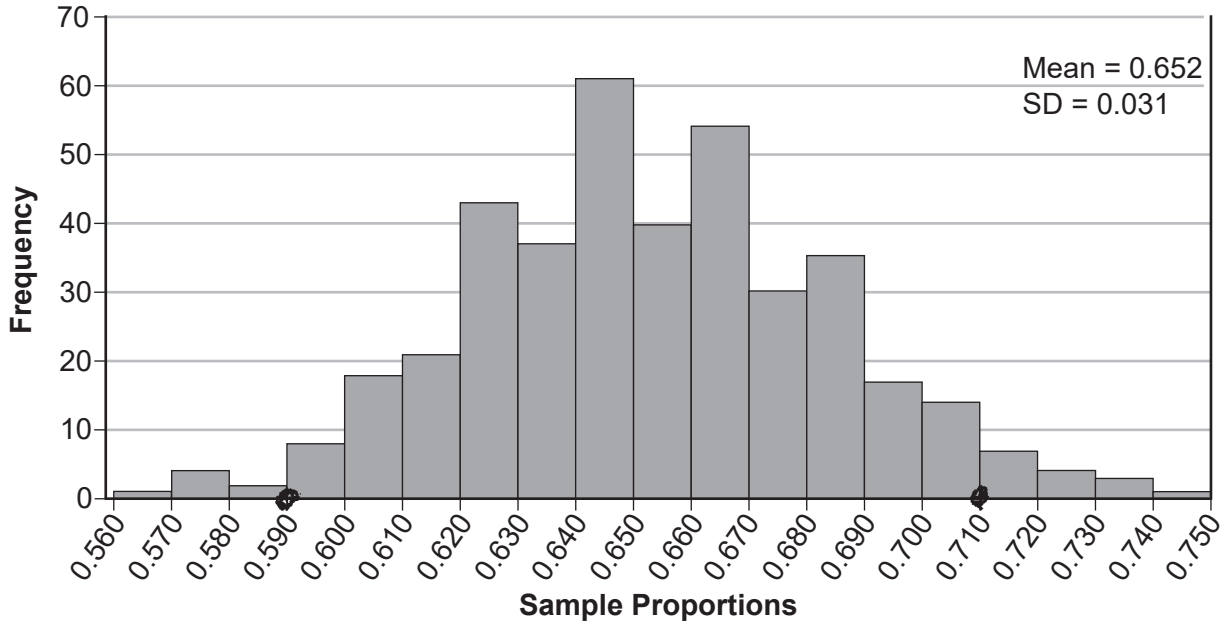
The school district's superintendent worries that less than half of parents restrict their child's cell phone privileges. Do the simulation results support the superintendent's concern? Explain.

The simulation results do not support the superintendent's concerns because it is within the middle 95%.

Score 1: The student earned one credit for the interval.

Question 35

35 A principal wonders what percentage of parents at her large high school restrict their child's cell phone privileges. The school surveys a random sample of 250 parents at the school and finds that 65% of them restrict their child's cell phone privileges. The school runs a simulation with 400 samples of 250 parents, assuming that 65% of them restrict cell phone privileges. The simulation results are shown below.



Use the simulation to determine an interval containing the middle 95% of simulated proportions. Justify your answer. Round all values to the *nearest hundredth*.

Mean ± 2(SD)
.65 ± 2(.031)
.588 to .712 ≈ .59 to .71

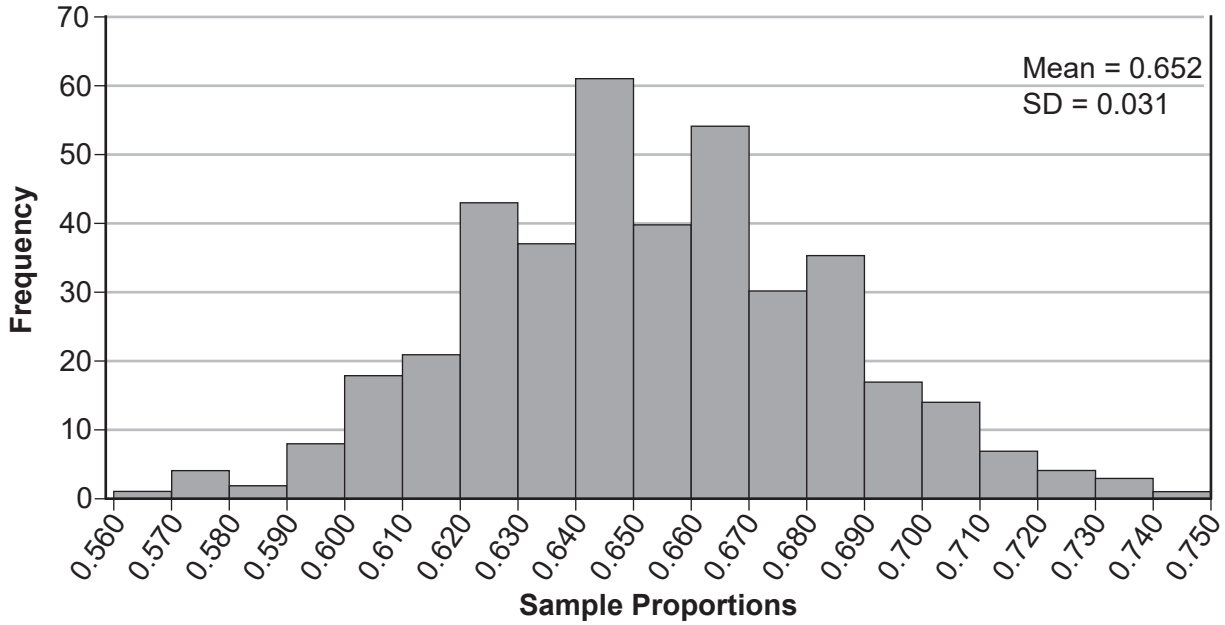
The school district's superintendent worries that less than half of parents restrict their child's cell phone privileges. Do the simulation results support the superintendent's concern? Explain.

65% falls within the middle 95%.

Score 1: The student used an incorrect mean when calculating the interval, did not state yes or no, and the explanation is irrelevant.

Question 35

35 A principal wonders what percentage of parents at her large high school restrict their child's cell phone privileges. The school surveys a random sample of 250 parents at the school and finds that 65% of them restrict their child's cell phone privileges. The school runs a simulation with 400 samples of 250 parents, assuming that 65% of them restrict cell phone privileges. The simulation results are shown below.



Use the simulation to determine an interval containing the middle 95% of simulated proportions. Justify your answer. Round all values to the *nearest hundredth*.

0

Lower: 250
Upper: 400
$\mu = 0.652$
$\sigma = 0.031$

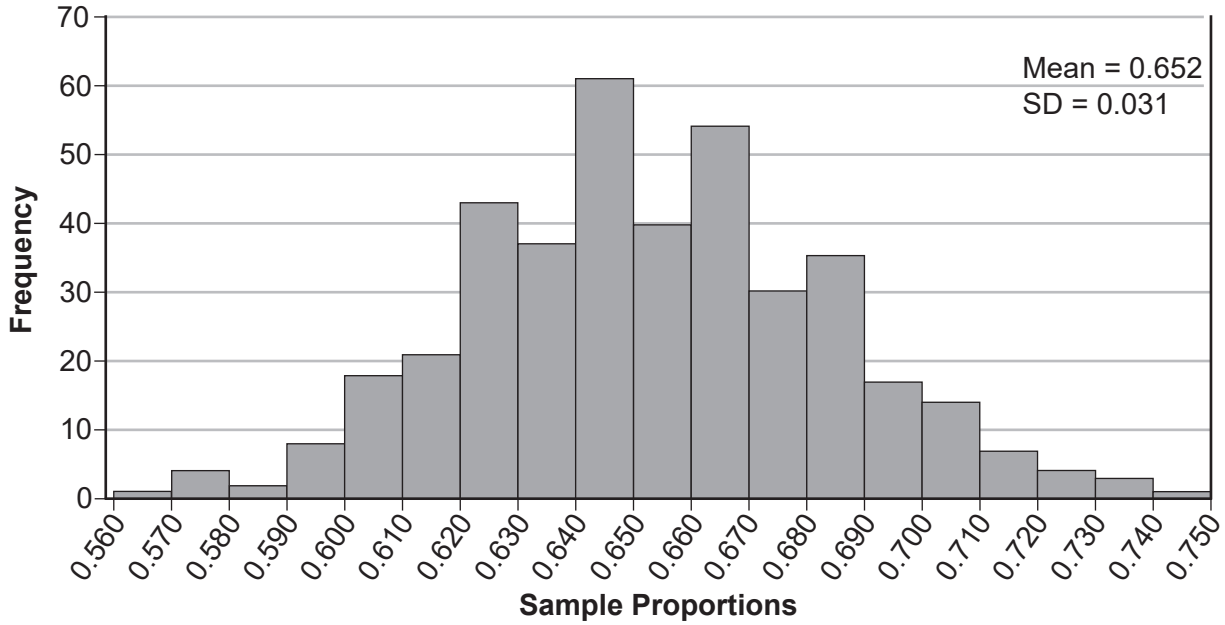
The school district's superintendent worries that less than half of parents restrict their child's cell phone privileges. Do the simulation results support the superintendent's concern? Explain.

The Simulation Results. Does not support the Superintendents Concern because, more than half do not Restrict their children.

Score 0: The student did not satisfy the criteria for one or more credits.

Question 35

35 A principal wonders what percentage of parents at her large high school restrict their child's cell phone privileges. The school surveys a random sample of 250 parents at the school and finds that 65% of them restrict their child's cell phone privileges. The school runs a simulation with 400 samples of 250 parents, assuming that 65% of them restrict cell phone privileges. The simulation results are shown below.



Use the simulation to determine an interval containing the middle 95% of simulated proportions. Justify your answer. Round all values to the *nearest hundredth*.

.652 + 2(0.031) = .714

.714

The school district's superintendent worries that less than half of parents restrict their child's cell phone privileges. Do the simulation results support the superintendent's concern? Explain.

Because 65% of them restrict Cell Phone Privileges that's more than half.

Score 0: The student did not satisfy the criteria for one or more credits.

Question 36

36 Lubin pours green tea into a cup to cool. The function below can be used to model the temperature, in degrees Fahrenheit, of Lubin's tea x minutes after he pours it into the cup.

$$T(x) = 110e^{-0.0453x} + 74$$

State the temperature of the tea, in degrees Fahrenheit, when Lubin poured it into the cup.

$T(0)=110e^{0}+74$
$T(0)=110+74$
$T(0)=184$

184°F

To the *nearest tenth*, use $T(x)$ to determine the average rate of change in degrees per minute, from $x = 0$ to $x = 5$.

$T(5)=110e^{-0.0453(5)}+74$
$T(5)=161.705$

$m=\frac{184-161.705}{0-5}$
$m=-4.5$

Question 36 is continued on the next page.

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

Question 36 continued

Interpret the value of the average rate of change within the given context.

From the time the tea was poured to 5 minutes after, the tea cooled about 4.5°F every minute.

To the *nearest tenth of a minute*, determine how long Lubin must wait after pouring his tea into the cup before the tea's temperature reaches 120° Fahrenheit.

$120 = 110e^{-0.0453(t)} + 74$

$46 = 110e^{-0.0453(t)}$

$\frac{23}{55} = e^{-0.0453t}$

$-0.0453(t) = \ln\left(\frac{23}{55}\right)$

$t = \frac{\ln\left(\frac{23}{55}\right)}{-0.0453}$

$t = 19.2$

19.2 minutes

Question 36

36 Lubin pours green tea into a cup to cool. The function below can be used to model the temperature, in degrees Fahrenheit, of Lubin's tea x minutes after he pours it into the cup.

$$T(x) = 110e^{-0.0453x} + 74$$

State the temperature of the tea, in degrees Fahrenheit, when Lubin poured it into the cup.

$110e^{-0.0453 \cdot 0} + 74$
$= 110 + 74 = 184°F$

To the *nearest tenth*, use $T(x)$ to determine the average rate of change in degrees per minute, from $x = 0$ to $x = 5$.

$$\frac{T(5) - T(0)}{5} = -4.5$$

Question 36 is continued on the next page.

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

Question 36 continued

Interpret the value of the average rate of change within the given context.

The temp decreases a rate of 4.5°F per minute on average.

To the *nearest tenth of a minute*, determine how long Lubin must wait after pouring his tea into the cup before the tea's temperature reaches 120° Fahrenheit.

$110e^{-0.0453x} + 74 = 120$

$110e^{-0.0453x} = 46$

$e^{-0.0453x} = 0.41818$

$-0.0453x = -0.8718$

$x = 19.24589$

$x = 19.2$

Question 36

36 Lubin pours green tea into a cup to cool. The function below can be used to model the temperature, in degrees Fahrenheit, of Lubin's tea x minutes after he pours it into the cup.

$$T(x) = 110e^{-0.0453x} + 74$$

State the temperature of the tea, in degrees Fahrenheit, when Lubin poured it into the cup.

~~74°F~~ 184°F

To the *nearest tenth*, use $T(x)$ to determine the average rate of change in degrees per minute, from $x = 0$ to $x = 5$.

$$\frac{161.705 - 184}{5 - 0} \qquad \frac{-22.295}{5}$$

$$-4.5$$

Question 36 is continued on the next page.

Score 5: The student's interpretation is incorrect.

Question 36 continued

Interpret the value of the average rate of change within the given context.

4.5°F less every minute the cup is cooled

To the *nearest tenth of a minute*, determine how long Lubin must wait after pouring his tea into the cup before the tea's temperature reaches 120° Fahrenheit.

$120 = 110e^{-.0453x} + 74$

$\ln \frac{46}{110} = -.0453x$

$\frac{\ln \frac{46}{110}}{-.0453}$

19.2 minutes

Question 36

36 Lubin pours green tea into a cup to cool. The function below can be used to model the temperature, in degrees Fahrenheit, of Lubin's tea x minutes after he pours it into the cup.

$$T(x) = 110e^{-0.0453x} + 74$$

State the temperature of the tea, in degrees Fahrenheit, when Lubin poured it into the cup.

$T(0) = 110e^{-0.0453(0)} + 74$

184°F

To the *nearest tenth*, use $T(x)$ to determine the average rate of change in degrees per minute, from $x = 0$ to $x = 5$.

$\frac{161.7051... - 184^\circ}{5 - 0} = -4.5^\circ$

$T(0) = 184^\circ F$

$T(5) = 110e^{-0.0453(5)} + 74$

$T(5) = 161.7051...^\circ F$

Question 36 is continued on the next page.

Score 5: The student had a transcription error with the exponent in the last part.

Question 36 continued

Interpret the value of the average rate of change within the given context.

On average the tea cooled by 4.5 °F each minute in the first five minutes.

To the *nearest tenth of a minute*, determine how long Lubin must wait after pouring his tea into the cup before the tea's temperature reaches 120° Fahrenheit.

$120^0 = 110e^{-0.0453x} + 74$
$-74 \qquad\qquad -74$

19.4 minutes = x

$\frac{46}{110} = \frac{110e^{-0.0453x}}{110}$

$\frac{23}{55} = e^{-0.045x}$

$\ln\frac{23}{55} = \ln e^{-0.045x}$

$\ln\frac{23}{55} = -0.045x(1)$

$\frac{\ln\frac{23}{55}}{-0.045} = \frac{-0.045x}{-0.045}$

Question 36

36 Lubin pours green tea into a cup to cool. The function below can be used to model the temperature, in degrees Fahrenheit, of Lubin's tea x minutes after he pours it into the cup.

$$T(x) = 110e^{-0.0453x} + 74$$

State the temperature of the tea, in degrees Fahrenheit, when Lubin poured it into the cup.

$T(0) = 110e^{-0.0453(0)} + 74$

$T(0) = 110e^{(0)} + 74$

$T(0) = 110(1) + 74$

$\boxed{T(0) = 184°}$

To the *nearest tenth*, use $T(x)$ to determine the average rate of change in degrees per minute, from $x = 0$ to $x = 5$.

$T(5) \approx 161.7$

$$\frac{184 - 161.7}{-5} = 4.5$$

Question 36 is continued on the next page.

Score 4: The student made a computational error calculating the average rate of change and gave an incomplete interpretation.

Question 36 continued

Interpret the value of the average rate of change within the given context.

The tea cooled by about 4.5°

To the *nearest tenth of a minute*, determine how long Lubin must wait after pouring his tea into the cup before the tea's temperature reaches 120° Fahrenheit.

$120 = 110e^{-0.0453x} + 74$

$-74 \qquad -74$

$\frac{46}{110} = \frac{110e^{-0.0453x}}{110}$

$\ln\left(\frac{46}{110}\right) = \ln e^{-0.0453x}$

$\frac{\ln\left(\frac{46}{110}\right)}{-0.0453} = \frac{-0.0453x}{-0.0453}$

$19.2 \approx x$

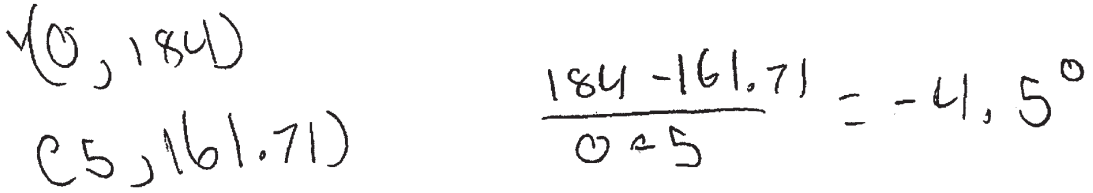
Question 36

36 Lubin pours green tea into a cup to cool. The function below can be used to model the temperature, in degrees Fahrenheit, of Lubin's tea x minutes after he pours it into the cup.

$$T(x) = 110e^{-0.0453x} + 74$$

State the temperature of the tea, in degrees Fahrenheit, when Lubin poured it into the cup.

To the *nearest tenth*, use $T(x)$ to determine the average rate of change in degrees per minute, from $x = 0$ to $x = 5$.

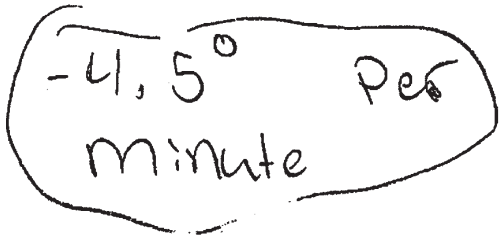


Question 36 is continued on the next page.

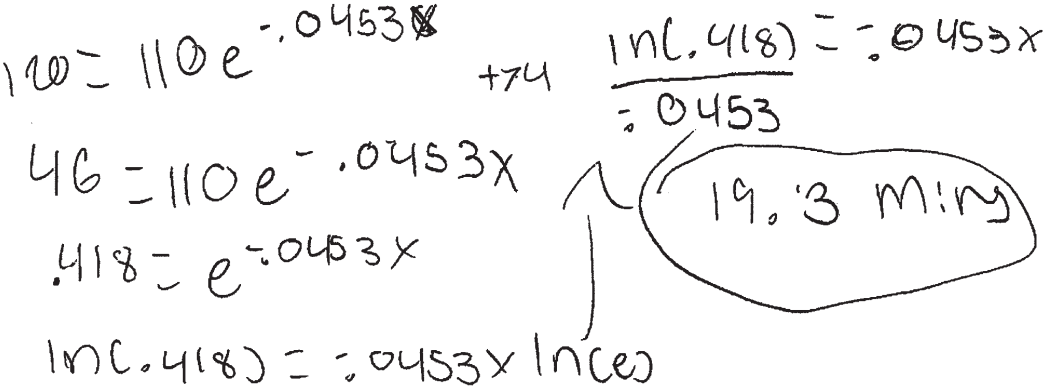
Score 4: The student gave an incomplete interpretation and rounded too early in the last part.

Question 36 continued

Interpret the value of the average rate of change within the given context.



To the *nearest tenth of a minute*, determine how long Lubin must wait after pouring his tea into the cup before the tea's temperature reaches 120° Fahrenheit.



Question 36

36 Lubin pours green tea into a cup to cool. The function below can be used to model the temperature, in degrees Fahrenheit, of Lubin's tea x minutes after he pours it into the cup.

$$T(x) = 110e^{-0.0453x} + 74$$

State the temperature of the tea, in degrees Fahrenheit, when Lubin poured it into the cup.

$T(0) = 110e^{-0.0453(0)} + 74$

$T(0) = \boxed{184°F}$

To the *nearest tenth*, use $T(x)$ to determine the average rate of change in degrees per minute, from $x = 0$ to $x = 5$.

$\frac{162 - 184}{5 - 0}$ $\frac{-22}{5}$

-4.4

$T(5) = 110e^{-0.0453(5)} + 74 = 161.7$

$T(0) = 110e^{-0.0453(0)} + 74 = 184$

Question 36 is continued on the next page.

Score 3: The student rounded too early calculating the average rate of change, gave no interpretation, and did not express their final answer to the nearest tenth.

Question 36 continued

Interpret the value of the average rate of change within the given context.

Average rate of change = -4.4

To the *nearest tenth of a minute*, determine how long Lubin must wait after pouring his tea into the cup before the tea's temperature reaches 120° Fahrenheit.

$T(x) = 110e^{-0.0453(x)} + 74$

plug in $y =$

19	120.52
20	118.46

19 minutes

120.52

120.5

Question 36

36 Lubin pours green tea into a cup to cool. The function below can be used to model the temperature, in degrees Fahrenheit, of Lubin's tea x minutes after he pours it into the cup.

$$T(x) = 110e^{-0.0453x} + 74$$

State the temperature of the tea, in degrees Fahrenheit, when Lubin poured it into the cup.

$T(0) = 100e^{-0.0453(0)} + 74$

$T(0) = 174°F$

To the *nearest tenth*, use $T(x)$ to determine the average rate of change in degrees per minute, from $x = 0$ to $x = 5$.

$\frac{\Delta y}{\Delta x}$ $\frac{153.73 - 174}{5 - 0} = -4.1$

Question 36 is continued on the next page.

Score 3: The student had a transcription error of 100 but calculated and interpreted the average rate of change appropriately.

Question 36 continued

Interpret the value of the average rate of change within the given context.

This means the temperature will decrease at an average rate of 4.1°F per minute.

To the *nearest tenth of a minute*, determine how long Lubin must wait after pouring his tea into the cup before the tea's temperature reaches 120° Fahrenheit.

$120 = 100e^{-0.0453x} + 74$

$-74 \quad -74$

$46 = 100e^{-0.0453x}$

$\log 46 = \log 100e^{-0.0453x}$

$\frac{\log 46}{-.453 \log 100e} = \frac{-.453x \log 100e}{-.453 \log 100e}$

Question 36

36 Lubin pours green tea into a cup to cool. The function below can be used to model the temperature, in degrees Fahrenheit, of Lubin's tea x minutes after he pours it into the cup.

$$T(x) = 110e^{-0.0453x} + 74$$

State the temperature of the tea, in degrees Fahrenheit, when Lubin poured it into the cup.

$T(x) = 110e^{-0.0453x} + 74$ → 0 minutes

$T(0) = 110e^{-0.0453(0)} + 74$

$T(0) = 184°$

To the *nearest tenth*, use $T(x)$ to determine the average rate of change in degrees per minute, from $x = 0$ to $x = 5$.

$T(5) = 110e^{-0.0453(5)} + 74$

$T(5) = 161.7°$

Question 36 is continued on the next page.

Score 2: The student earned one credit on the first and last parts.

Question 36 continued

Interpret the value of the average rate of change within the given context.

Rate of change: 4.5° per minute

To the *nearest tenth of a minute*, determine how long Lubin must wait after pouring his tea into the cup before the tea's temperature reaches 120° Fahrenheit.

$T(19) = 110e^{-0.0453(19)} + 74 = 120.5°$

$T(20) = 118.5°$

19 minutes

Question 36

36 Lubin pours green tea into a cup to cool. The function below can be used to model the temperature, in degrees Fahrenheit, of Lubin's tea x minutes after he pours it into the cup.

$$T(x) = 110e^{-0.0453x} + 74$$

State the temperature of the tea, in degrees Fahrenheit, when Lubin poured it into the cup.

$110e^{-0.0453(0)} + 74 = 184$

To the *nearest tenth*, use $T(x)$ to determine the average rate of change in degrees per minute, from $x = 0$ to $x = 5$.

(x_2, y_2) $(0, 184)$
(x_1, y_1) $(5, 161.71)$

$\frac{184 - 161.71}{0 - 5} = -5.5$

Question 36 is continued on the next page.

Score 2: The student earned one credit in the first and the second parts.

Question 36 continued

Interpret the value of the average rate of change within the given context.

this means that each minute the temperator decrease

To the *nearest tenth of a minute*, determine how long Lubin must wait after pouring his tea into the cup before the tea's temperature reaches 120° Fahrenheit.

Question 36

36 Lubin pours green tea into a cup to cool. The function below can be used to model the temperature, in degrees Fahrenheit, of Lubin's tea x minutes after he pours it into the cup.

$$T(x) = 110e^{-0.0453x} + 74$$

State the temperature of the tea, in degrees Fahrenheit, when Lubin poured it into the cup.

184°

To the *nearest tenth*, use $T(x)$ to determine the average rate of change in degrees per minute, from $x = 0$ to $x = 5$.

179.17
+ -161.7
17.473
5 = 3.5

Question 36 is continued on the next page.

Score 1: The student earned one credit for the first part.

Question 36 continued

Interpret the value of the average rate of change within the given context.

To the *nearest tenth of a minute*, determine how long Lubin must wait after pouring his tea into the cup before the tea's temperature reaches 120° Fahrenheit.

19 minutes

Question 36

36 Lubin pours green tea into a cup to cool. The function below can be used to model the temperature, in degrees Fahrenheit, of Lubin's tea x minutes after he pours it into the cup.

$$T(x) = 110e^{-0.0453x} + 74$$

State the temperature of the tea, in degrees Fahrenheit, when Lubin poured it into the cup.

110° degrees Fahrenheit

To the *nearest tenth*, use $T(x)$ to determine the average rate of change in degrees per minute, from $x = 0$ to $x = 5$.

slope

$x_1 = 0$
$y_1 = 184$

$x_2 = 5$
$y_2 = 161.7051277$

$\frac{y_2 - y_1}{x_2 - x_1}$

average rate = 4.5

Question 36 is continued on the next page.

Score 1: The student earned one credit for the average rate of change.

Question 36 continued

Interpret the value of the average rate of change within the given context.

To the *nearest tenth of a minute*, determine how long Lubin must wait after pouring his tea into the cup before the tea's temperature reaches 120° Fahrenheit.

around 19.3
or 19.2

Question 36

36 Lubin pours green tea into a cup to cool. The function below can be used to model the temperature, in degrees Fahrenheit, of Lubin's tea x minutes after he pours it into the cup.

$$T(x) = 110e^{-0.0453x} + 74$$

State the temperature of the tea, in degrees Fahrenheit, when Lubin poured it into the cup.

$T(x) = 110e^{-0.0453x} + 74$

To the *nearest tenth*, use $T(x)$ to determine the average rate of change in degrees per minute, from $x = 0$ to $x = 5$.

184 161.7

$T(0) = 110e^{-0.0453(0)} + 74 = 184$

$T(5) = 110e^{-0.0453(5)} + 74 = 161.7$

Question 36 is continued on the next page.

Score 0: The student did not satisfy the criteria for one or more credits.

Question 36 continued

Interpret the value of the average rate of change within the given context.

To the *nearest tenth of a minute*, determine how long Lubin must wait after pouring his tea into the cup before the tea's temperature reaches 120° Fahrenheit.

1 hour and 14 minutes

Question 36

36 Lubin pours green tea into a cup to cool. The function below can be used to model the temperature, in degrees Fahrenheit, of Lubin's tea x minutes after he pours it into the cup.

$$T(x) = 110e^{-0.0453x} + 74$$

State the temperature of the tea, in degrees Fahrenheit, when Lubin poured it into the cup.

$110e^{-0.0453(0)} + 74$

185

To the *nearest tenth*, use $T(x)$ to determine the average rate of change in degrees per minute, from $x = 0$ to $x = 5$.

$110e^{-0.0453(5)} + 74$

162.7051277

185
$-\ 162.7051277$
22.2948723

22.3

Question 36 is continued on the next page.

Score 0: The student did not satisfy the criteria for one or more credits.

Question 36 continued

Interpret the value of the average rate of change within the given context.

To the *nearest tenth of a minute*, determine how long Lubin must wait after pouring his tea into the cup before the tea's temperature reaches 120° Fahrenheit.

19.8 minutes

$110e^{-0.0453(19.8)} + 74$

119.8

$\approx$

120°