The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA II (Common Core)

Thursday, August 18, 2016 — 12:30 to 3:30 p.m.

MODEL RESPONSE SET

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Question 25

25 The volume of air in a person's lungs, as the person breathes in and out, can be modeled by a sine graph. A scientist is studying the differences in this volume for people at rest compared to people told to take a deep breath. When examining the graphs, should the scientist focus on the amplitude, period, or midline? Explain your choice.

amplitude because it shows how much air gets into someones lungs with a deep breath compared to a shallow breath when the person is at rest.

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

Question 25

25 The volume of air in a person's lungs, as the person breathes in and out, can be modeled by a sine graph. A scientist is studying the differences in this volume for people at rest compared to people told to take a deep breath. When examining the graphs, should the scientist focus on the amplitude, period, or midline? Explain your choice.

Amplitude → show difference in height of graph as to how much volume is being taken in

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

Question 25

25 The volume of air in a person's lungs, as the person breathes in and out, can be modeled by a sine graph. A scientist is studying the differences in this volume for people at rest compared to people told to take a deep breath. When examining the graphs, should the scientist focus on the amplitude, period, or midline? Explain your choice.

All 3, The amplitude will show how heavy they breathe in and out. The period would show frequent they breathe. The midline would show when they breathe the most

Score 1: The student correctly explained why amplitude should be used, but the remainder of the explanation was erroneous.

Question 25

25 The volume of air in a person's lungs, as the person breathes in and out, can be modeled by a sine graph. A scientist is studying the differences in this volume for people at rest compared to people told to take a deep breath. When examining the graphs, should the scientist focus on the amplitude, period, or midline? Explain your choice.

Midline because it is the average volume of air in their lungs.

Score 1: The student correctly explained an incorrect choice within the context of the problem.

Question 25

25 The volume of air in a person's lungs, as the person breathes in and out, can be modeled by a sine graph. A scientist is studying the differences in this volume for people at rest compared to people told to take a deep breath. When examining the graphs, should the scientist focus on the amplitude, period, or midline? Explain your choice.

The scientist should focus on the period because it is the frequency of breaths taken.

Score 0: The student gave a completely incorrect response.

Question 26

26 Explain how $\left(3^{\frac{1}{5}}\right)^2$ can be written as the equivalent radical expression $\sqrt[5]{9}$.

The $\frac{1}{5}$ power means to do the fifth root, but since you can apply either power first you can square the 3 first and then take the fifth root of it (commutative property)

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

Question 26

26 Explain how $\left(3^{\frac{1}{5}}\right)^2$ can be written as the equivalent radical expression $\sqrt[5]{9}$.

$(3^{1/5})^2 = (3^2)^{1/5} = 9^{1/5} = \sqrt[5]{9}$

I reversed the order of the exponents

I squared the 3 to get 9

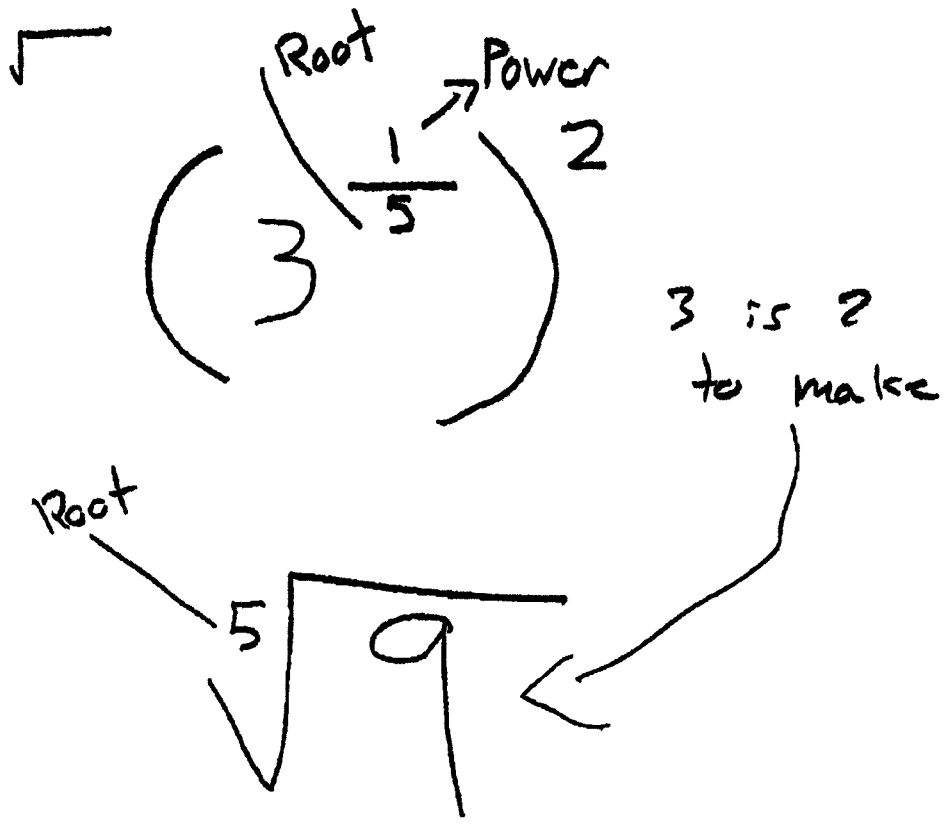
The $\frac{1}{5}$ power is the same as $\sqrt[5]{\ }$

So $(3^{1/5})^2 = \sqrt[5]{9}$

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

Question 26

26 Explain how $\left(3^{\frac{1}{5}}\right)^2$ can be written as the equivalent radical expression $\sqrt[5]{9}$.



Score 1: The student demonstrated the equivalence, but gave an incomplete explanation.

Question 26

26 Explain how $\left(3^{\frac{1}{5}}\right)^2$ can be written as the equivalent radical expression $\sqrt[5]{9}$.

1.55

The exponent (fraction) $(\frac{1}{5})$ is equivalent to taking the root with the denominator $(\sqrt[5]{\ })$ base five. Squaring the first value is equivalent to square rooting the second value. $(\sqrt[5]{9})$ Because $9 = 3^2$, these operations are equal.

Score 1: The student gave an incomplete explanation.

Question 26

26 Explain how $\left(3^{\frac{1}{5}}\right)^2$ can be written as the equivalent radical expression $\sqrt[5]{9}$.

you flip the $\frac{1}{5}$ to $\frac{5}{1}$ and square the 3, making it 9. To square the 5, you make it the square root, giving you $\sqrt{9}$.

Score 0: The student gave a completely incorrect explanation.

Question 27

27 Simplify $xi(i - 7i)^2$, where i is the imaginary unit.

$xi(-6i)^2$

$xi(36i^2)$

$36xi^3$

$-36xi$

(1)

$i \cdot 0$

$(-i)i^2 \quad i \quad i'(i)$

i^2

(-1)

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

Question 27

27 Simplify $xi(i - 7i)^2$, where i is the imaginary unit.

$xi(i-7i)^2$

$i^2=-1$

$xi(i-7i)(i-7i)$ foil

$i^2-7i^2-7i^2+49i^2$

$-1-7(-1)-7(-1)+49(-1)$

-36

Score 1: The student did not multiply by xi.

Question 27

27 Simplify $xi(i - 7i)^2$, where i is the imaginary unit.

$xi(i-7i)^2$

$xi(i^2-49i^2)$

$xi(-1-49(-1))$

$xi(-1+49)$

$xi(48)$

Score 1: The student did not square the binomial correctly.

Question 27

27 Simplify $xi(i - 7i)^2$, where i is the imaginary unit.

~~$xi^2 - 7xi$~~

$xi(i-7i)^2$

$xi((i-7i)(i-7i))$

$(xi^2 - 7i^2)(i-7i)$

$xi^3 - 7xi^3 - 7i^3 + 49i^3$

~~$xi^3 = 14x$~~

$-6xi^3 - 42i^3$

Score 0: The student made an error when distributing the xi and did not reduce the powers of i to simplify the answer.

Question 28

28 Using the identity $\sin^2\theta + \cos^2\theta = 1$, find the value of $\tan\theta$, to the *nearest hundredth*, if $\cos\theta$ is -0.7 and θ is in Quadrant II.

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

$\sin^2\theta + -.7^2 = 1$

$\sin^2\theta + .49 = 1$

$\sin^2\theta = .51$

$\sin\theta = \sqrt{.51}$

$\tan\theta = \frac{\sin\theta}{\cos\theta}$

$\tan\theta = \frac{\sqrt{.51}}{-.7}$

$\tan\theta = -1.02$

$\tan\theta = -1.02$

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

Question 28

28 Using the identity $\sin^2\theta + \cos^2\theta = 1$, find the value of $\tan\theta$, to the *nearest hundredth*, if $\cos\theta$ is -0.7 and θ is in Quadrant II.

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

$$\tan^2\theta + 1 = \frac{1}{\cos^2\theta}$$

$$\tan^2\theta = \frac{1}{(-.7)^2} - 1 = 1.0408$$

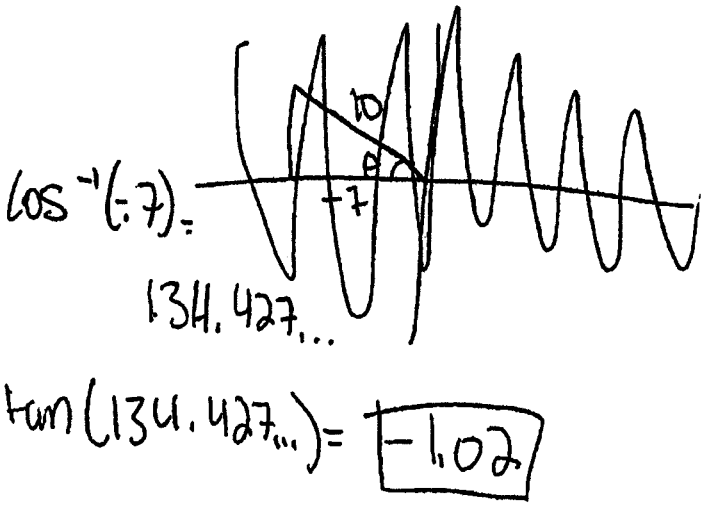
$$\tan\theta = \sqrt{1.0408}$$

$$= -1.02 \text{ in QII}$$

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

Question 28

28 Using the identity $\sin^2\theta + \cos^2\theta = 1$, find the value of $\tan\theta$, to the *nearest hundredth*, if $\cos\theta$ is –0.7 and θ is in Quadrant II.



Score 1: The student did not use the identity.

Question 28

28 Using the identity $\sin^2\theta + \cos^2\theta = 1$, find the value of $\tan\theta$, to the *nearest hundredth*, if $\cos\theta$ is –0.7 and θ is in Quadrant II.

$\sin^2\theta + (-0.7)^2 = 1$

$\sin^2\theta + .49 = 1$

$\sqrt{\sin^2\theta} = \sqrt{.51}$

$\tan\theta = -\frac{0.71}{0.7}$

Score 1: The student correctly found the value for $\sin\theta$.

Question 28

28 Using the identity $\sin^2\theta + \cos^2\theta = 1$, find the value of $\tan\theta$, to the *nearest hundredth*, if $\cos\theta$ is -0.7 and θ is in Quadrant II.

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

$1 + \tan^2\theta = \frac{1}{\sin^2\theta}$ $\frac{y}{x}$

(0.7)

$1 + \tan^2\theta = \frac{1}{0.49}$

$-1 \quad -1$

$\sqrt{\tan^2\theta} = \sqrt{1.0408}$

$\tan\theta = 1.0202$

$\theta \approx 1.02$

-1.02

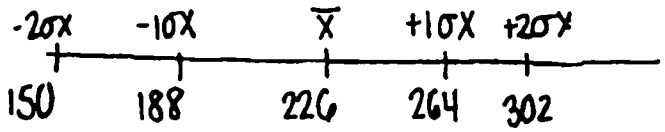
Score 0: The student obtained a correct response by an incorrect procedure. The student wrote $\tan^2\theta$ instead of $\cot^2\theta$ and used 0.7 for $\sin^2\theta$.

Question 29

29 Elizabeth waited for 6 minutes at the drive thru at her favorite fast-food restaurant the last time she visited. She was upset about having to wait that long and notified the manager. The manager assured her that her experience was very unusual and that it would not happen again.

A study of customers commissioned by this restaurant found an approximately normal distribution of results. The mean wait time was 226 seconds and the standard deviation was 38 seconds. Given these data, and using a 95% level of confidence, was Elizabeth's wait time unusual? Justify your answer.

6 min = 360



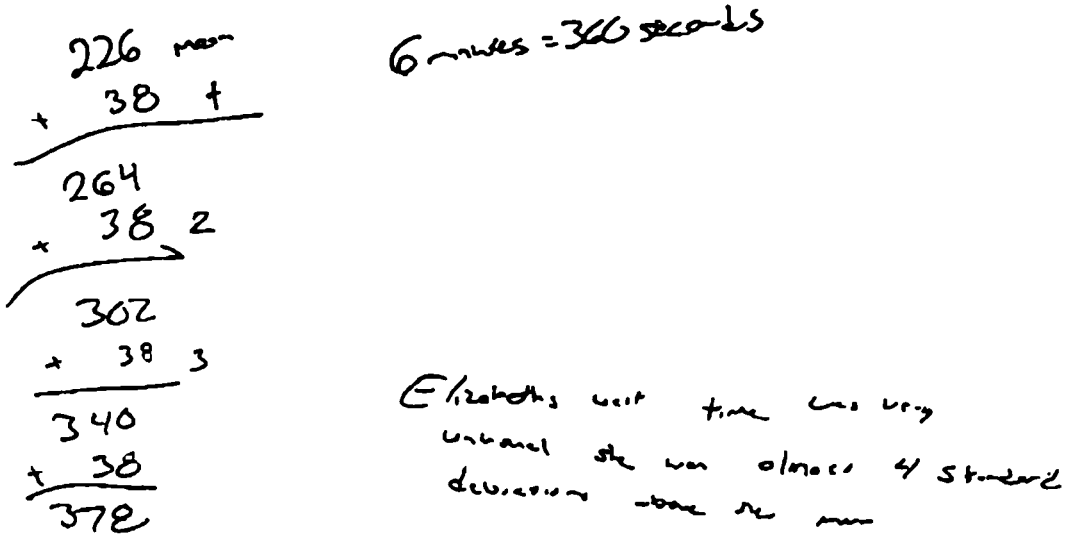
Unusual. 360 seconds is out of 95% range of results.

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

Question 29

29 Elizabeth waited for 6 minutes at the drive thru at her favorite fast-food restaurant the last time she visited. She was upset about having to wait that long and notified the manager. The manager assured her that her experience was very unusual and that it would not happen again.

A study of customers commissioned by this restaurant found an approximately normal distribution of results. The mean wait time was 226 seconds and the standard deviation was 38 seconds. Given these data, and using a 95% level of confidence, was Elizabeth's wait time unusual? Justify your answer.



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

Question 29

29 Elizabeth waited for 6 minutes at the drive thru at her favorite fast-food restaurant the last time she visited. She was upset about having to wait that long and notified the manager. The manager assured her that her experience was very unusual and that it would not happen again.

A study of customers commissioned by this restaurant found an approximately normal distribution of results. The mean wait time was 226 seconds and the standard deviation was 38 seconds. Given these data, and using a 95% level of confidence, was Elizabeth's wait time unusual? Justify your answer.

6 min = 360 sec

$\mu = 226$

$\sigma = 38$

$$z = \frac{\bar{x} - \mu}{\sigma} = \frac{360 - 226}{38}$$

$z \simeq 3.53$

Yes, her wait time was unusual being 3.53 std dev above the mean

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

Question 29

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A study of customers commissioned by this restaurant found an approximately normal distribution of results. The mean wait time was 226 seconds and the standard deviation was 38 seconds. Given these data, and using a 95% level of confidence, was Elizabeth's wait time unusual? Justify your answer.

$226+38+38 = \frac{302}{60} \approx 5$ min.

Yes it was unusual.

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

Question 29

29 Elizabeth waited for 6 minutes at the drive thru at her favorite fast-food restaurant the last time she visited. She was upset about having to wait that long and notified the manager. The manager assured her that her experience was very unusual and that it would not happen again.

A study of customers commissioned by this restaurant found an approximately normal distribution of results. The mean wait time was 226 seconds and the standard deviation was 38 seconds. Given these data, and using a 95% level of confidence, was Elizabeth's wait time unusual? Justify your answer.

$\bar{x} = 226 \text{ sec} = 3.7\overline{6} \text{ min}$

$SD = 38 \text{ sec} = .6\overline{3} \text{ min}$

$\bar{x} + 2SD = 5.0\overline{3}$

$\bar{x} - 2SD = 2.5$

$2.5 - 5.0\overline{3}$

Score 1: The student obtained the correct interval in minutes.

Question 29

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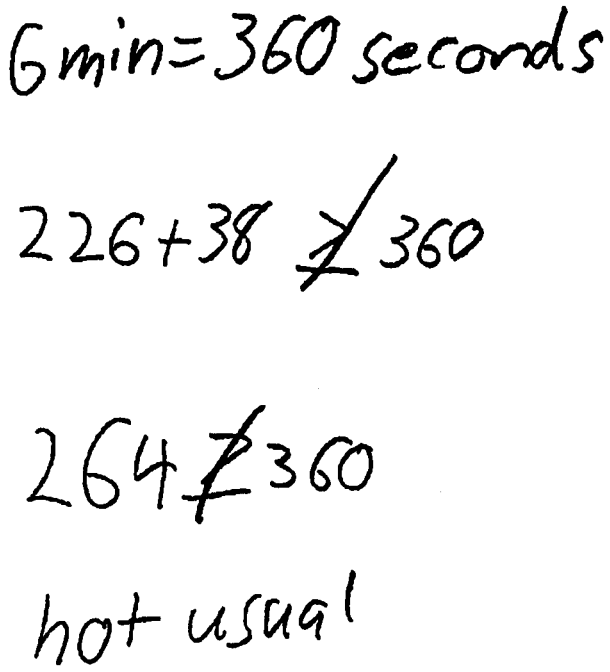
A study of customers commissioned by this restaurant found an approximately normal distribution of results. The mean wait time was 226 seconds and the standard deviation was 38 seconds. Given these data, and using a 95% level of confidence, was Elizabeth's wait time unusual? Justify your answer.



Score 0: The student gave a completely incorrect response.

Question 30

30 The x-value of which function's x-intercept is larger, f or h? Justify your answer.

$f(x) = \log(x - 4)$

x	h(x)
−1	6
0	4
1	2
2	0
3	−2

$0 = \log(x-4)$

$10^0 = x - 4$

$1 = x - 4$

$x = 5$

function f has the larger x-intercept, because at the x-intercept, $y = 0$, and $5 > 2$.

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

Question 30

30 The x-value of which function's x-intercept is larger, f or h? Justify your answer.

$f(x) = \log(x - 4)$

x	h(x)
−1	6
0	4
1	2
2	0
3	−2

f because it's x-intercept is 5 while h's x-intercept is 2

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

Question 30

30 The x-value of which function's x-intercept is larger, f or h? Justify your answer.

$f(x) = \log(x - 4)$

this came up as an error

x	h(x)
−1	6
0	4
1	2
2	0
3	−2

f b/c when graphed in the calculator it has a larger x-intercept

Score 1: The student gave an incomplete justification.

Question 30

30 The x-value of which function's x-intercept is larger, f or h? Justify your answer.

$f(x) = \log(x - 4)$

x	h(x)
−1	6
0	4
1	2
2	0
3	−2

"F" because it starts at 5

Score 1: The student gave an incomplete justification.

Question 30

30 The x-value of which function's x-intercept is larger, f or h? Justify your answer.

$f(x) = \log(x - 4)$

x	h(x)
−1	6
0	4
1	2
2	0
3	−2

f(-1) = log(-1-4)
= log(-5)
not real
f(1) = log(1-4)
= log(-3)
not real

h(x) = log(k-4)
= log 2
= .30102999 57

Most of h(x) has real answeres so h has a larger x-intercept

Score 0: The student gave a completely incorrect response.

Question 31

31 The distance needed to stop a car after applying the brakes varies directly with the square of the car's speed. The table below shows stopping distances for various speeds.

Speed (mph)	10	20	30	40	50	60	70
Distance (ft)	6.25	25	56.25	100	156.25	225	306.25

Determine the average rate of change in braking distance, in ft/mph, between one car traveling at 50 mph and one traveling at 70 mph.

$\frac{150}{20} = 7.5$

Explain what this rate of change means as it relates to braking distance.

As the speed of the car increases by 1mph over 50 mph the braking distance goes up by 7.5ft

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

Question 31

31 The distance needed to stop a car after applying the brakes varies directly with the square of the car's speed. The table below shows stopping distances for various speeds.

Speed (mph)	10	20	30	40	50	60	70
Distance (ft)	6.25	25	56.25	100	156.25	225	306.25

Determine the average rate of change in braking distance, in ft/mph, between one car traveling at 50 mph and one traveling at 70 mph.

$$\frac{(306.25 - 156.25)}{(70 - 50)} = \frac{150}{20} = 7.5 \text{ ft/mph}$$

Explain what this rate of change means as it relates to braking distance.

As the speed of the car increases by 1 mph, the car will need 7.5 ft more to stop after breaking.

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

Question 31

31 The distance needed to stop a car after applying the brakes varies directly with the square of the car's speed. The table below shows stopping distances for various speeds.

Speed (mph)	10	20	30	40	50	60	70
Distance (ft)	6.25	25	56.25	100	156.25	225	306.25

Determine the average rate of change in braking distance, in ft/mph, between one car traveling at 50 mph and one traveling at 70 mph.

10

81.25

8.125 ~~ft~~/mile

Explain what this rate of change means as it relates to braking distance.

It mean that with every increase by 1 mile per hour the breaking distance increases 8.125 ft.

Score 1: The student gave a correct explanation based on an incorrect rate of change.

Question 31

31 The distance needed to stop a car after applying the brakes varies directly with the square of the car's speed. The table below shows stopping distances for various speeds.

Speed (mph)	10	20	30	40	50	60	70
Distance (ft)	6.25	25	56.25	100	156.25	225	306.25

Determine the average rate of change in braking distance, in ft/mph, between one car traveling at 50 mph and one traveling at 70 mph.

$$\frac{306.25 - 156.25}{20} = 7.5$$

Explain what this rate of change means as it relates to braking distance.

The faster the longer to stop

Score 1: The student gave an incomplete explanation.

Question 31

31 The distance needed to stop a car after applying the brakes varies directly with the square of the car's speed. The table below shows stopping distances for various speeds.

Speed (mph)	10	20	30	40	50	60	70
Distance (ft)	6.25	25	56.25	100	156.25	225	306.25

Determine the average rate of change in braking distance, in ft/mph, between one car traveling at 50 mph and one traveling at 70 mph.

$\frac{50}{156.25} = 3.125$ $\frac{70}{306.25} = 4.375$

Explain what this rate of change means as it relates to braking distance.

The faster the speed, the longer distance the car needs to stop.

Score 0: The student did not find the rate of change and gave an incomplete explanation.

31 The distance needed to stop a car after applying the brakes varies directly with the square of the car's speed. The table below shows stopping distances for various speeds.

Speed (mph)	10	20	30	40	50	60	70
Distance (ft)	6.25	25	56.25	100	156.25	225	306.25

Determine the average rate of change in braking distance, in ft/mph, between one car traveling at 50 mph and one traveling at 70 mph.

50mph - 156.25 +150 = 306.25
70mph - 306.25
Average rate of change = 150

Explain what this rate of change means as it relates to braking distance.

At 10 mph the rate of change to 30 mph is 50. Every 20 mph relationship the rate of change goes up 25.
20 → 40 mph - rate of change = 75
30 → 50 mph - rate of change = 100
40 → 60 mph - rate of change = 125
50 → 70 mph - rate of change = 150

Score 0: The student gave a completely incorrect response.

Question 32

32 Given events A and B, such that $P(A) = 0.6$, $P(B) = 0.5$, and $P(A \cup B) = 0.8$, determine whether A and B are independent or dependent.

$0.8 = 0.6 + 0.5 - P(A \text{ and } B)$

$0.8 = 1.1 - P(A \text{ and } B)$

$P(A \text{ and } B) = 0.3$

$P(A \mid B) = P(A)$

$\frac{P(A \text{ and } B)}{P(B)} = P(A)$

$\frac{0.3}{0.5} = 0.6$

$0.6 = 0.6$

A and B ~~are~~ are independent

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

Question 32

32 Given events A and B, such that $P(A) = 0.6$, $P(B) = 0.5$, and $P(A \cup B) = 0.8$, determine whether A and B are independent or dependent.

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$0.8 = 0.6 + 0.5 - P(A \cap B)$

$0.8 = 1.1 - P(A \cap B)$

$P(A \cap B) = 0.3$

A AND B are independent if

$P(A \cap B) = P(A)\,P(B)$

$0.3 = (0.6)(0.5)$

$0.3 = 0.3$

independent

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

Question 32

32 Given events A and B, such that $P(A) = 0.6$, $P(B) = 0.5$, and $P(A \cup B) = 0.8$, determine whether A and B are independent or dependent.

$P(A \cup B) = P(A) + P(B) - P(A \text{ and } B)$

~~$P(A \cup B)$~~

$0.8 = 0.6 + 0.5 - P(A \text{ and } B)$

$0.8 = 1.1 - P(A \text{ and } B)$

$P(A \text{ and } B) = 0.3.$

(1)

A and B ~~are~~ dependent

Score 1: The student found $P(A \cap B)$, but did not show further correct work.

Question 32

32 Given events A and B, such that $P(A) = 0.6$, $P(B) = 0.5$, and $P(A \cup B) = 0.8$, determine whether A and B are independent or dependent.

p(A or B) = 0.8

p(A) = 0.6

p(B = 0.5

A and b are dependent event,

because p(A ∪ B) = 0.8, independant

mean p(A) × p(B) = 0.3, so it dependant

event.

Score 0: The student gave a completely incorrect response.

Question 33

33 Find algebraically the zeros for $p(x) = x^3 + x^2 - 4x - 4$.

x^3+x^2-4x-4

$x^2(x+1)\ (-4)(x+1)$

$(x+1)(x^2-4)$

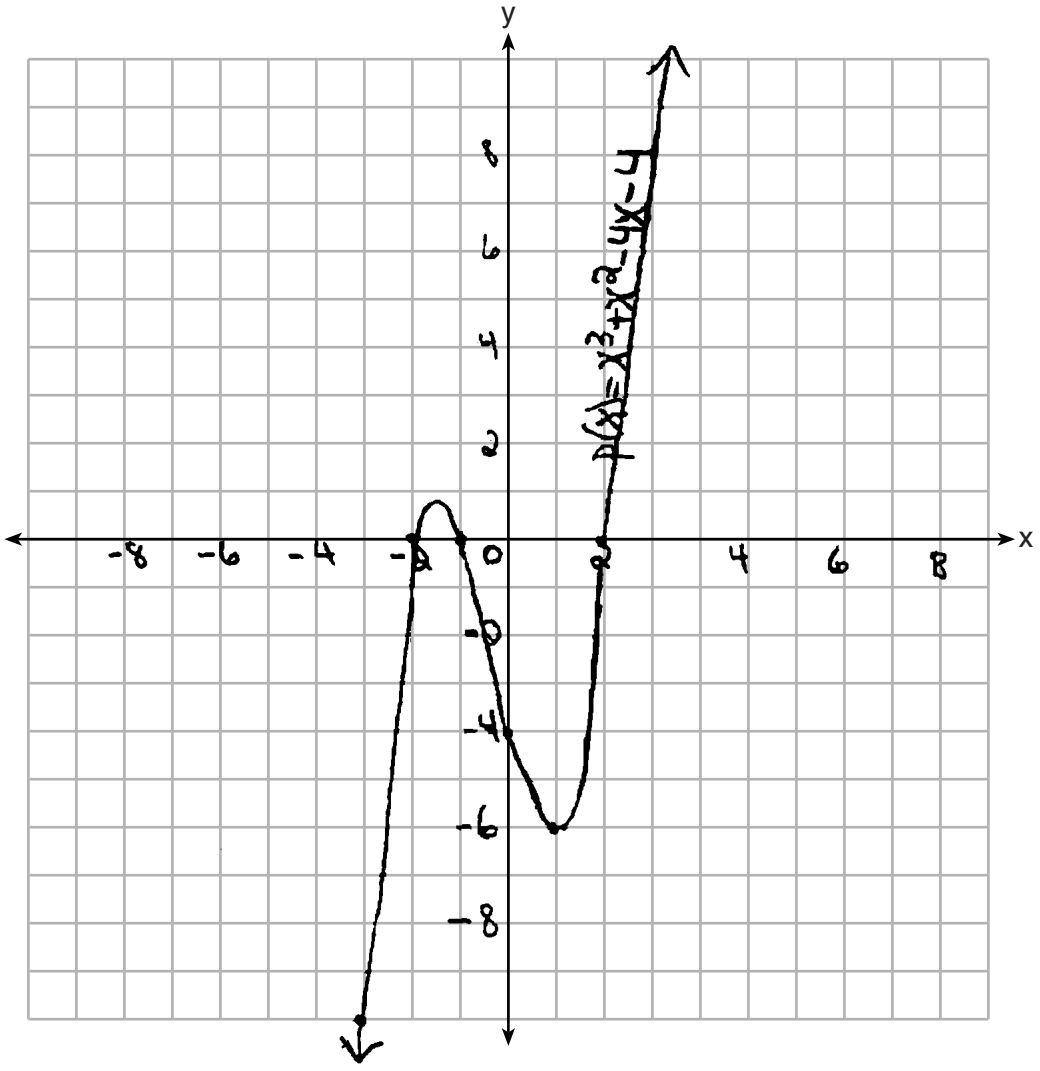
$(x+1)(x+2)(x-2)$

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

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

$\boxed{x=\{-2,-1,2\}}$

On the set of axes below, graph $y = p(x)$.



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

Question 33

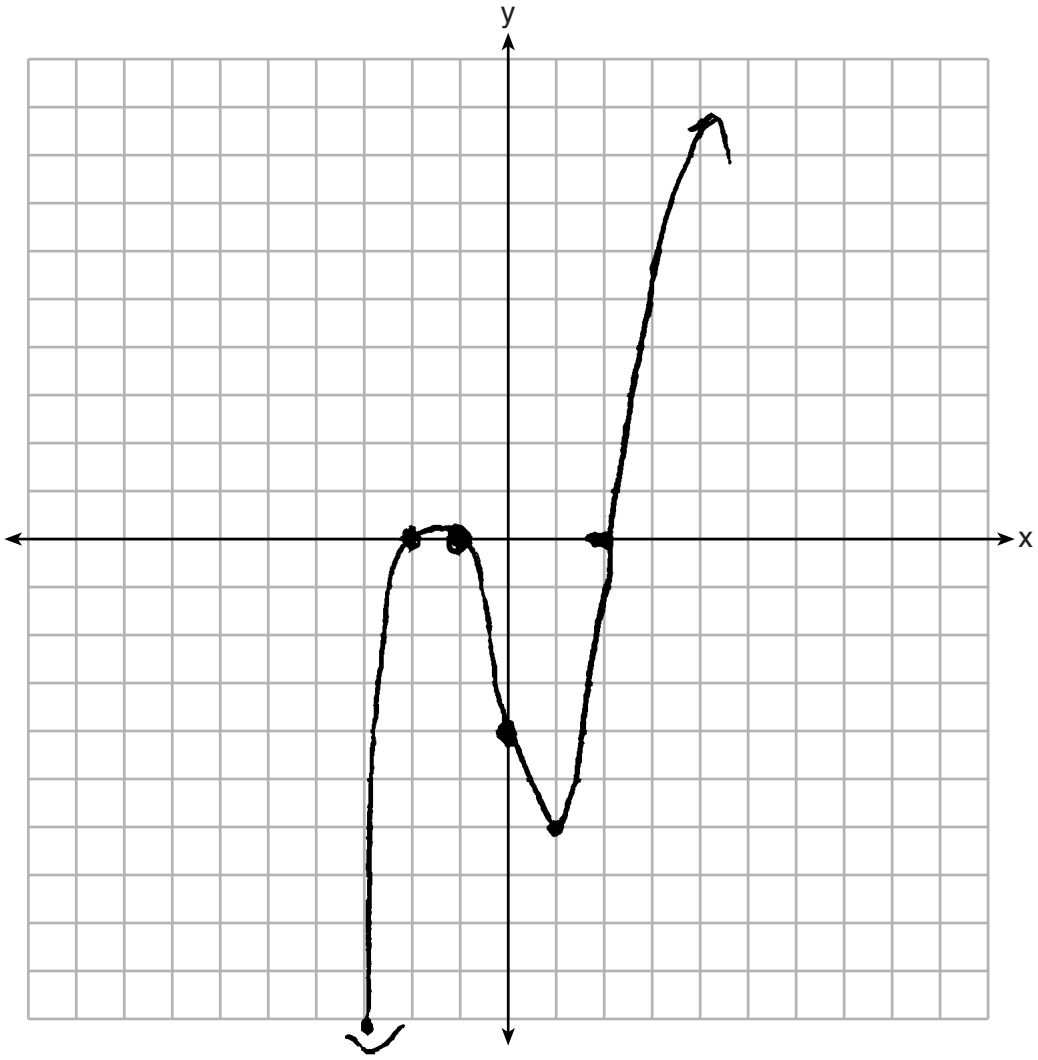
33 Find algebraically the zeros for $p(x) = x^3 + x^2 - 4x - 4$.

$x^2(x+1) - 4(x+1)$

$(x^2-4)(x+1)$

$(x+2)$	$(x-2)$	$(x+1)$
$x+2=0$	$x-2=0$	$x+1=0$
-2	$+2$	-1
$x=-2$	$x=2$	$x=-1$

On the set of axes below, graph $y = p(x)$.



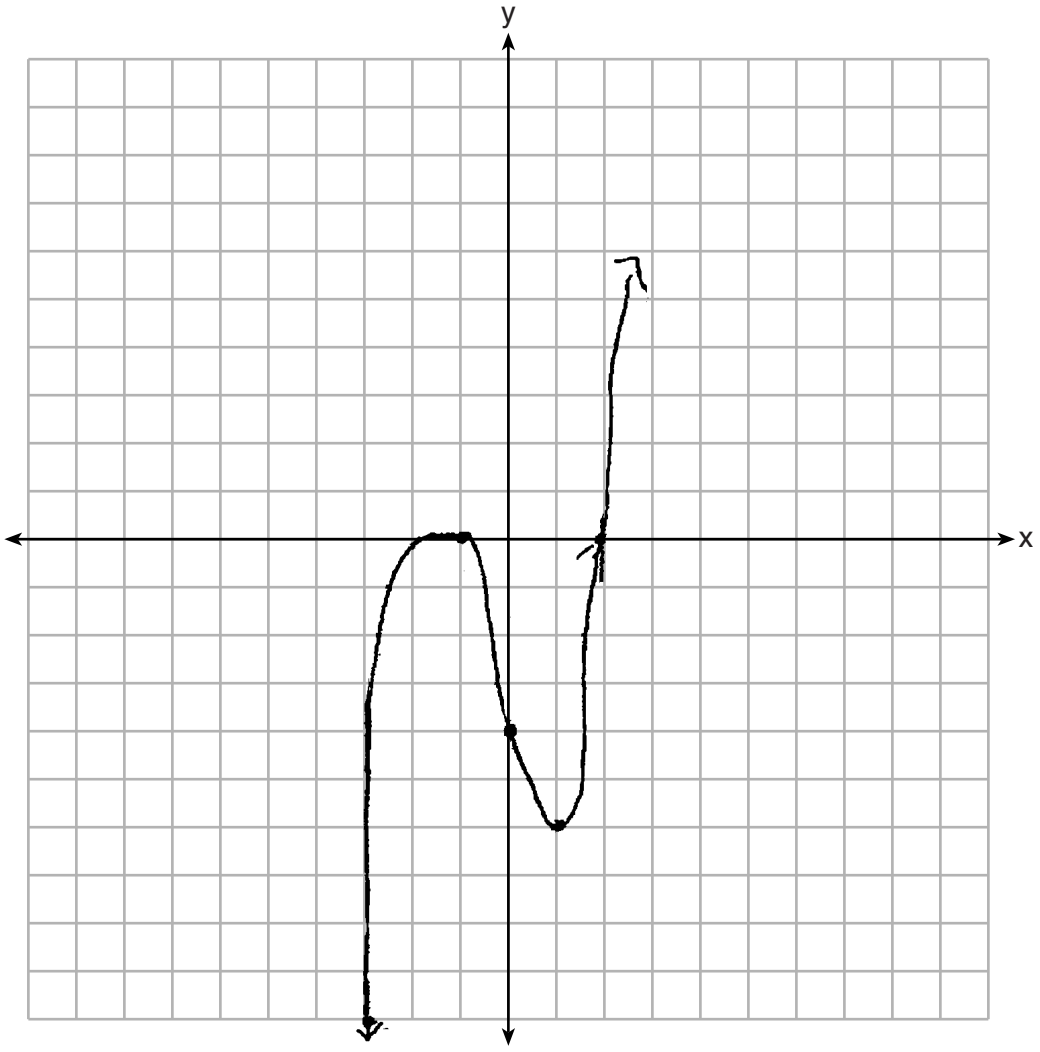
Score 4: The student gave a complete and correct response.

Question 33

33 Find algebraically the zeros for $p(x) = x^3 + x^2 - 4x - 4$.

$x^2(x+1)-4(x+1)$
$(x^2-4)(x+1)$
$(x-2)(x+2)(x+1)$
$x=2;-2;-1$

On the set of axes below, graph $y = p(x)$.



Score 3: The student incorrectly graphed between $x = -1$ and $x = -2$.

Question 33

33 Find algebraically the zeros for $p(x) = x^3 + x^2 - 4x - 4$.

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

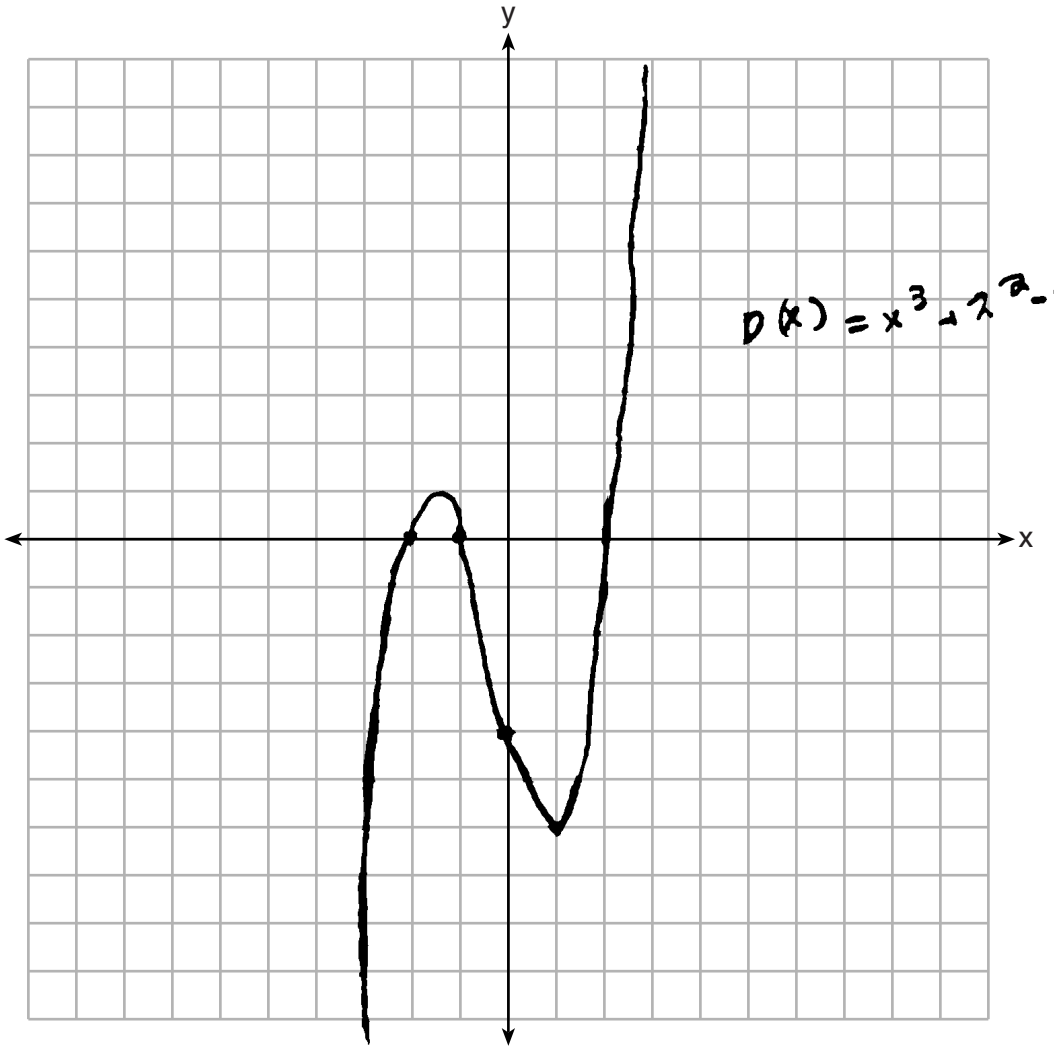
$\frac{4 \pm \sqrt{16-4(-4)}}{2}$

$\sqrt{16+16}$

$\frac{4 \pm \sqrt{32}}{2}$

-1
-2
2

On the set of axes below, graph $y = p(x)$.



Score 3: The student obtained the zeros by a method other than algebraic and graphed the function correctly.

Question 33

33 Find algebraically the zeros for $p(x) = x^3 + x^2 - 4x - 4$.

$x^2(x+1) - 4(x+1)$

$(x^2-4)(x+1)$

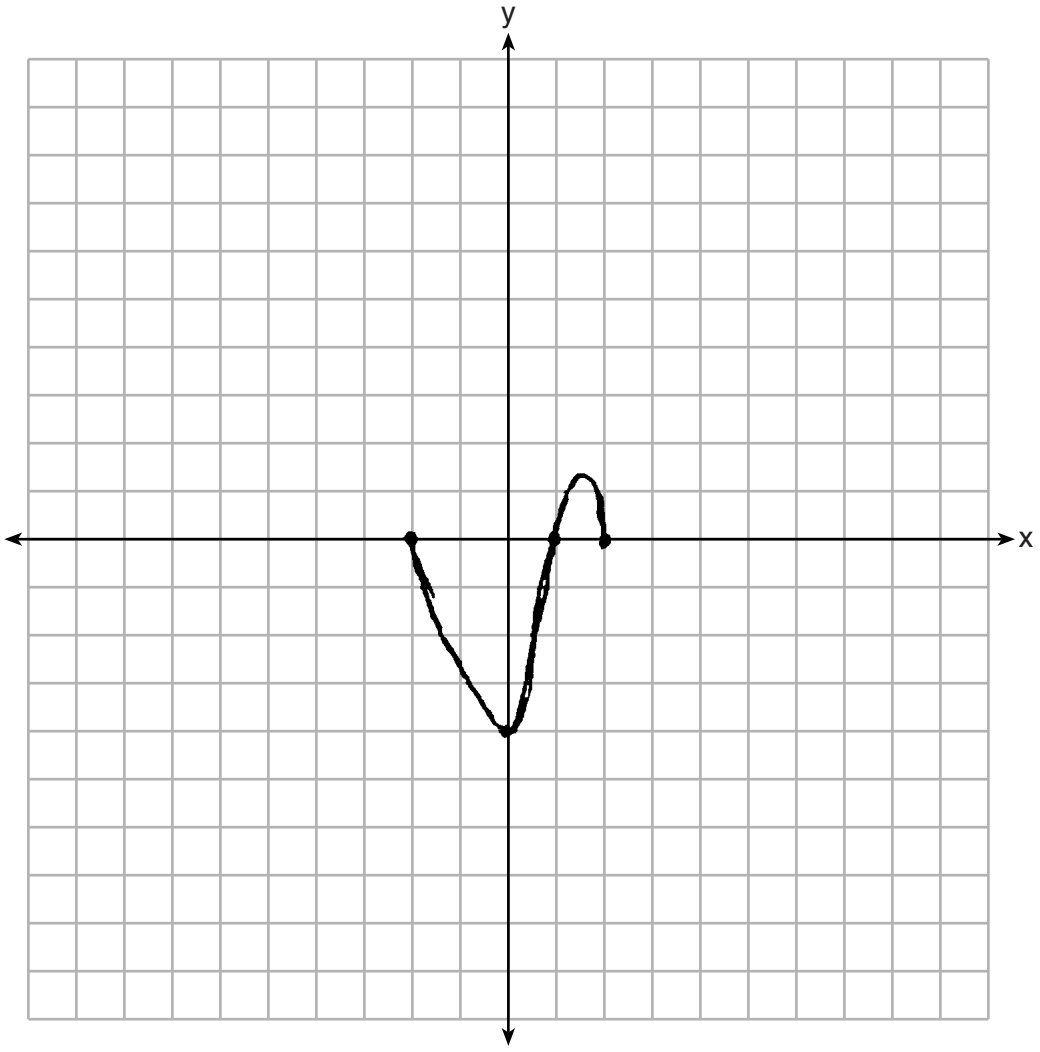
$(x-2)(x+2)(x+1)=0$

$x-2=0$, $+2\ +2$, $x=2$

$x+2=0$, $-2\ -2$, $x=-2$

$x+1=0$, $-1\ -1$, $x=-1$

On the set of axes below, graph $y = p(x)$.



Score 2: The student found the zeros algebraically, but graphed the function incorrectly.

Question 33

33 Find algebraically the zeros for $p(x) = x^3 + x^2 - 4x - 4$.

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

$x^2(x+1) - 4(x+1) = 0$

$(x^2-4)(x+1) = 0$

$x^2 - 4 = 0$ $\quad x+1=0$

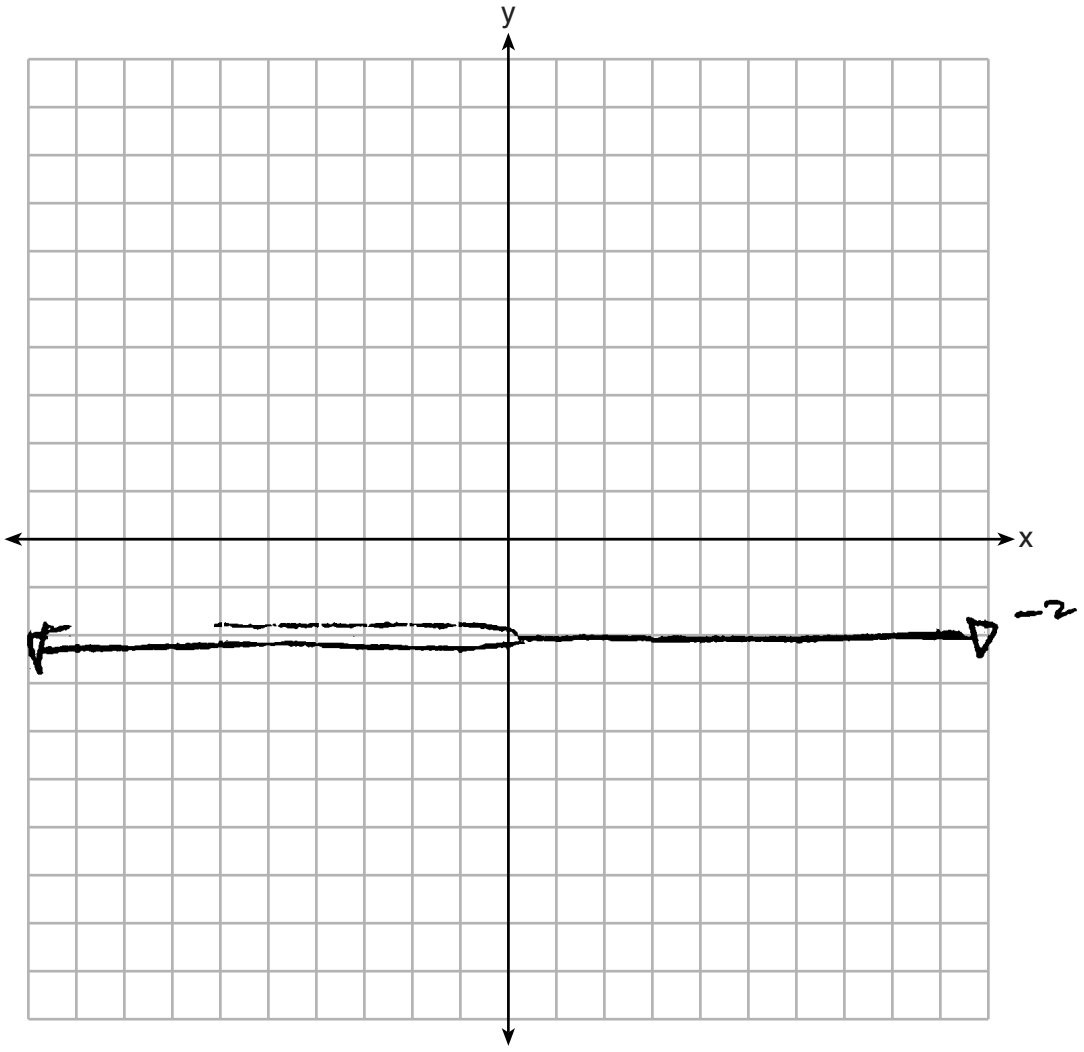
$x^2 = 4$ $\quad x = -1$

$\sqrt{x^2} = \sqrt{4}$

$x = 2$

$2, -1$

On the set of axes below, graph $y = p(x)$.



Score 1: The student found two zeros correctly.

Question 33

33 Find algebraically the zeros for $p(x) = x^3 + x^2 - 4x - 4$.

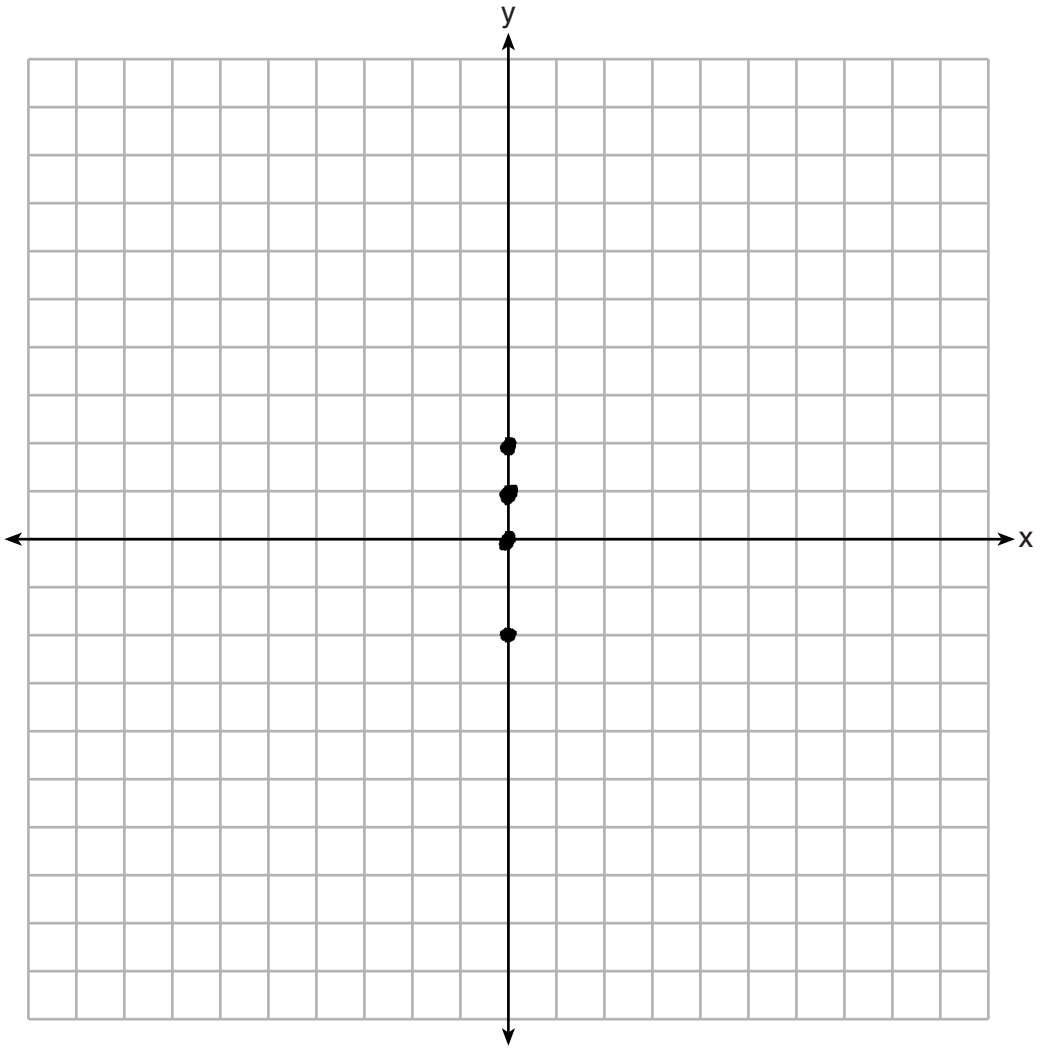
$P(x) = x^3 + x^2 - 4x - 4$

$x^2(x+1) \quad -4(x+1)$

$x^2 - 4 \qquad (x+1)$

$(x+2)(x-2)(x+1)$

On the set of axes below, graph $y = p(x)$.



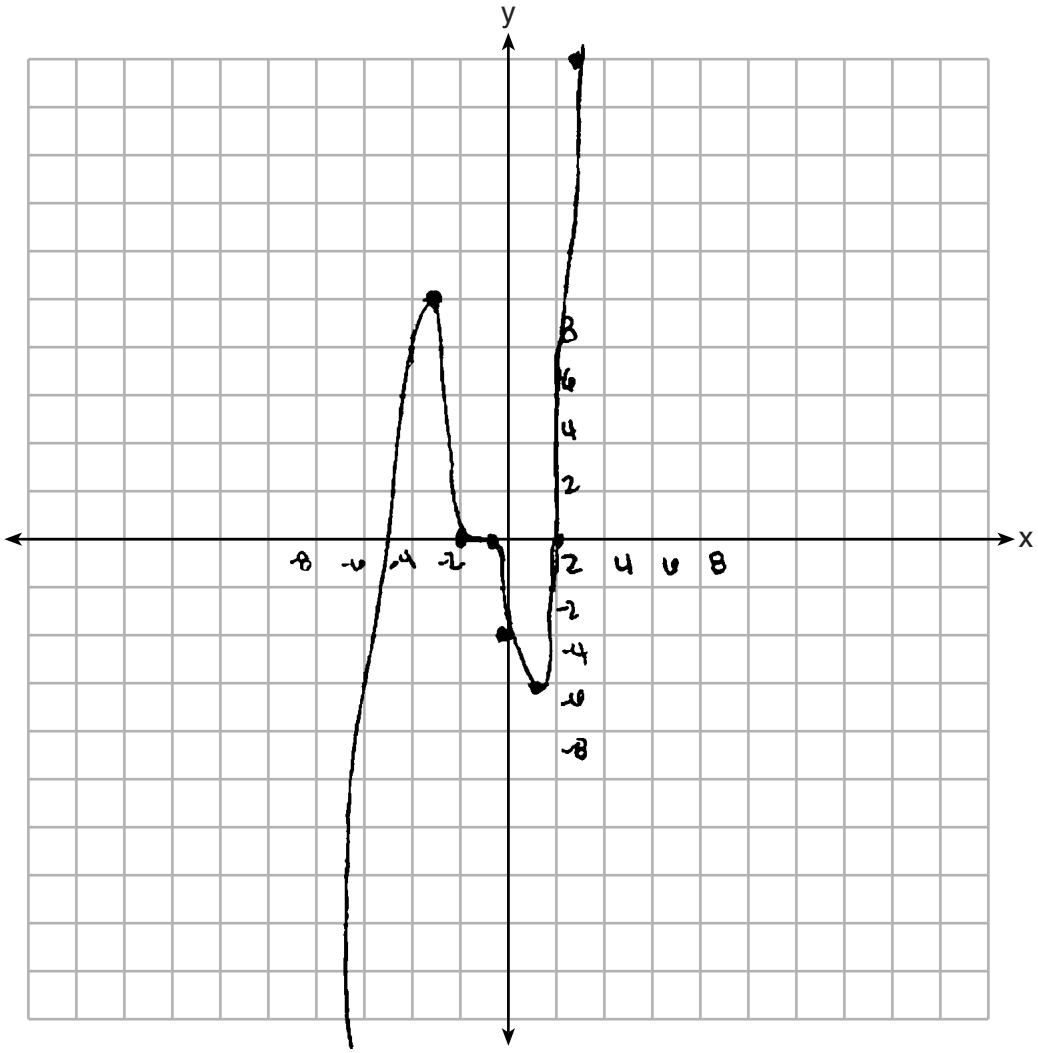
Score 0: The student did not provide enough correct work to receive any credit.

Question 33

33 Find algebraically the zeros for $p(x) = x^3 + x^2 - 4x - 4$.

(-2,0) (-1,0) (2,0)

On the set of axes below, graph $y = p(x)$.



Score 0: The student stated the x-intercepts, but not the zeros, and made numerous graphing errors.

Question 33

33 Find algebraically the zeros for $p(x) = x^3 + x^2 - 4x - 4$.

$x^3+x^2=0$ $\quad -4x-4=0$

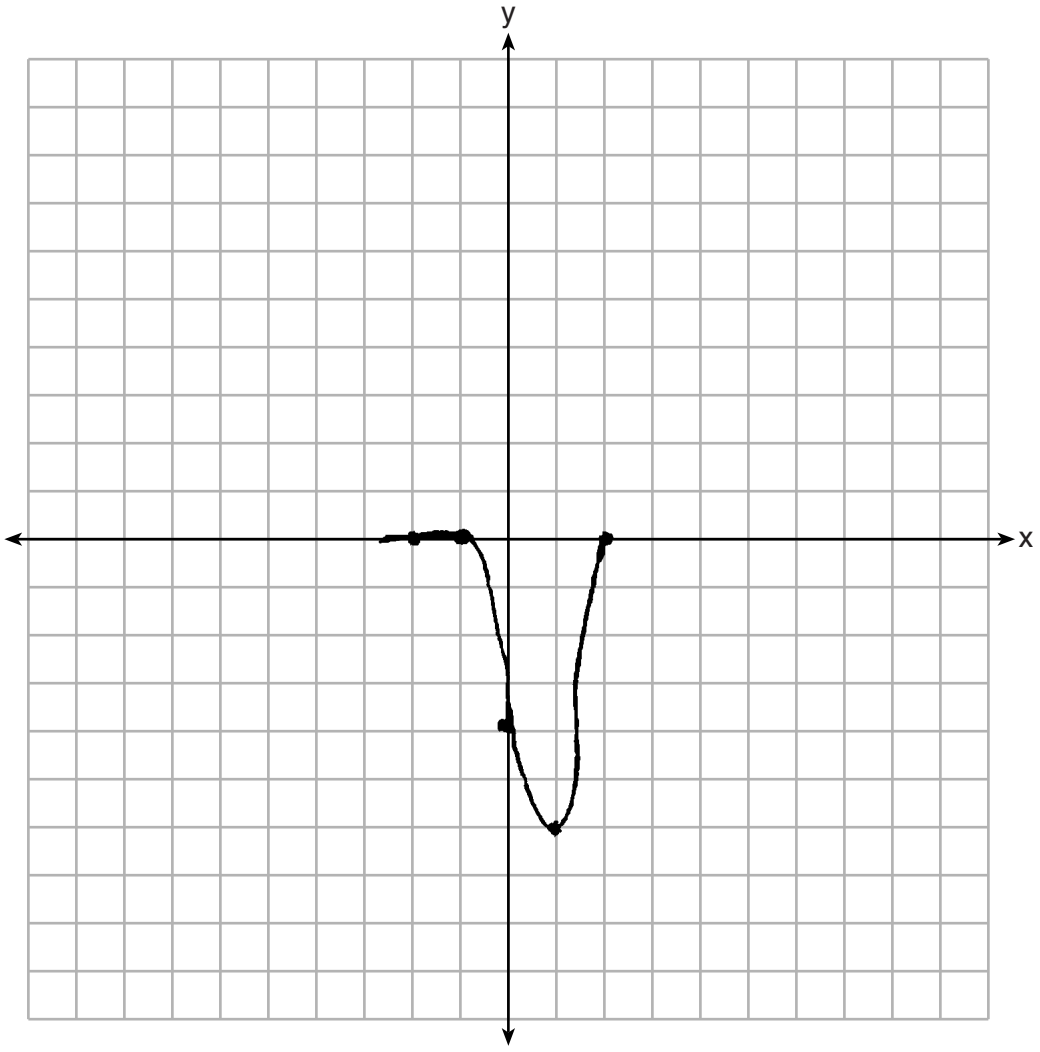
$\sqrt{x^2=0}$ $\quad x^2(x+1)=0$ $\quad -4(x+1)=0$

$-4=0$ $\quad x+1=0$

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

$0, -1$

On the set of axes below, graph $y = p(x)$.



Score 0: The student found the zeros incorrectly and made numerous graphing errors.

Question 34

34 One of the medical uses of Iodine–131 (I–131), a radioactive isotope of iodine, is to enhance x-ray images. The half-life of I–131 is approximately 8.02 days. A patient is injected with 20 milligrams of I–131. Determine, to the *nearest day*, the amount of time needed before the amount of I–131 in the patient's body is approximately 7 milligrams.

$$7 = 20(.5)^{\frac{t}{8.02}}$$

$$.35 = (.5)^{\frac{t}{8.02}}$$

$$\log_{.5} .35 = \frac{t}{8.02}$$

$$1.51457 = \frac{t}{8.02}$$

$$12.14 = t$$

$$12$$

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

Question 34

34 One of the medical uses of Iodine–131 (I–131), a radioactive isotope of iodine, is to enhance x-ray images. The half-life of I–131 is approximately 8.02 days. A patient is injected with 20 milligrams of I–131. Determine, to the *nearest day*, the amount of time needed before the amount of I–131 in the patient's body is approximately 7 milligrams.

$7 = 20(1-.5)^t$

t = number of 8.02 day cycles

$7 = 20(.5)^t$

$\frac{7}{20} = .5^t$

$t = \log_{.5} \frac{7}{20}$

$t = 1.51457$

$1.51457 \cdot 8.02 = 12.146877$

≈ 12 days

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

Question 34

34 One of the medical uses of Iodine–131 (I–131), a radioactive isotope of iodine, is to enhance x-ray images. The half-life of I–131 is approximately 8.02 days. A patient is injected with 20 milligrams of I–131. Determine, to the *nearest day*, the amount of time needed before the amount of I–131 in the patient's body is approximately 7 milligrams.

$$\frac{7}{20} = \frac{20\left(\frac{1}{2}\right)^{\frac{x}{8.02}}}{20}$$

$$\frac{7}{20} = \left(\frac{1}{2}\right)^{x/8.02}$$

$$8.02\left(\log_{\frac{1}{2}} 7/20\right) = \left(\frac{x}{8.02}\right)8.02$$

$$x = 8.02\left(\log_{\frac{1}{2}} 7/20\right)$$

$$x = 12.14687685$$

$$x = 13 \text{ days}$$

Score 3: The student stated the wrong number of days.

Question 34

34 One of the medical uses of Iodine–131 (I–131), a radioactive isotope of iodine, is to enhance x-ray images. The half-life of I–131 is approximately 8.02 days. A patient is injected with 20 milligrams of I–131. Determine, to the *nearest day*, the amount of time needed before the amount of I–131 in the patient's body is approximately 7 milligrams.

$\frac{20}{2} \cdot 10$

$\frac{7}{20} = \frac{20}{20}(.5)^x$

$\frac{7}{20} = .5^x$

$\log_{.5}\left(\frac{7}{20}\right) = x$

$1.5 = x$

2 days

Score 2: The student found the number of half-lives correctly.

Question 34

34 One of the medical uses of Iodine–131 (I–131), a radioactive isotope of iodine, is to enhance x-ray images. The half-life of I–131 is approximately 8.02 days. A patient is injected with 20 milligrams of I–131. Determine, to the *nearest day*, the amount of time needed before the amount of I–131 in the patient's body is approximately 7 milligrams.

$20\left(\frac{1}{2}\right)^{\frac{x}{8.02}}$ 7

$20(.546$

Score 1: The student wrote a correct expression.

Question 34

34 One of the medical uses of Iodine–131 (I–131), a radioactive isotope of iodine, is to enhance x-ray images. The half-life of I–131 is approximately 8.02 days. A patient is injected with 20 milligrams of I–131. Determine, to the *nearest day*, the amount of time needed before the amount of I–131 in the patient's body is approximately 7 milligrams.

I-131	Time
20	0
10	8.02 days
7	X
5	16.04 days

$\left(\frac{a_1}{a_n}\right) * 2 \cdot 8.02 = x$

$\left(\frac{a_1}{a_2}\right) \div 2 \cdot 8.02 = x$

$\left(\frac{20}{7}\right) \div 2 \cdot 8.02 = x$

$(2.857142857) \div 2 \cdot 8.02 = x$

$1.428571429 \cdot 8.02 = x$

$11.45714286 = x$

$x \approx 11.$ days

Score 0: The student gave a completely incorrect response.

Question 35

35 Solve the equation $\sqrt{2x-7} + x = 5$ algebraically, and justify the solution set.

$\sqrt{2x-7} + x = 5$

$\sqrt{2x-7} = 5-x$

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

$2x-7 = 25-10x+x^2$

$x^2-12x+32 = 0$

$(x-8)(x-4) = 0$

$x_1 = 8$ reject $\quad x_2 = 4$

$\sqrt{2(8)-7} + 8 = 5$

$\sqrt{9} + 8 = 5$

$3 + 8 \neq 5$

$11 \neq 5$

$\sqrt{2(4)-7} + 4 = 5$

$\sqrt{1} + 4 = 5$

$1 + 4 = 5$

$5 = 5$ ✓

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

Question 35

35 Solve the equation $\sqrt{2x-7} + x = 5$ algebraically, and justify the solution set.

$\sqrt{2x-7} + x = 5$

$-x \quad -x$

$(\sqrt{2x-7})^2 = (-x+5)^2$

$2x-7 = x^2-10x+25$

$-2x+7 \quad -2x+7$

$x^2-12x+32=0$

$(x-8)(x-4)=0$

$x-8=0 \quad x-4=0$

$x=8, 4$

$-x(x+5)+5(-x+5)$

$x^2-5x-5x+25$

$x^2-10x+25$

CHECK

$\sqrt{2x-7}+x=5$

$\sqrt{2(8)-7}+(8)=5$

$11 \neq 5$

$\sqrt{2(4)-7}+4=5$

$5=5$

The value of x is 4 because when 8 is plugged into the equation it does not equal 5, but when 4 is plugged back in it equals 5.

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

Question 35

35 Solve the equation $\sqrt{2x-7} + x = 5$ algebraically, and justify the solution set.

$\sqrt{2x-7} + x = 5$

$-x \quad -x$

$\sqrt{2x-7}^2 = (5-x)^2 \quad (5-x)(5-x)$

$2x-7 = 25 - 10x + x^2$

$-2x+7 \qquad +7 \quad -2x$

$x^2 - 12x + 32 = 0$

$(x-4)(x-8) = 0$

$x-4=0 \quad | \quad x-8=0$

$x=4 \quad | \quad x=8$

$\sqrt{2(4)-7} + 4 = 5$

$\sqrt{8-7} + 4 = 5$

$\sqrt{1} + 4 = 5$

~~$-1+4=5$~~ $1+4=5$

$5=5$

$\sqrt{2(8)-7} + 8 = 5$

$\sqrt{16-7} + 8 = 5$

$\sqrt{9} + 8 = 5$

~~$3+8=5$~~ $-3+8=5$

Score 3: The student incorrectly justified the 8.

Question 35

35 Solve the equation $\sqrt{2x-7} + x = 5$ algebraically, and justify the solution set.

32 1
16 2
8 4

$(\sqrt{2x-7})^2 = (5-x)^2$

$(5-x)(5-x)$
$25-5x-5x+x^2$
$25-10x+x^2$

$2x-7=25-10x+x^2$
$2x=32-10x+x^2$
$0=32-12x+x^2$
$(0=(x-8)(x-4)$
$x-8=0 \mid x-4=0$
$x=8 \mid x=4$

$\{8,4\}$

Score 2: The student found 8 and 4, but did not justify the solution set.

Question 35

35 Solve the equation $\sqrt{2x-7} + x = 5$ algebraically, and justify the solution set.

$\sqrt{2x-7}+x=5$

Solution set

4

Score 1: The student stated 4, but showed no work.

Question 35

35 Solve the equation $\sqrt{2x-7} + x = 5$ algebraically, and justify the solution set.

$\sqrt{2x-7} + x = 5$

$+7 \quad -x \quad -x$

$+7$

$\sqrt{2x+x} = 12$

$\sqrt{3x} = 12$

$\sqrt{3}$

$x = 4$

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

Question 36

36 Ayva designed an experiment to determine the effect of a new energy drink on a group of 20 volunteer students. Ten students were randomly selected to form group 1 while the remaining 10 made up group 2. Each student in group 1 drank one energy drink, and each student in group 2 drank one cola drink. Ten minutes later, their times were recorded for reading the same paragraph of a novel. The results of the experiment are shown below.

Group 1 (seconds)	**Group 2** (seconds)
17.4	23.3
18.1	18.8
18.2	22.1
19.6	12.7
18.6	16.9
16.2	24.4
16.1	21.2
15.3	21.2
17.8	16.3
19.7	14.5
Mean = 17.7	Mean = 19.1

1,47 3,9

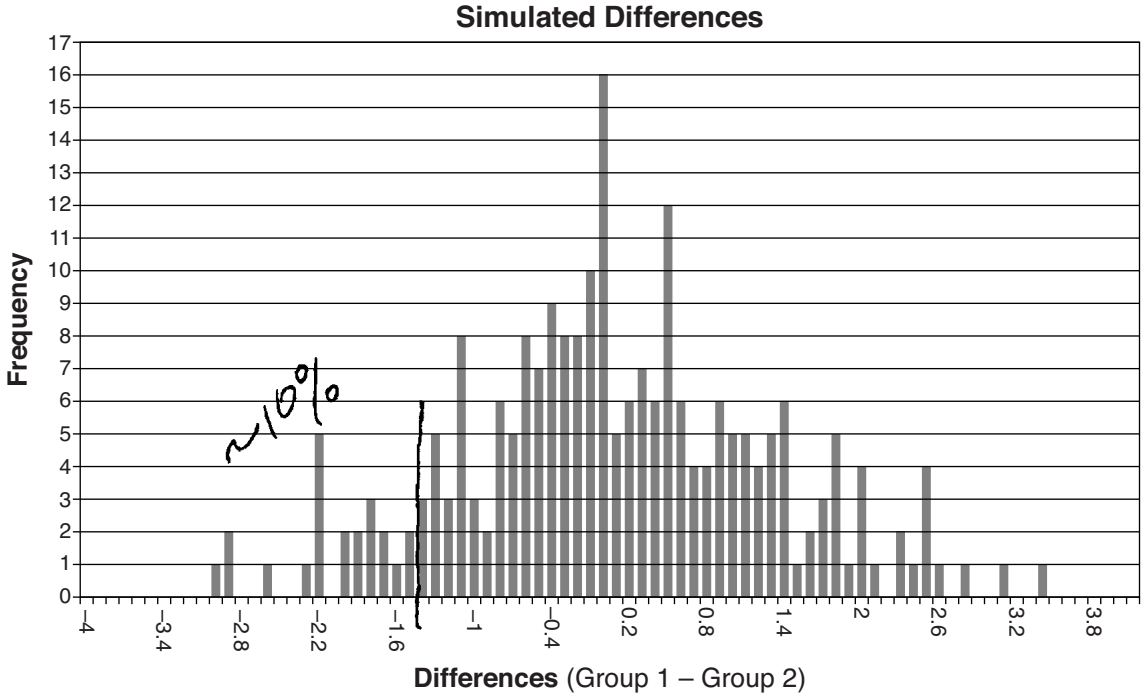
a) Ayva thinks drinking energy drinks makes students read faster. Using information from the experimental design or the results, explain why Ayva's hypothesis may be *incorrect*.

Group 2 has several students that read faster than group 1.

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

Question 36

Using the given results, Ayva randomly mixes the 20 reading times, splits them into two groups of 10, and simulates the difference of the means 232 times.



b) Ayva has decided that the difference in mean reading times is *not* an unusual occurence. Support her decision using the results of the simulation. Explain your reasoning.

Since the difference of -1.4 or less (extreme) occurs about 10% of the time in the simulation, this difference is not that unusual.

Question 36

36 Ayva designed an experiment to determine the effect of a new energy drink on a group of 20 volunteer students. Ten students were randomly selected to form group 1 while the remaining 10 made up group 2. Each student in group 1 drank one energy drink, and each student in group 2 drank one cola drink. Ten minutes later, their times were recorded for reading the same paragraph of a novel. The results of the experiment are shown below.

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16.1	21.2
15.3	21.2
17.8	16.3
19.7	14.5
Mean = 17.7	Mean = 19.1

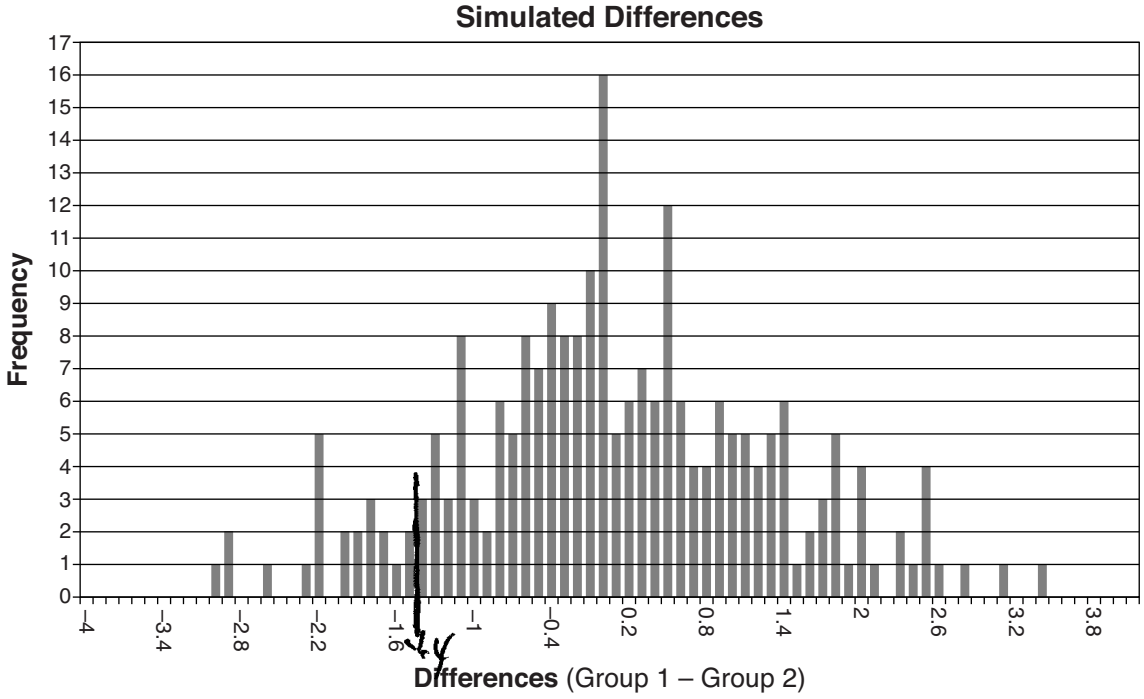
a) Ayva thinks drinking energy drinks makes students read faster. Using information from the experimental design or the results, explain why Ayva's hypothesis may be *incorrect*.

Ayva did not take into consideration the standard deviations of each group
Group 1 = 1.471 Group 2 = 3.921
(there is an outlier)

Score 3: The student wrote a partially correct first explanation and a correct second explanation.

Question 36

Using the given results, Ayva randomly mixes the 20 reading times, splits them into two groups of 10, and simulates the difference of the means 232 times.



b) Ayva has decided that the difference in mean reading times is *not* an unusual occurence. Support her decision using the results of the simulation. Explain your reasoning.

17.7 − 19.1 = −1.4

I support her decision because scores less than −2 occurs 5% of the time so −1.4 is not that unusual.

Question 36

36 Ayva designed an experiment to determine the effect of a new energy drink on a group of 20 volunteer students. Ten students were randomly selected to form group 1 while the remaining 10 made up group 2. Each student in group 1 drank one energy drink, and each student in group 2 drank one cola drink. Ten minutes later, their times were recorded for reading the same paragraph of a novel. The results of the experiment are shown below.

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16.2	24.4
16.1	21.2
15.3	21.2
17.8	16.3
19.7	14.5
Mean = 17.7	Mean = 19.1

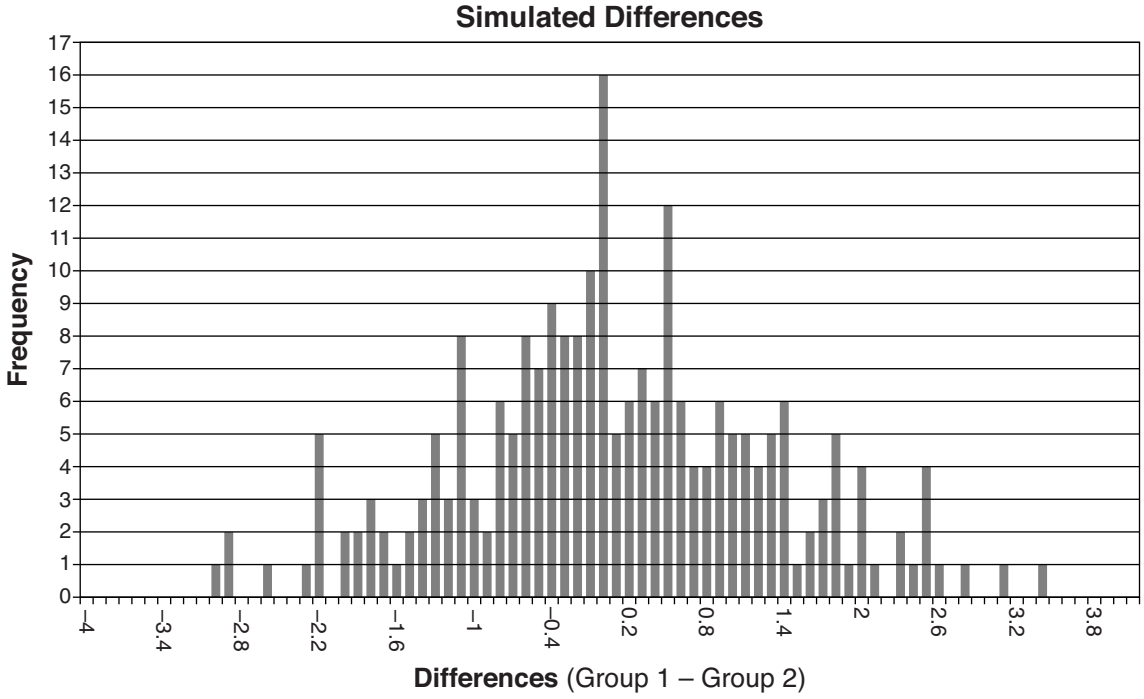
a) Ayva thinks drinking energy drinks makes students read faster. Using information from the experimental design or the results, explain why Ayva's hypothesis may be *incorrect*.

The Group given the energy drinks had a quicker mean time because there was a small deviation from the mean. The Second group had many quicker times than the first group, and some slower creating a larger standard deviation

Score 2: The student wrote two partially correct explanations.

Question 36

Using the given results, Ayva randomly mixes the 20 reading times, splits them into two groups of 10, and simulates the difference of the means 232 times.



b) Ayva has decided that the difference in mean reading times is *not* an unusual occurence. Support her decision using the results of the simulation. Explain your reasoning.

The mean differences varies enough that the energy drink may not have effected the times, and that it was by chance

Question 36

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16.2	24.4
16.1	21.2
15.3	21.2
17.8	16.3
19.7	14.5
Mean = 17.7	Mean = 19.1

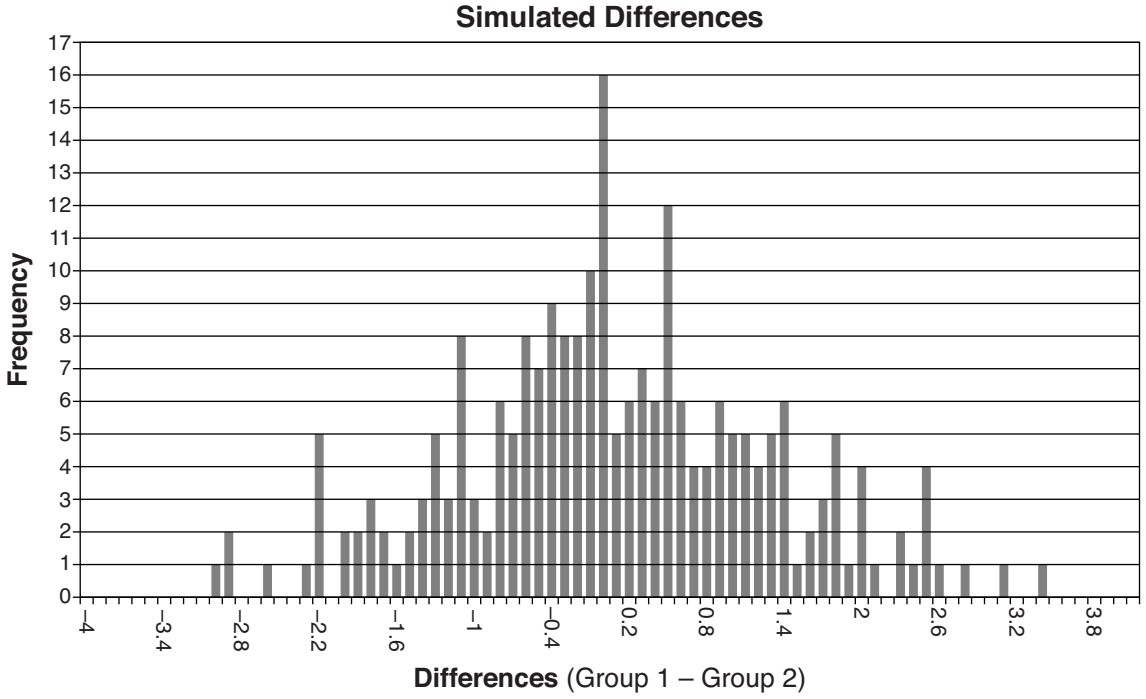
a) Ayva thinks drinking energy drinks makes students read faster. Using information from the experimental design or the results, explain why Ayva's hypothesis may be *incorrect*.

some of the students who drank Colax read faster than the ones who drank energy drinks, it has to do with how well the kid can read

Score 2: The student wrote a correct first explanation.

Question 36

Using the given results, Ayva randomly mixes the 20 reading times, splits them into two groups of 10, and simulates the difference of the means 232 times.



b) Ayva has decided that the difference in mean reading times is *not* an unusual occurence. Support her decision using the results of the simulation. Explain your reasoning.

The data is not very consistant at all showing that it would not be very accurate

Question 36

36 Ayva designed an experiment to determine the effect of a new energy drink on a group of 20 volunteer students. Ten students were randomly selected to form group 1 while the remaining 10 made up group 2. Each student in group 1 drank one energy drink, and each student in group 2 drank one cola drink. Ten minutes later, their times were recorded for reading the same paragraph of a novel. The results of the experiment are shown below.

min 15.3
max 19.7
Q_1 16.2
Q_3 18.6
med. 17.95

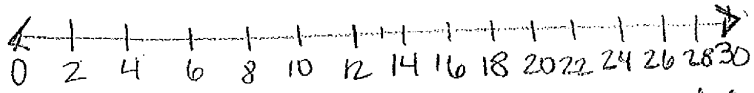
Group 1 (seconds)	Group 2 (seconds)
17.4	23.3
18.1	18.8
18.2	22.1
19.6	12.7
18.6	16.9
16.2	24.4
16.1	21.2
15.3	21.2
17.8	16.3
19.7	14.5
Mean = 17.7	Mean = 19.1

min 12.7
max 24.4
Q_1 16.3
Q_3 22.1
med 20

a) Ayva thinks drinking energy drinks makes students read faster. Using information from the experimental design or the results, explain why Ayva's hypothesis may be *incorrect*.

Group 2:

Group 1:

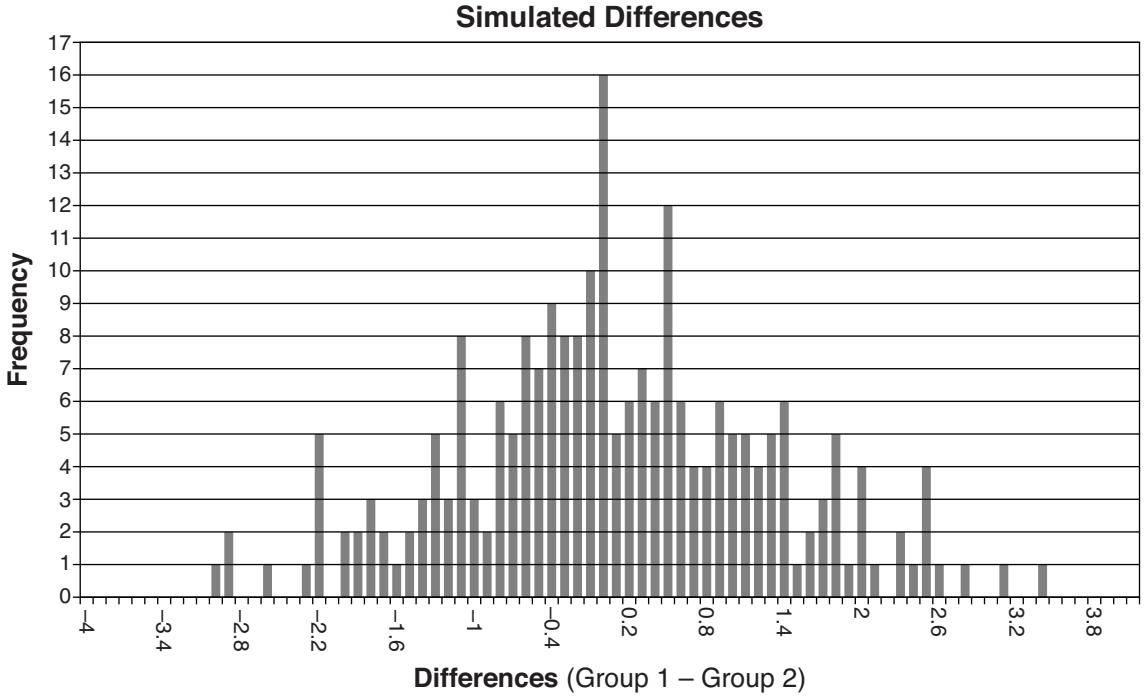


Ayva's hypothesis may be incorrect due to the overlap of Group 2's reading times compared to Group 1.

Score 1: The student wrote a partially correct first explanation.

Question 36

Using the given results, Ayva randomly mixes the 20 reading times, splits them into two groups of 10, and simulates the difference of the means 232 times.



b) Ayva has decided that the difference in mean reading times is *not* an unusual occurence. Support her decision using the results of the simulation. Explain your reasoning.

Question 36

36 Ayva designed an experiment to determine the effect of a new energy drink on a group of 20 volunteer students. Ten students were randomly selected to form group 1 while the remaining 10 made up group 2. Each student in group 1 drank one energy drink, and each student in group 2 drank one cola drink. Ten minutes later, their times were recorded for reading the same paragraph of a novel. The results of the experiment are shown below.

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16.1	21.2
15.3	21.2
17.8	16.3
19.7	14.5
Mean = 17.7	Mean = 19.1

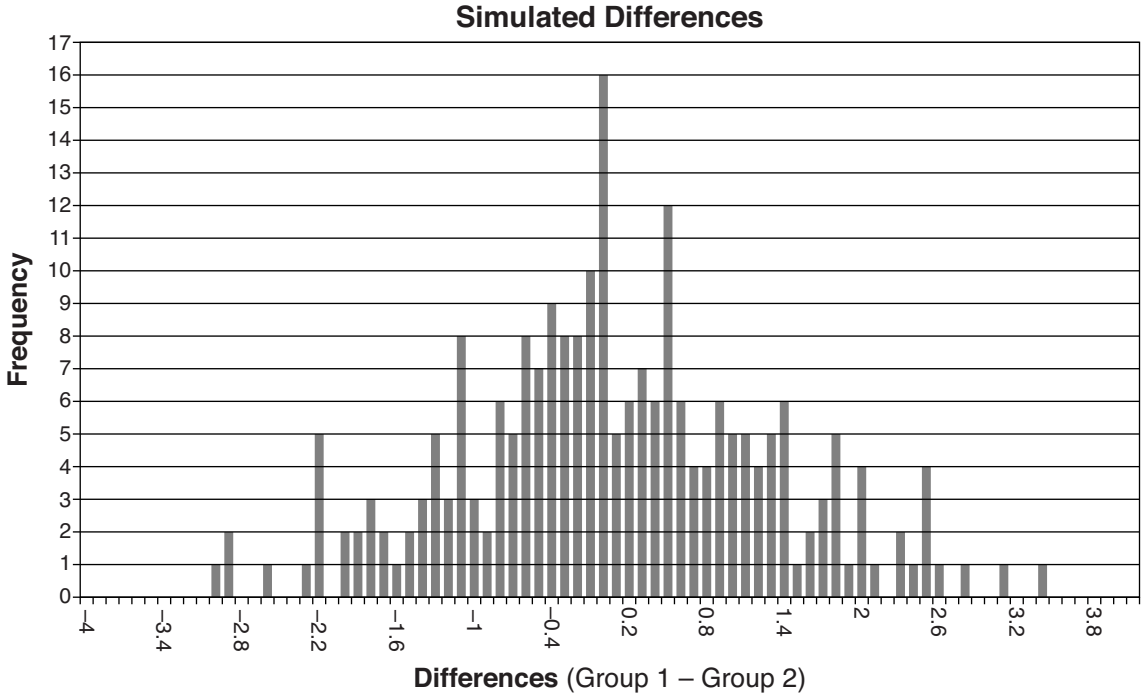
a) Ayva thinks drinking energy drinks makes students read faster. Using information from the experimental design or the results, explain why Ayva's hypothesis may be *incorrect*.

For each student, the rate differs. If one student is a much faster/slower reader that another, it provides a bias to the experiment.

Score 0: The student gave a completely incorrect response.

Question 36

Using the given results, Ayva randomly mixes the 20 reading times, splits them into two groups of 10, and simulates the difference of the means 232 times.



b) Ayva has decided that the difference in mean reading times is *not* an unusual occurence. Support her decision using the results of the simulation. Explain your reasoning.

I support her decision to reject the hypothesis because the graph does not show significant differences, it has a bell curve shape (although it is a bar graph), not two opposite ends of the graph.

Question 37

37 Seth's parents gave him \$5000 to invest for his 16th birthday. He is considering two investment options. Option *A* will pay him 4.5% interest compounded annually. Option *B* will pay him 4.6% compounded quarterly.

Write a function of option *A* and option *B* that calculates the value of each account after *n* years.

$A = 5000\left(1+\frac{.045}{1}\right)^{n(1)}$ $B = 5000\left(1+\frac{.046}{4}\right)^{n(4)}$

Seth plans to use the money after he graduates from college in 6 years. Determine how much more money option *B* will earn than option *A* to the *nearest cent*.

A $A=\$6511.30$

B $B=\$6578.87$ $\$67.57$ more

Algebraically determine to the *nearest tenth of a year*, how long it would take for option *B* to double Seth's initial investment.

$10{,}000 = 5{,}000\left(1+\frac{.046}{4}\right)^{4n}$

$2 = 1.0115^{4n}$

$4n = \log_{1.0115}(2)$

$4n = 60.61958099$

$n = 15.2$ yrs

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

Question 37

37 Seth's parents gave him $5000 to invest for his 16th birthday. He is considering two investment options. Option *A* will pay him 4.5% interest compounded annually. Option *B* will pay him 4.6% compounded quarterly.

Write a function of option *A* and option *B* that calculates the value of each account after *n* years.

$5000\left(1+\frac{.045}{1}\right)^{1n}$ $5000\left(1+\frac{.046}{4}\right)^{4n}$

Seth plans to use the money after he graduates from college in 6 years. Determine how much more money option *B* will earn than option *A* to the *nearest cent*.

A = $6511.30

B = $6578.87

$67.57 more

Algebraically determine to the *nearest tenth of a year*, how long it would take for option *B* to double Seth's initial investment.

$10,000 = 5,000\left(1+\frac{.046}{4}\right)^{4n}$

$2 = 1.0115^{4n}$

$4n = \log_{1.0115}(2)$

$4n = 60.61958099$

$n = 15.2$ yrs.

Score 5: The student wrote expressions instead of functions.

Question 37

37 Seth's parents gave him \$5000 to invest for his 16th birthday. He is considering two investment options. Option *A* will pay him 4.5% interest compounded annually. Option *B* will pay him 4.6% compounded quarterly.

Write a function of option *A* and option *B* that calculates the value of each account after *n* years.

$A: \quad 5000(1.045)^n$

$B = 5000\left(1+\frac{.046}{4}\right)^{n\cdot 4}$

Seth plans to use the money after he graduates from college in 6 years. Determine how much more money option *B* will earn than option *A* to the *nearest cent*.

$A: 5000(1.045)^6$

$A = \$6511.30$

$B: 5000\left(1+\frac{.046}{4}\right)^{24}$

$B = \$6578.87$

$-\ 6511.30$

$\$67.57$

Algebraically determine to the *nearest tenth of a year*, how long it would take for option *B* to double Seth's initial investment.

$10000 = 5000\left(1+\frac{.046}{4}\right)^{n\cdot 4}$

$2 = \left(1+\frac{.046}{4}\right)^{4n\cdot 1}$

$2 = (1.0115)^{4n}$

Score 4: The student received no credit for the insufficient work done in the third part.

37 Seth's parents gave him $5000 to invest for his 16th birthday. He is considering two investment options. Option *A* will pay him 4.5% interest compounded annually. Option *B* will pay him 4.6% compounded quarterly.

Write a function of option *A* and option *B* that calculates the value of each account after *n* years.

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

a) $A = 5000(1 + \frac{.045}{1})^{1n}$

b) $A = 5000(1 + \frac{.046}{4})^{4n}$

Seth plans to use the money after he graduates from college in 6 years. Determine how much more money option *B* will earn than option *A* to the *nearest cent*.

a) $5000(1 + \frac{.046}{1})^{1 \cdot 6}$

6511.30062...

b will make $67.57 more

$6511.30

b) $5000(1 + \frac{.046}{4})^{4 \cdot 6}$

6578.8698...

$6578.87

Algebraically determine to the *nearest tenth of a year*, how long it would take for option *B* to double Seth's initial investment.

$5000(1 + \frac{.046}{1})^{4n}$

5057.5^{4n}

21 years

Score 4: The student received no credit for the third part.

37 Seth's parents gave him \$5000 to invest for his 16th birthday. He is considering two investment options. Option *A* will pay him 4.5% interest compounded annually. Option *B* will pay him 4.6% compounded quarterly.

Write a function of option *A* and option *B* that calculates the value of each account after *n* years.

A → $f(x) = \$5000 + (.045n\$5000)$

B → $f(x) = \$5000 + (.046n\$5000)$

Seth plans to use the money after he graduates from college in 6 years. Determine how much more money option *B* will earn than option *A* to the *nearest cent*.

B → $\$5000 + (.046(6)\$5000) = \$6380$

A → $\$5000 + (.045(6)\$5000) = \$6350$

\$30 more

Algebraically determine to the *nearest tenth of a year*, how long it would take for option *B* to double Seth's initial investment.

$\$5000 + (.046n\$5000) = 10{,}000$

-5000

$.046n\$5000 = 5000$

$\frac{230n}{230} = \frac{5000}{230}$

$n = 21.7$ years

Score 4: The student wrote incorrect functions, but completed the remaining parts appropriately.

Question 37

37 Seth's parents gave him \$5000 to invest for his 16th birthday. He is considering two investment options. Option *A* will pay him 4.5% interest compounded annually. Option *B* will pay him 4.6% compounded quarterly.

$a_1 = a_1 + (n-1)d$

Write a function of option *A* and option *B* that calculates the value of each account after *n* years.

OPTION A: $a_1 = 5000 + (n-1)(.045)$ OPTION B: $a_1 = 5000 + (n-1)(.230)$

Seth plans to use the money after he graduates from college in 6 years. Determine how much more money option *B* will earn than option *A* to the *nearest cent*.

A) $a_6 = 5000 + (6-1)(.045)$ B) $a_6 = 5000 + (6-1)(.230)$

$a_6 = 6185$ $a_6 = 6150$

$6150 - 6185 = \$35.00$

Algebraically determine to the *nearest tenth of a year*, how long it would take for option *B* to double Seth's initial investment.

$10000 = 5000 + (n-1)(.023)$

$5000 = (n-1)(.230)$

$5000 = 2.30n - .230$

$5230 = 2.30n$

22.7 ≈ n

Score 3: The student wrote incorrect functions, but completed the second part appropriately and made a rounding error in the third part.

37 Seth's parents gave him \$5000 to invest for his 16th birthday. He is considering two investment options. Option *A* will pay him 4.5% interest compounded annually. Option *B* will pay him 4.6% compounded quarterly.

Write a function of option *A* and option *B* that calculates the value of each account after *n* years.

Op A: $f(x) = 5000\left(1 + \frac{.045}{12}\right)^n$

Op B: $f(x) = 5000\left(1 + \frac{.046}{.3}\right)^n$

Seth plans to use the money after he graduates from college in 6 years. Determine how much more money option *B* will earn than option *A* to the *nearest cent*.

A: $y = 5000\left(1 + \frac{.045}{12}\right)^6$

$= 5000(1.00375)^6$

$= \$5113.56$

B: $y = 5000\left(1 + \frac{.046}{3}\right)^6$

$= 5000($

$= \$5478.00$

\$364.44

Algebraically determine to the *nearest tenth of a year*, how long it would take for option *B* to double Seth's initial investment.

$y = 5000\left(1 + \frac{.046}{3}\right)^n$

$10{,}000 = 5000\left(1 + \frac{.046}{3}\right)^n$

$5000 = \left(1 + \frac{.046}{3}\right)^n$

$\therefore \log_{(1.015333333)}(5000) = n$

$n = 3.7$ years

Score 2: The student wrote incorrect functions, but completed the second part appropriately.

Question 37

37 Seth's parents gave him \$5000 to invest for his 16th birthday. He is considering two investment options. Option *A* will pay him 4.5% interest compounded annually. Option *B* will pay him 4.6% compounded quarterly.

Write a function of option *A* and option *B* that calculates the value of each account after *n* years.

$A = 5000(1+.045)^{(1)(n)}$ $B = 5000(1+.046)^{(4)(n)}$

Seth plans to use the money after he graduates from college in 6 years. Determine how much more money option *B* will earn than option *A* to the *nearest cent*.

$5000(1.045)^6$
6511.30

$5000(1.046)^{(6)}$
6548.78

6548.78
-6511.30
$\$37.48$

Algebraically determine to the *nearest tenth of a year*, how long it would take for option *B* to double Seth's initial investment.

$\frac{10,000}{5,000} = \frac{5000(1.046)^n}{5,000}$

Score 1: The student wrote function *A* correctly, but did not use function *B* appropriately in the remaining parts.

Question 37

37 Seth's parents gave him \$5000 to invest for his 16th birthday. He is considering two investment options. Option *A* will pay him 4.5% interest compounded annually. Option *B* will pay him 4.6% compounded quarterly.

Write a function of option *A* and option *B* that calculates the value of each account after *n* years.

Pe^{rt} $A = 5000e^{.045t}$

$B = 5000e^{.046t}$

Seth plans to use the money after he graduates from college in 6 years. Determine how much more money option *B* will earn than option *A* to the *nearest cent*.

$A = 5000e^{.045(6)}$

$A = \$6549.82$

$B = 5000e^{\frac{.046}{4}(6)}$

$= 5357.18$

Algebraically determine to the *nearest tenth of a year*, how long it would take for option *B* to double Seth's initial investment.

$10{,}000 = 5000e^{\frac{.046}{4}(4)}$

$2 = e^{\frac{.046}{4}t}$

$\log_e 2 = \frac{.046}{4}t$

Score 1: The student evaluated functions *A* and *B* appropriately in the second part, but did not calculate the difference.

37 Seth's parents gave him \$5000 to invest for his 16th birthday. He is considering two investment options. Option *A* will pay him 4.5% interest compounded annually. Option *B* will pay him 4.6% compounded quarterly.

Write a function of option *A* and option *B* that calculates the value of each account after *n* years.

$A = 5000(.045 \cdot 365)^n$

$B = 5000(.046 \cdot 91.25)^n$

Seth plans to use the money after he graduates from college in 6 years. Determine how much more money option *B* will earn than option *A* to the *nearest cent*.

$A = 5000(.045 \cdot 365)^6$

9.817530829

9.8

$B = 5000(.046 \cdot 91.25)^6$

27347286.04

Algebraically determine to the *nearest tenth of a year*, how long it would take for option *B* to double Seth's initial investment.

5 years

Score 0: The student gave a completely incorrect response.