The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

INTEGRATED ALGEBRA

Tuesday, January 27, 2015 — 1:15 a.m. to 4:15 p.m., only

SAMPLE RESPONSE SET

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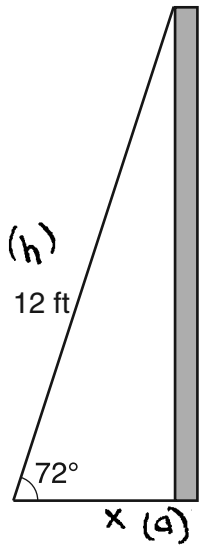
Question 31

31 As shown in the diagram below, a ladder 12 feet long leans against a wall and makes an angle of 72° with the ground.



Find, to the *nearest tenth of a foot,* the distance from the wall to the base of the ladder.

$$\frac{\cos 72}{1} = \frac{x}{12}$$

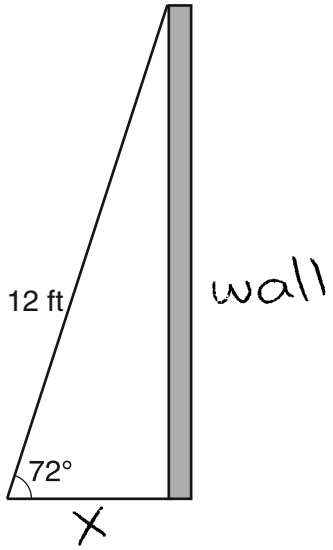
$$x = 12\cos 72$$

$$x = 3.7 \text{ ft}$$

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

Question 31

31 As shown in the diagram below, a ladder 12 feet long leans against a wall and makes an angle of 72° with the ground.



Find, to the *nearest tenth of a foot,* the distance from the wall to the base of the ladder.

$\sin 72 = \frac{w}{12}$

$w = 12 \times \sin 72 = 11.4$

$12^2 = x^2 + 11.4^2$

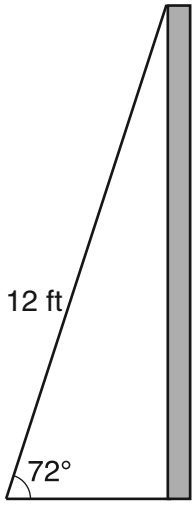
$x^2 = 144 - 129.96 = 14.04$

$x = \sqrt{14.04} = 3.7$

Score 2: The student used the correct trigonometric ratio to find the height of the wall. The student then used the Pythagorean Theorem to correctly find the distance from the wall.

Question 31

31 As shown in the diagram below, a ladder 12 feet long leans against a wall and makes an angle of 72° with the ground.



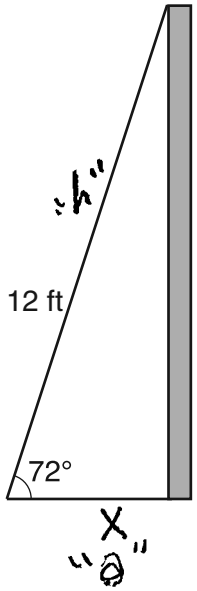
Find, to the *nearest tenth of a foot,* the distance from the wall to the base of the ladder.

$\cos(72) = \frac{x}{12}$

Score 1: The student wrote a correct trigonometric equation, but showed no further correct work.

Question 31

31 As shown in the diagram below, a ladder 12 feet long leans against a wall and makes an angle of 72° with the ground.



Find, to the *nearest tenth of a foot,* the distance from the wall to the base of the ladder.

let x = distance from wall to base of ladder

SOH CAH TOA

$\cos\theta = \frac{A}{H}$

$\frac{\cos 72}{1} = \frac{x}{12}$

$12\cos 72 = x$

$3.708 \approx x$

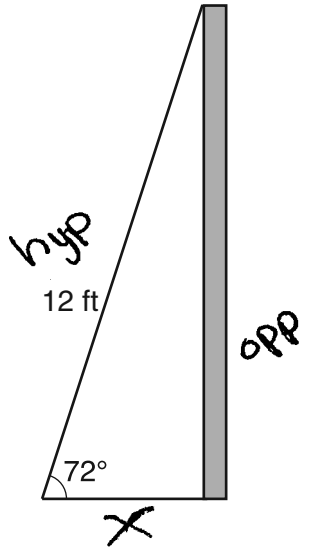
$4 \approx x$

∴ the distance from the wall to the base of the ladder is 4 ft.

Score 1: The student showed appropriate work, but made a rounding error by finding the answer to the nearest whole number instead of the nearest tenth.

Question 31

31 As shown in the diagram below, a ladder 12 feet long leans against a wall and makes an angle of 72° with the ground.



Find, to the *nearest tenth of a foot,* the distance from the wall to the base of the ladder.

$\sin 72 = \frac{x}{12}$

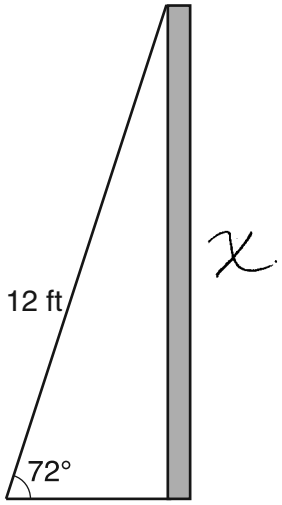
$\frac{.95}{1} = \frac{x}{12}$

$x = 11.4$

Score 1: The student used an incorrect trigonometric function.

Question 31

31 As shown in the diagram below, a ladder 12 feet long leans against a wall and makes an angle of 72° with the ground.



Find, to the *nearest tenth of a foot,* the distance from the wall to the base of the ladder.

$\sin 72 = \frac{x}{12}$

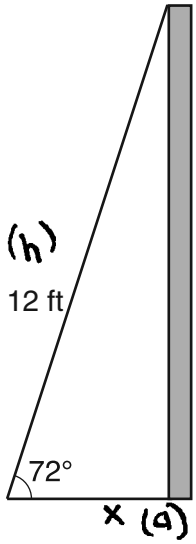
$x = 11.4126$

$x = 11.4$

Score 1: The student made a conceptual error by finding the height of the wall instead of the distance from the wall to the ladder.

Question 31

31 As shown in the diagram below, a ladder 12 feet long leans against a wall and makes an angle of 72° with the ground.



Find, to the *nearest tenth of a foot,* the distance from the wall to the base of the ladder.

$\frac{\cos 72}{1} = \frac{x}{12}$

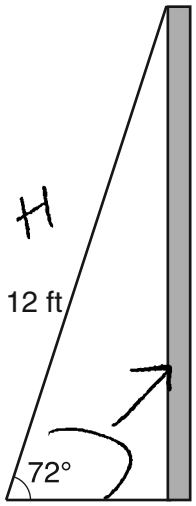
$12 \cos 72 = x$

$x = -11.6$

Score 1: The student made an error by using radian mode instead of degree mode in the calculator.

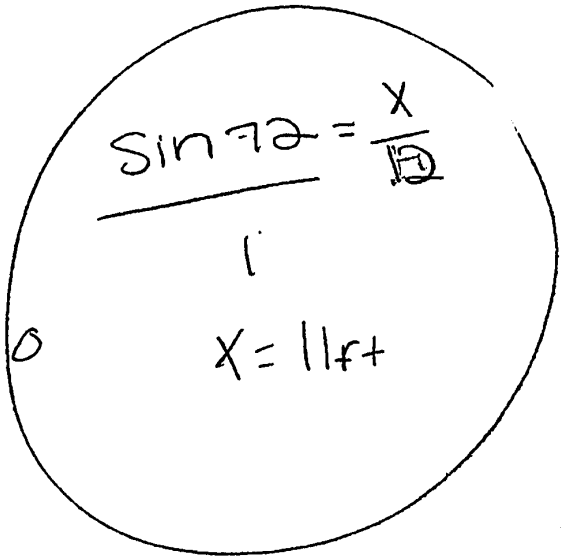
Question 31

31 As shown in the diagram below, a ladder 12 feet long leans against a wall and makes an angle of 72° with the ground.



a

Find, to the *nearest tenth of a foot,* the distance from the wall to the base of the ladder.

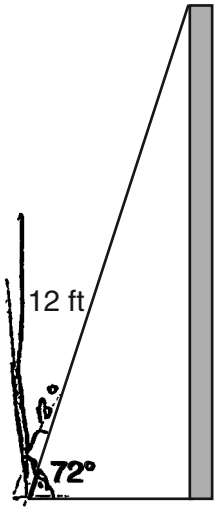


0

Score 0: The student made two errors by finding the height of the wall and rounding to the nearest foot.

Question 31

31 As shown in the diagram below, a ladder 12 feet long leans against a wall and makes an angle of 72° with the ground.



Find, to the *nearest tenth of a foot,* the distance from the wall to the base of the ladder.

SOH CAH TOA

$\cos 72 = \frac{12}{x}$

Score 0: The student wrote the trigonometric ratio incorrectly and did not calculate the answer.

Question 32

32 Carla bought a dress at a sale for 20% off the original price. The sale price of the dress was $28.80. Find the original price of the dress, in dollars.

X = Original price

$100\% - 20\% = 80\%$

So $0.80X = 28.80$

$$x = \frac{28.80}{0.80} = 36$$

Dress was $ 36.00

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

Question 32

32 Carla bought a dress at a sale for 20% off the original price. The sale price of the dress was $28.80. Find the original price of the dress, in dollars.

X - Original price

$\frac{28.80}{X} = \frac{100-20}{100} = \frac{80}{100}$

$80x = 2880$

$x = \frac{2880}{80} = 36$

$ 36

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

Question 32

32 Carla bought a dress at a sale for 20% off the original price. The sale price of the dress was $28.80. Find the original price of the dress, in dollars.

28.8
× .8

$ 23.04

Score: 1 The student made one conceptual error by taking 80% of $28.80.

Question 32

32 Carla bought a dress at a sale for 20% off the original price. The sale price of the dress was $28.80. Find the original price of the dress, in dollars.

100 + 20 = 120%

28.80 × 1.20 = 34.56

$34.56

Score: 1 The student made one conceptual error by taking 120% of $28.80.

Question 32

32 Carla bought a dress at a sale for 20% off the original price. The sale price of the dress was $28.80. Find the original price of the dress, in dollars.

$100X - 20X = 28.80$

$80X = 28.80$

$X = \frac{28.80}{80} = 0.36$

$\$ = 0.36$

Score: 1 The student made a conceptual error by not writing percentages as decimals.

Question 32

32 Carla bought a dress at a sale for 20% off the original price. The sale price of the dress was $28.80. Find the original price of the dress, in dollars.

28.8
× 0.2
5.76

28.80
+ 5.76
34.56

Score: 1 The student made one conceptual error by taking 120% of $28.80.

Question 32

32 Carla bought a dress at a sale for 20% off the original price. The sale price of the dress was $28.80. Find the original price of the dress, in dollars.

28.80
+ 0.20
29.00

Score: 0 The student showed completely irrelevant work.

Question 32

32 Carla bought a dress at a sale for 20% off the original price. The sale price of the dress was $28.80. Find the original price of the dress, in dollars.

$\frac{28.8}{.2} = 144$

$144

Score: 0 The student showed completely irrelevant work.

Question 33

33 The probability that a student owns a dog is $\frac{1}{3}$. The probability that the same student owns a dog and a cat is $\frac{2}{15}$. Determine the probability that the student owns a cat.

prob. dog = $\frac{1}{3}$

prob. cat = x

$\frac{1}{3} \cdot x = \frac{2}{15}$

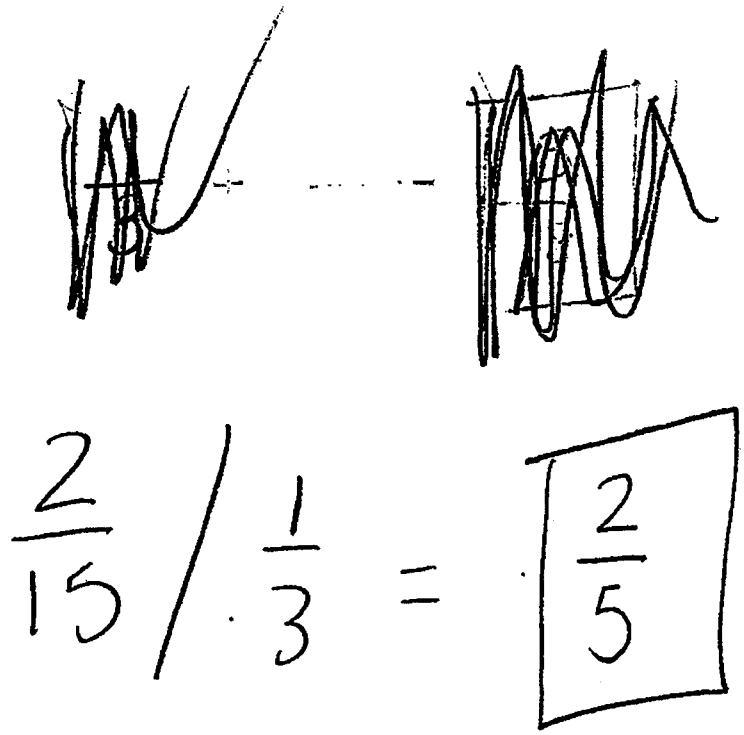
$\left(\frac{3}{1}\right)\frac{1}{3} \cdot x = \frac{2}{15}\left(\frac{3}{1}\right)$

$x = \frac{2}{5}$

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

Question 33

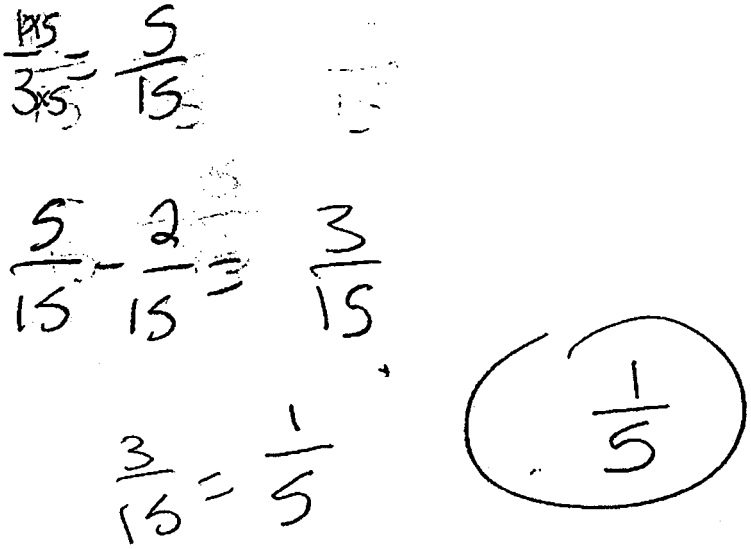
33 The probability that a student owns a dog is $\frac{1}{3}$. The probability that the same student owns a dog and a cat is $\frac{2}{15}$. Determine the probability that the student owns a cat.



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

Question 33

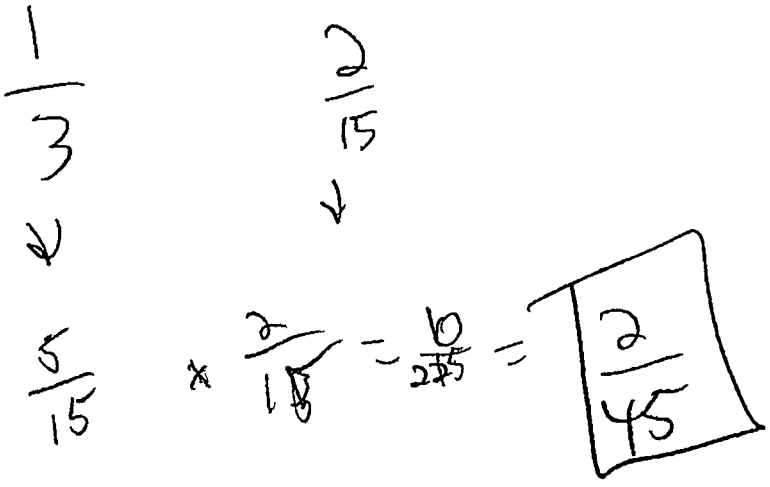
33 The probability that a student owns a dog is $\frac{1}{3}$. The probability that the same student owns a dog and a cat is $\frac{2}{15}$. Determine the probability that the student owns a cat.



Score: 1 The student made a conceptual error by subtracting rather than dividing.

Question 33

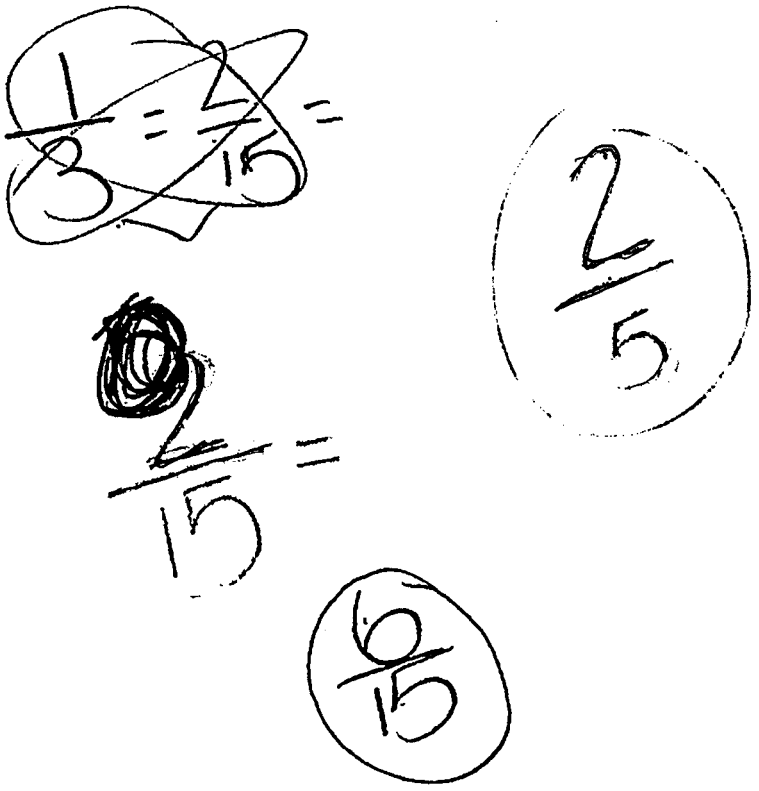
33 The probability that a student owns a dog is $\frac{1}{3}$. The probability that the same student owns a dog and a cat is $\frac{2}{15}$. Determine the probability that the student owns a cat.



Score: 1 The student made a conceptual error by multiplying instead of dividing.

Question 33

33 The probability that a student owns a dog is $\frac{1}{3}$. The probability that the same student owns a dog and a cat is $\frac{2}{15}$. Determine the probability that the student owns a cat.



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

Question 34

34 A DVD costs twice as much as a music CD. Jack buys 2 DVDs and 2 CDs and spends $45. Determine how much one CD costs, in dollars. [Only an algebraic solution can receive full credit.]

x = Cost of CD

$2x$ = Cost of DVD

$2(2x) + 2(x) = 45$

$4x + 2x = 6x = 45$

$x = 7.5$

Score: 3 The student has a complete and correct response.

Question 34

34 A DVD costs twice as much as a music CD. Jack buys 2 DVDs and 2 CDs and spends \$45. Determine how much one CD costs, in dollars. [Only an algebraic solution can receive full credit.]

let x = Cost of music CD

let $2x$ = Cost of DVD

$2(2x) + 2x = 45$

$4x + 2x = 45$

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

$x = 7.50$

Score: 3 The student has a complete and correct response.

Question 34

34 A DVD costs twice as much as a music CD. Jack buys 2 DVDs and 2 CDs and spends $45. Determine how much one CD costs, in dollars. [Only an algebraic solution can receive full credit.]

Cost of DVD = x

Cost of CD music = $\frac{1}{2}x$

$2x + x = 45$

$3x = 45$

$x = 15$

Score: 2 The student showed a correct method, but calculated the cost of a DVD instead of a CD.

Question 34

34 A DVD costs twice as much as a music CD. Jack buys 2 DVDs and 2 CDs and spends $45. Determine how much one CD costs, in dollars. [Only an algebraic solution can receive full credit.]

CD cost = m

DVD cost = 2m

2m + m = 45

6m = 45

m = 9

Score: 2 The student made one error by not considering the purchase of two CDs.

Question 34

34 A DVD costs twice as much as a music CD. Jack buys 2 DVDs and 2 CDs and spends $45. Determine how much one CD costs, in dollars. [Only an algebraic solution can receive full credit.]

$2x + 2x = 45$

$4x = 45$

$x = 11.25$

$\$ = 11.25$

Score: 1 The student made one conceptual error in writing an equation where the cost of a DVD is equal to the cost of a CD.

Question 34

34 A DVD costs twice as much as a music CD. Jack buys 2 DVDs and 2 CDs and spends $45. Determine how much one CD costs, in dollars. [Only an algebraic solution can receive full credit.]

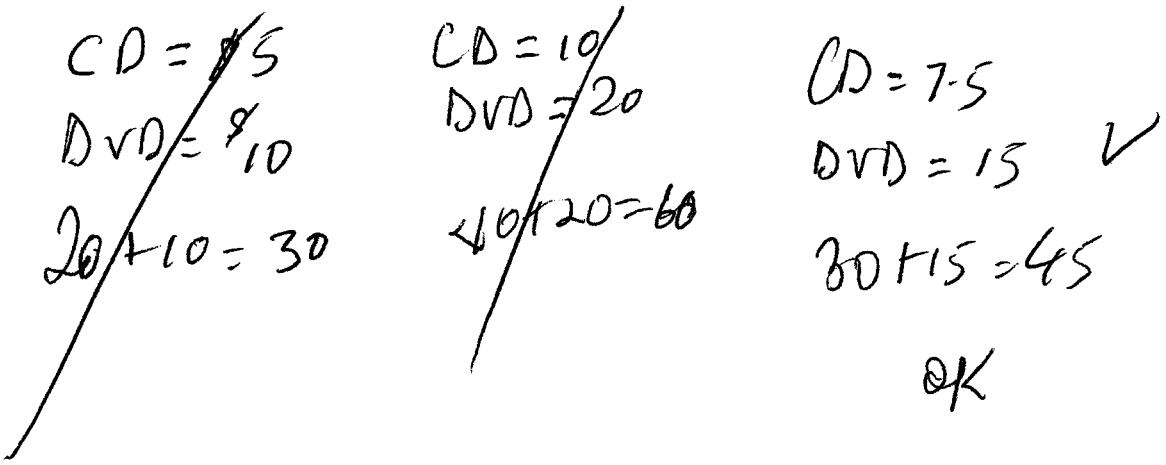
DVD = 2CD

2DVD + 2CD = 45

Score: 1 The student wrote a correct system of equations, but showed no further correct work.

Question 34

34 A DVD costs twice as much as a music CD. Jack buys 2 DVDs and 2 CDs and spends $45. Determine how much one CD costs, in dollars. [Only an algebraic solution can receive full credit.]



Score: 1 The student wrote the correct price of a CD, but used a method other than algebraic.

Question 34

34 A DVD costs twice as much as a music CD. Jack buys 2 DVDs and 2 CDs and spends $45. Determine how much one CD costs, in dollars. [Only an algebraic solution can receive full credit.]

Let x = cost of DVD
2x = cost of CD

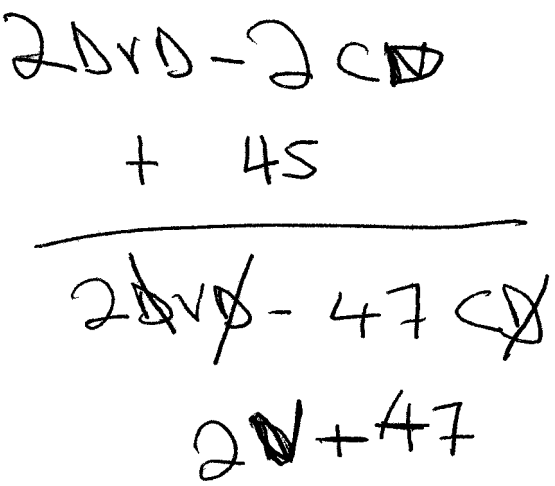
$2x + 4x = 45$
$6x = 45$
$x = 7.5$

Cost of CD = 2×7.5
$= 15$

Score: 1 The student made one conceptual error by assuming that the cost of a CD is twice the cost of a DVD.

Question 34

34 A DVD costs twice as much as a music CD. Jack buys 2 DVDs and 2 CDs and spends $45. Determine how much one CD costs, in dollars. [Only an algebraic solution can receive full credit.]



Score: 0 The student showed completely incorrect work.

Question 34

34 A DVD costs twice as much as a music CD. Jack buys 2 DVDs and 2 CDs and spends $45. Determine how much one CD costs, in dollars. [Only an algebraic solution can receive full credit.]

x = CD

$2x$ = DVD

$2x + 4x = 45$

$3x = 45$

$x = 45/8 = 5.625$

Score: 0 The student made one conceptual error setting up the equation and a second error when solving the equation.

Question 35

35 Noj has the following test scores:

76, 84, 69, 74, 91

His teacher will allow him to retake the test on which he scored lowest. Noj wants an average of *at least* 82. Determine the *least* number of additional points Noj must score on the retest.

Average right now = 76 + 84 + 69 + 74 + 91 = 394

394 ÷ 5 = 78.8

82 × 5 = 410

410 - 76 - 84 - 74 - 91 = 85

85 points - 69 = 16

16 points more

Score: 3 The student has a complete and correct response.

Question 35

35 Noj has the following test scores:

76, 84, 69, 74, 91

His teacher will allow him to retake the test on which he scored lowest. Noj wants an average of *at least* 82. Determine the *least* number of additional points Noj must score on the retest.

$\frac{76+84+74+91+69+x}{5} \geq 82$

$\left(\frac{5}{1}\right)\frac{394+x}{5} \geq 82\left(\frac{5}{1}\right)$

$394+x \geq 410$

$-394 \quad -394$

$x \geq 16$

least # pts = 16

(lowest 69+x)

$\frac{76+84+74+91+x}{5} \geq 82$

$\left(\frac{5}{1}\right)\frac{325+x}{5} \geq 82\left(\frac{5}{1}\right)$

$325+x \geq 410$

$-325 \quad -325$

$x \geq 85$ (new test grade needed)

$85 - 69$

16 more pts needed

Score: 3 The student has a complete and correct response.

Question 35

35 Noj has the following test scores:

76, 84, 69, 74, 91

His teacher will allow him to retake the test on which he scored lowest. Noj wants an average of *at least* 82. Determine the *least* number of additional points Noj must score on the retest.

$76+84+67+74+91=392$

$392 \div 5 = 78.4$

$82 \cdot 5 = 410$

$76+84+x+74+91=410$

$x = 85$

$85-67=\boxed{18}$

Score: 2 The student made a transcription error by writing 67 instead of 69.

Question 35

35 Noj has the following test scores:

76, 84, 69, 74, 91

His teacher will allow him to retake the test on which he scored lowest. Noj wants an average of *at least* 82. Determine the *least* number of additional points Noj must score on the retest.

$$\frac{76+84+69+74+91}{5} = 78.8$$

69 = lowest score

$$\frac{76+84+X+74+91}{5} = 82$$

$X = 85$

must score 85 or higher

85

Score: 2 The student showed work to find the new grade of 85, but did not find the number of additional points needed.

Question 35

35 Noj has the following test scores:

76, 84, 69, 74, 91

His teacher will allow him to retake the test on which he scored lowest. Noj wants an average of *at least* 82. Determine the *least* number of additional points Noj must score on the retest.

69, 76, 74, 84, 91

69 + 76 + 74 + 84 + 91 = 394

394 ÷ 5 = 78.8

82 · 5 = 410

x + 76 + 74 + 84 + 91 = 410

x = 85

410 ÷ 5 = 82

82
- 69

13

means that Noj must score at least 13 more point to get an average of at least 82.

Score: 2 The student showed work to find the new grade of 85, but showed no futher correct work.

Question 35

35 Noj has the following test scores:

76, 84, 69, 74, 91

His teacher will allow him to retake the test on which he scored lowest. Noj wants an average of *at least* 82. Determine the *least* number of additional points Noj must score on the retest.

$$\frac{76+84+69+74+91}{5} = 78.8$$

$$82 - 78.8 = 3.2$$

Score: 1 The student made a conceptual error by subtracting the current average from the target average.

Question 35

35 Noj has the following test scores:

76, 84, 69, 74, 91

His teacher will allow him to retake the test on which he scored lowest. Noj wants an average of *at least* 82. Determine the *least* number of additional points Noj must score on the retest.

$76+84+69+74+91 = 394$

$\frac{394}{5}$

78.8 average

Score: 0 The student only found the average of the original test scores, which is insufficient to answer the question.

Question 35

35 Noj has the following test scores:

76, 84, 69, 74, 91

His teacher will allow him to retake the test on which he scored lowest. Noj wants an average of *at least* 82. Determine the *least* number of additional points Noj must score on the retest.

$$\frac{76+84+74+91+x}{5}=82$$

$$\frac{325+x}{5}=82$$

$$\frac{65}{-65}+x=\frac{82}{-65}$$

$x=17$

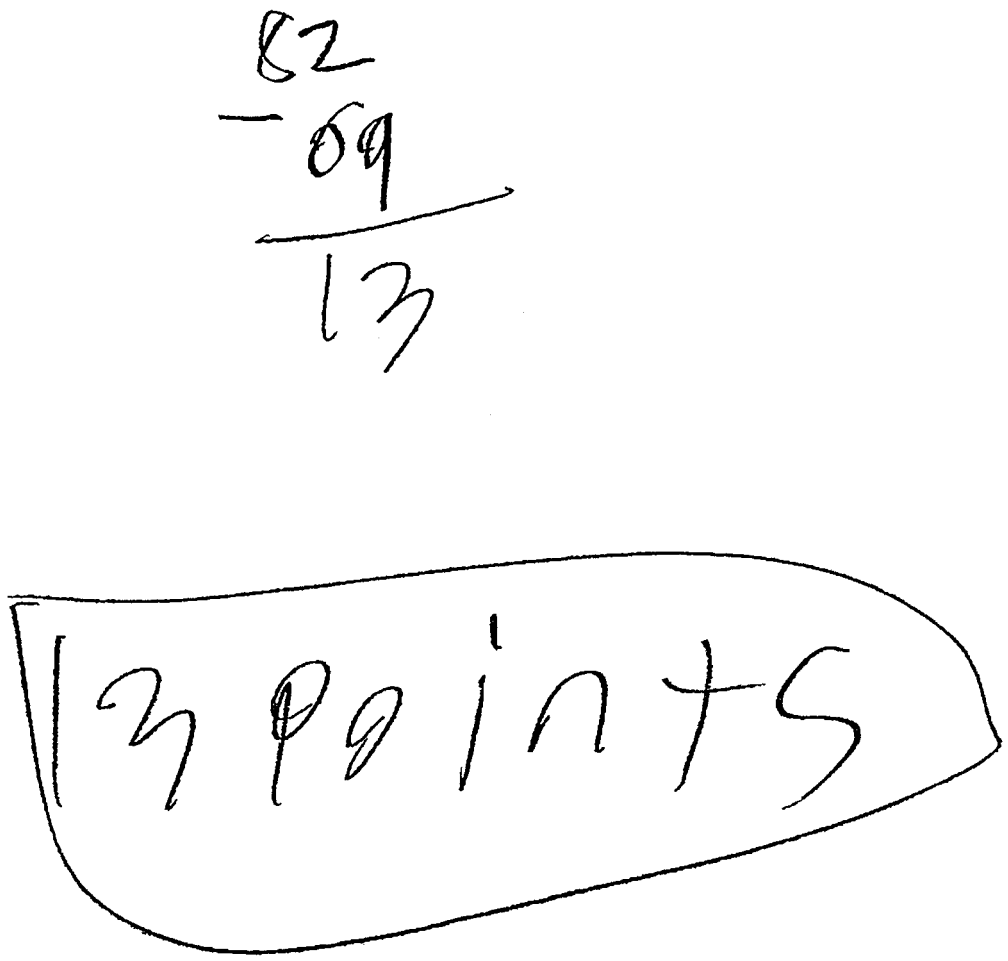
Score: 0 The student made a conceptual error when dividing $325 + x$ by 5. Then made a second conceptual error by using the new test score as the additional points needed.

Question 35

35 Noj has the following test scores:

76, 84, 69, 74, 91

His teacher will allow him to retake the test on which he scored lowest. Noj wants an average of *at least* 82. Determine the *least* number of additional points Noj must score on the retest.



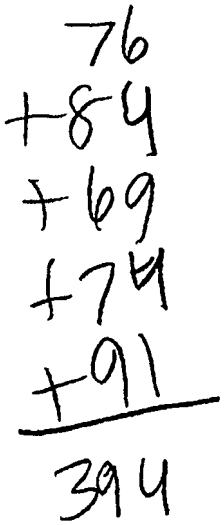
Score: 0 The student showed irrelevant work.

Question 35

35 Noj has the following test scores:

76, 84, 69, 74, 91

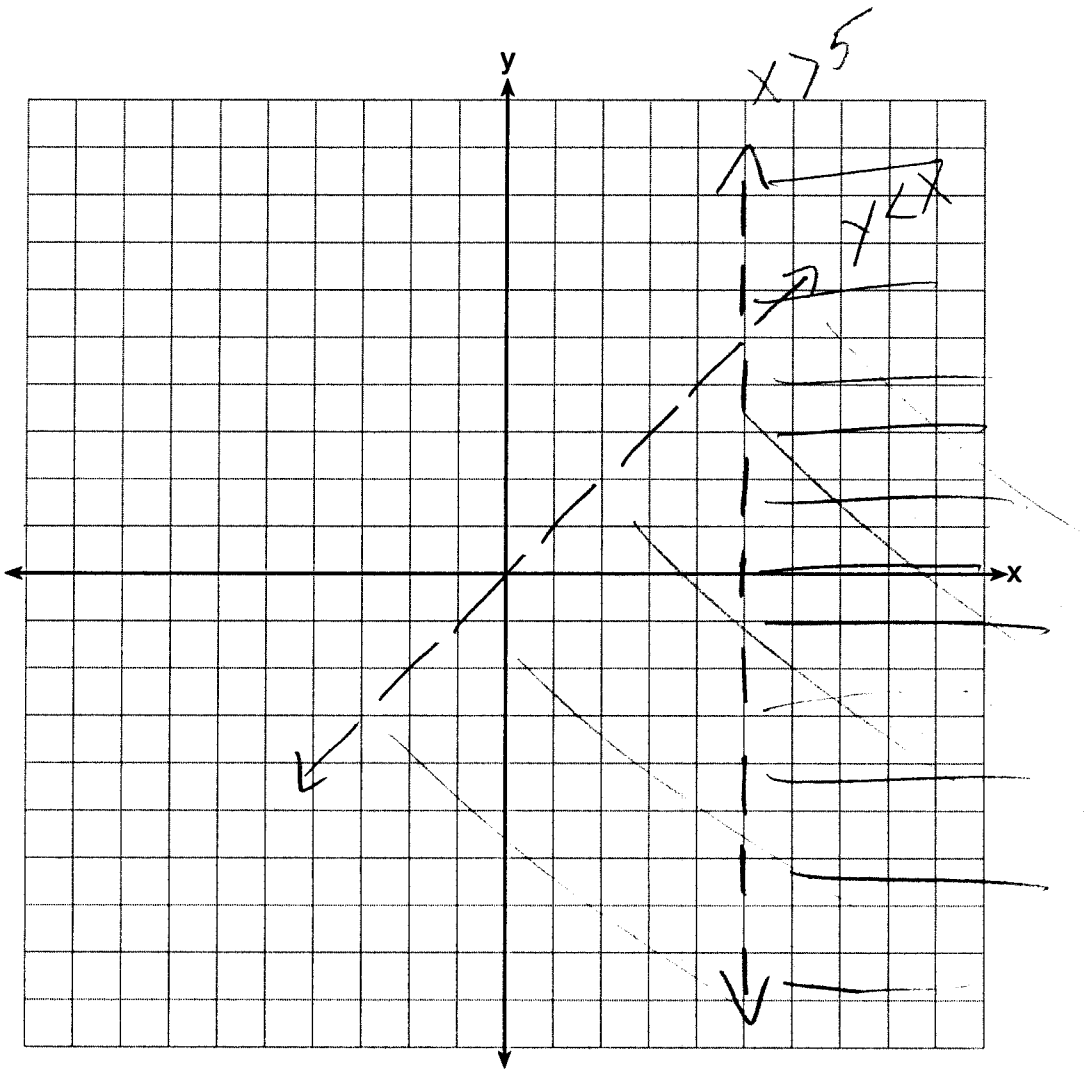
His teacher will allow him to retake the test on which he scored lowest. Noj wants an average of *at least* 82. Determine the *least* number of additional points Noj must score on the retest.



Score: 0 The correct work the student showed is insufficient.

Question 36

36 Graph $y < x$ and $x > 5$ on the axes below.



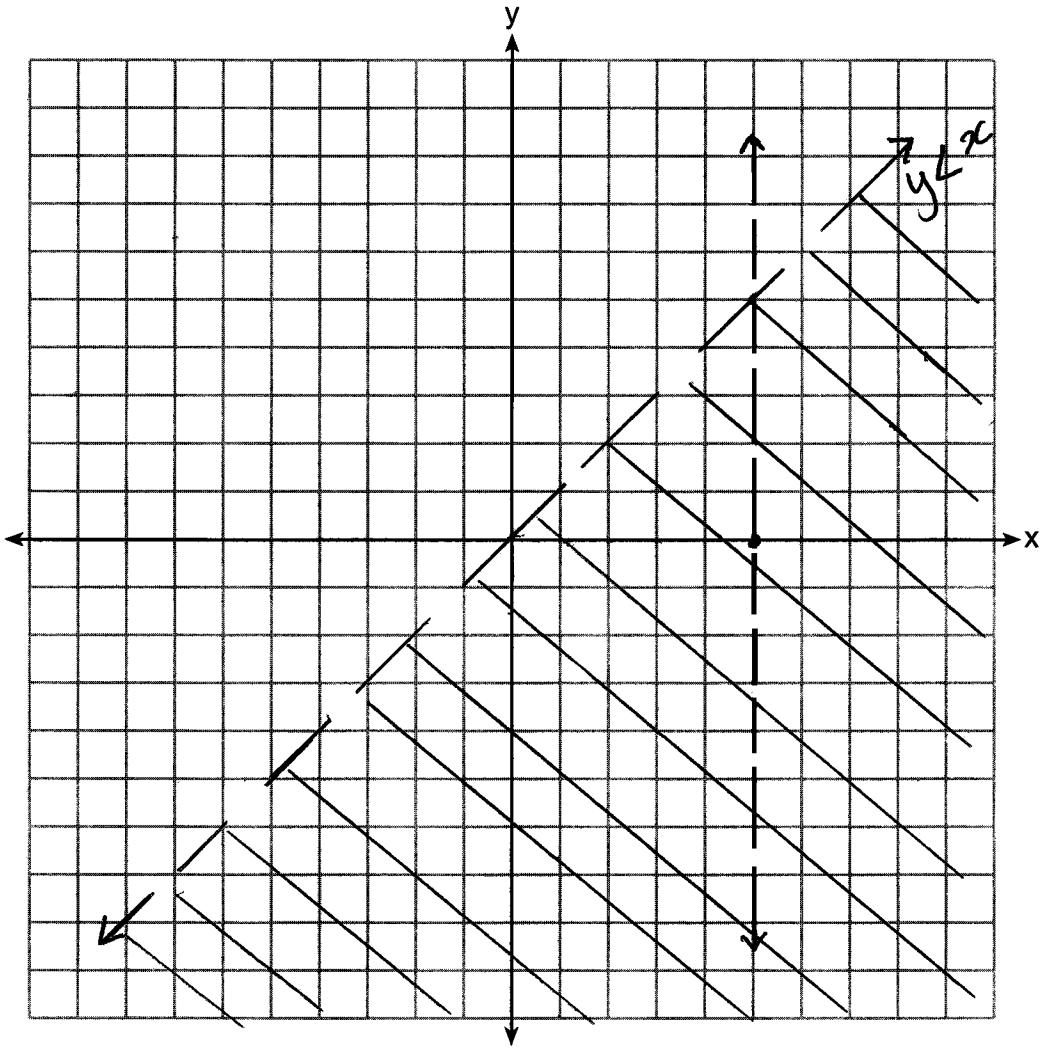
State the coordinates of a point in the solution set.

(7, 1)

Score: 3 The student has a complete and correct response.

Question 36

36 Graph $y < x$ and $x > 5$ on the axes below.

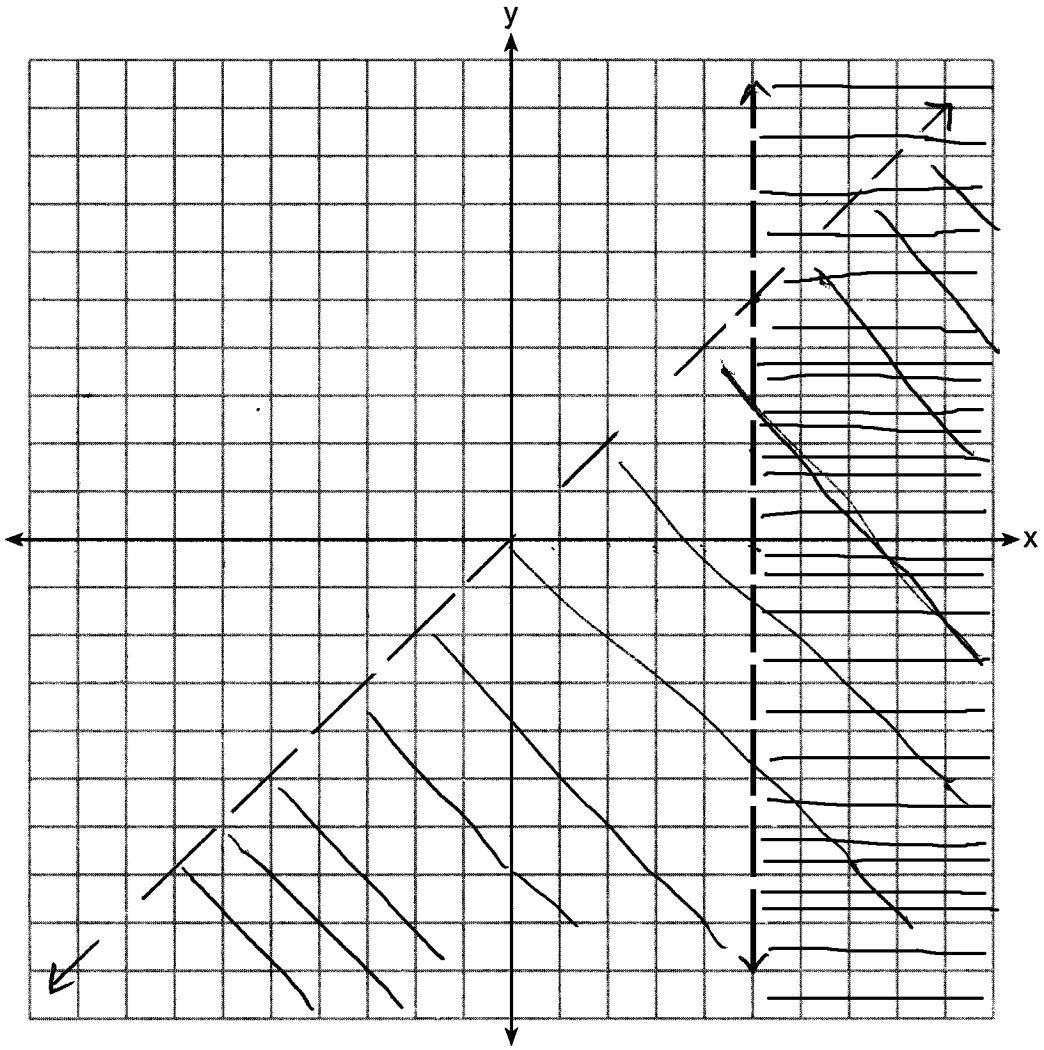


State the coordinates of a point in the solution set.

Score: 2 The student made one graphing error by not shading $x > 5$.

Question 36

36 Graph $y < x$ and $x > 5$ on the axes below.



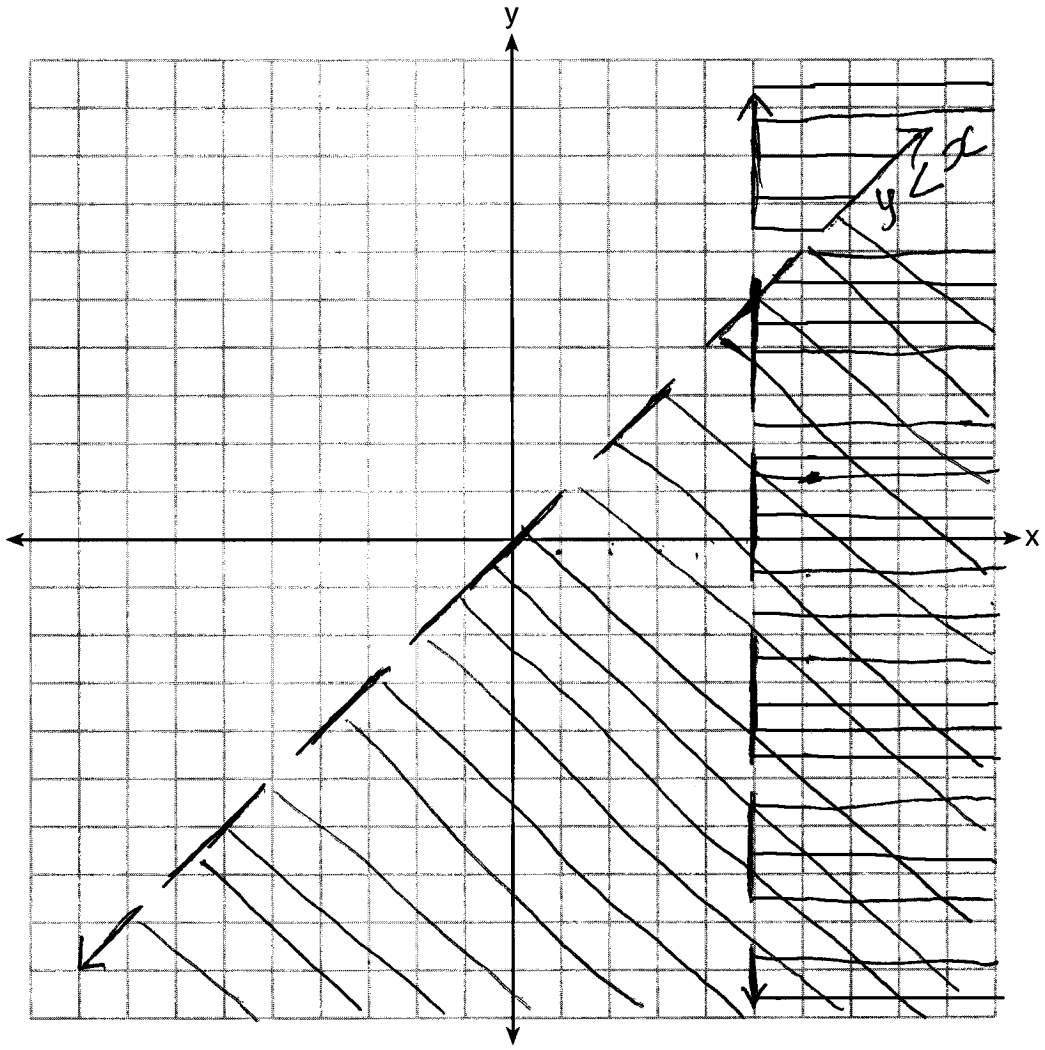
(6, 3)

State the coordinates of a point in the solution set.

Score: 2 The student graphed both inequalities correctly, but did not label at least one. The coordinates of a point within the solution set are stated.

Question 36

36 Graph $y < x$ and $x > 5$ on the axes below.

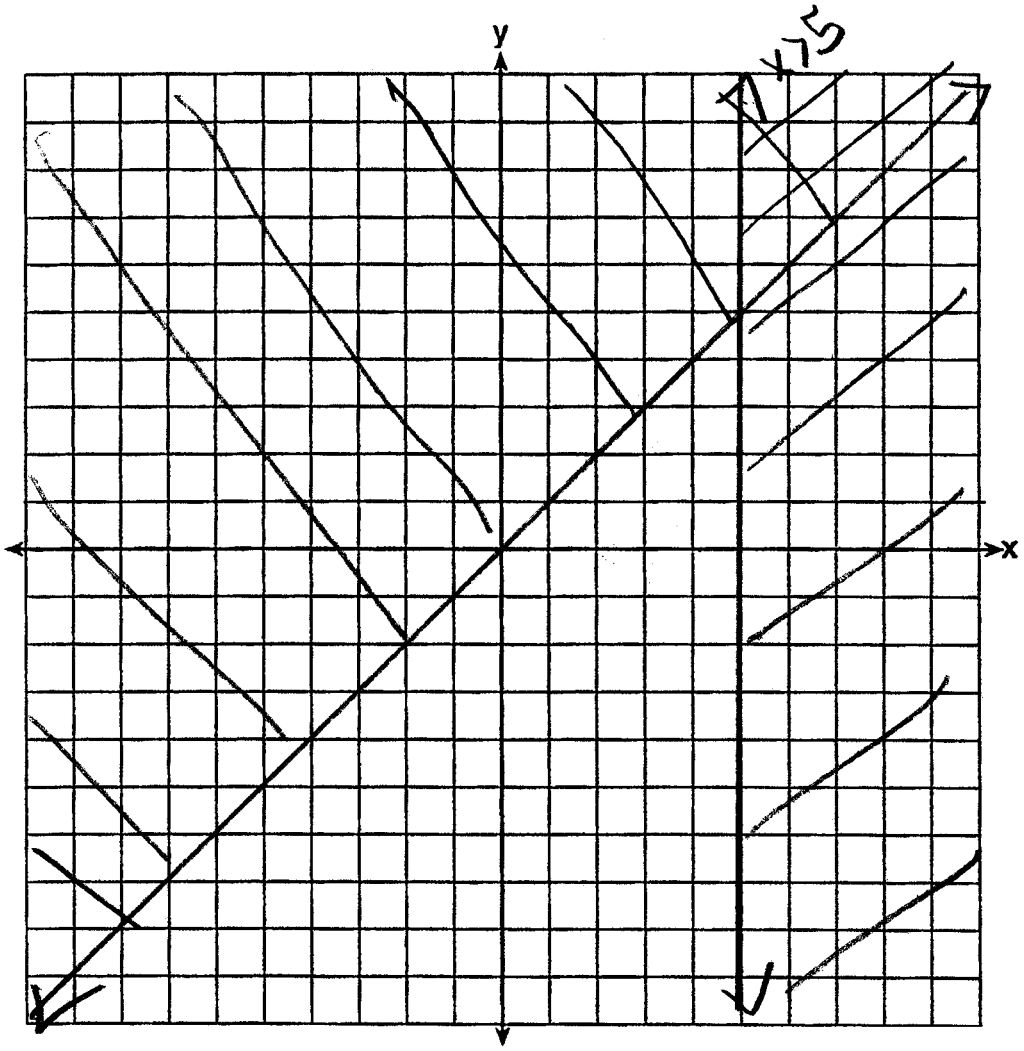


State the coordinates of a point in the solution set.

Score: 2 The student drew both graphs correctly and labeled one, but did not state a point in the solution set.

Question 36

36 Graph $y < x$ and $x > 5$ on the axes below.

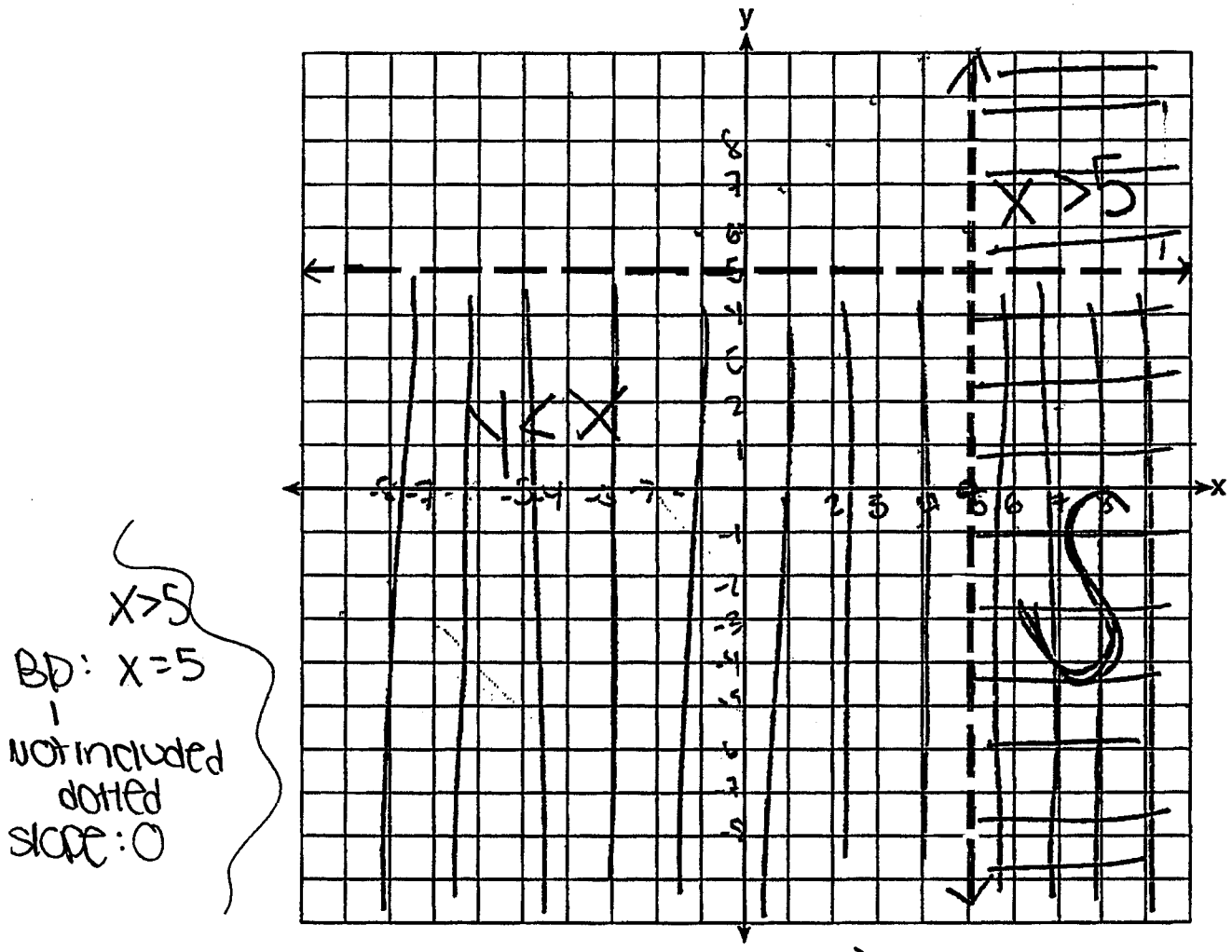


State the coordinates of a point in the solution set. (7, 9)

Score: 1 The student made two graphing errors, graphing solid boundary lines and shading $y < x$ incorrectly, but stated appropriate coordinates.

Question 36

36 Graph $y < x$ and $x > 5$ on the axes below.

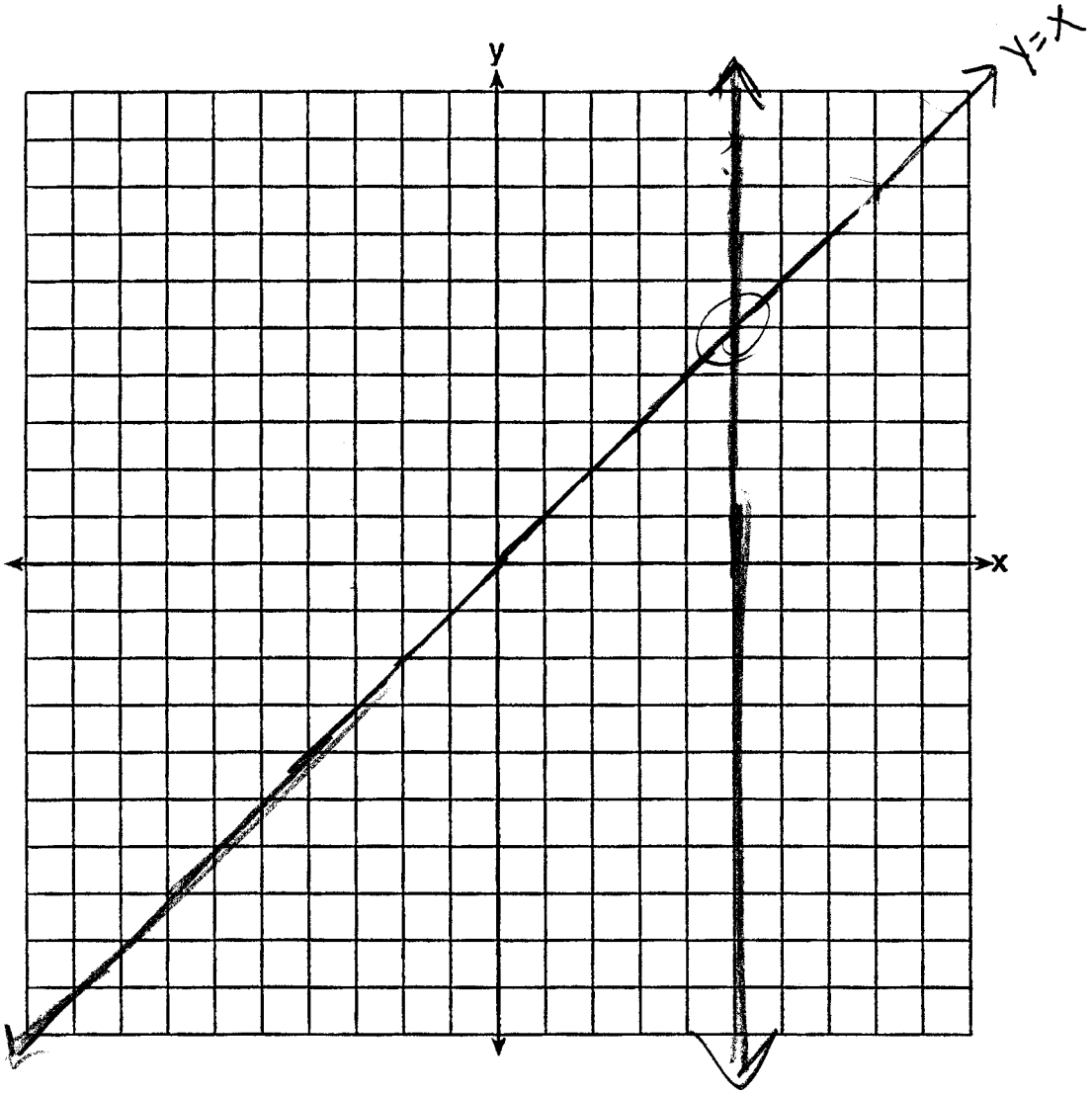


State the coordinates of a point in the solution set. (7,1) is in the solution set.

Score: 1 The student made one conceptual error by graphing $y < 5$ instead of $y < x$.

Question 36

36 Graph $y < x$ and $x > 5$ on the axes below.

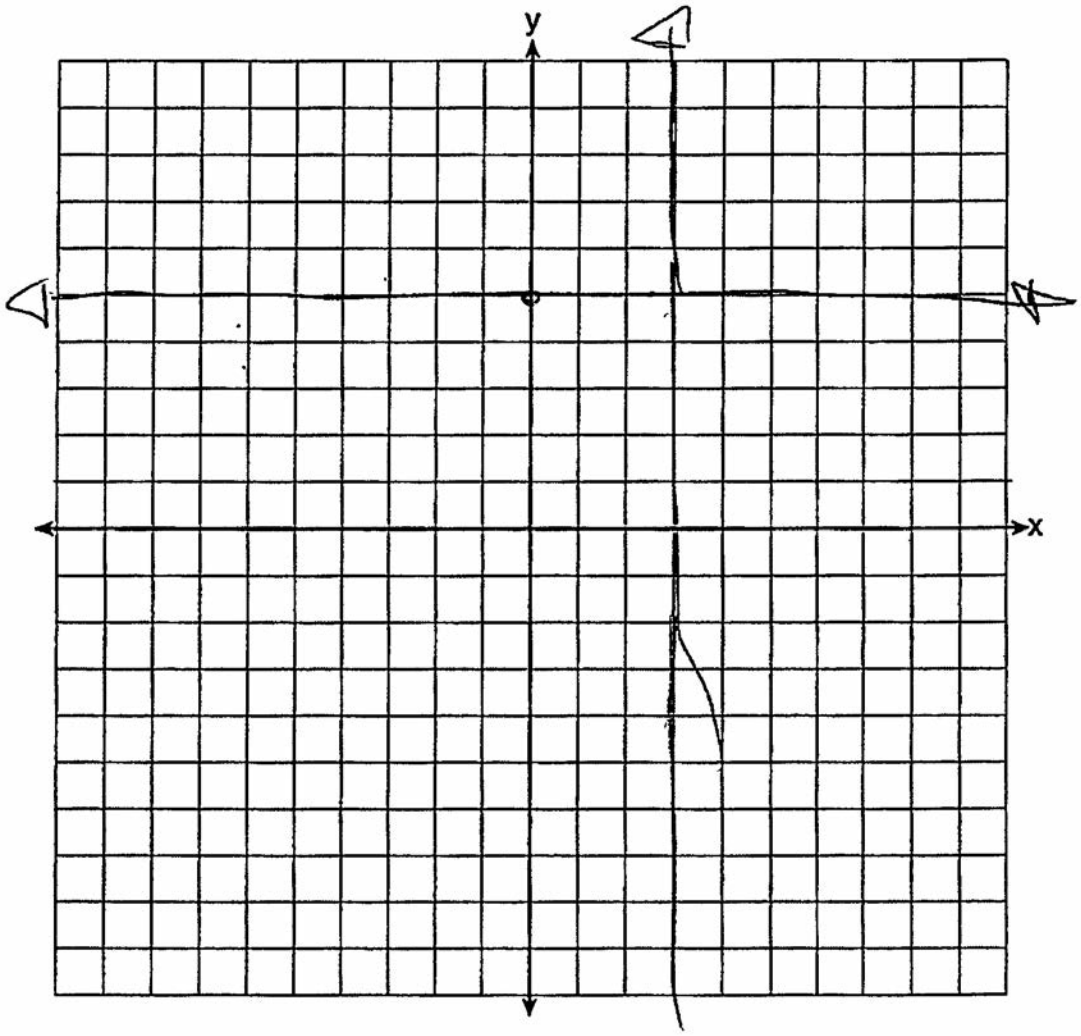


State the coordinates of a point in the solution set. (5, 5)

Score: 1 The student made a conceptual error by graphing equations instead of inequalities. The correct point of intersection was stated.

Question 36

36 Graph $y < x$ and $x > 5$ on the axes below.



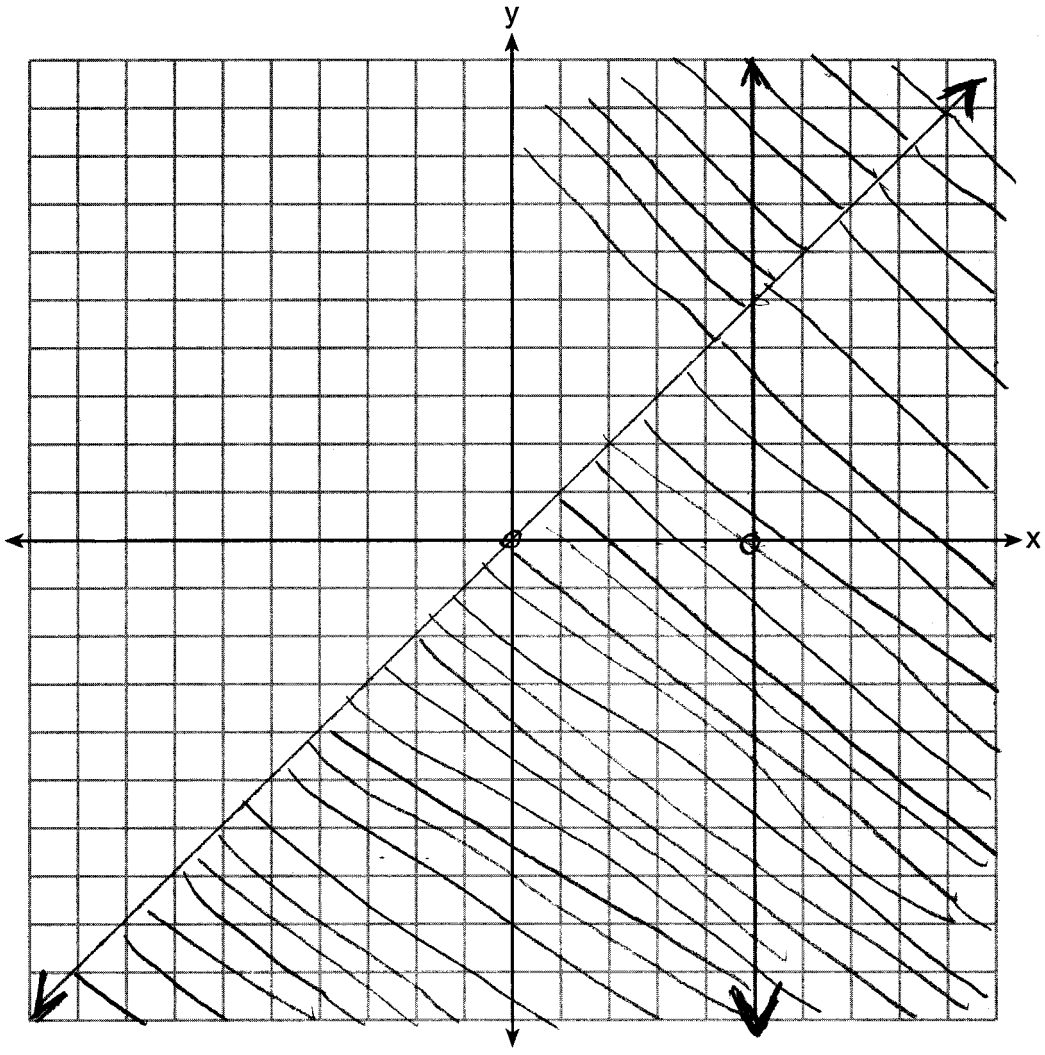
State the coordinates of a point in the solution set.

(3,5)

Score: 0 The student has a completely incorrect response.

Question 36

36 Graph $y < x$ and $x > 5$ on the axes below.

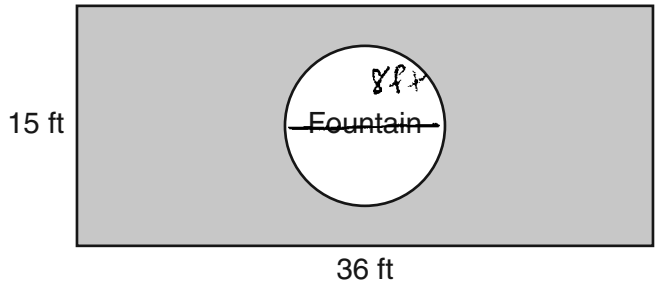


State the coordinates of a point in the solution set. (2, -5)

Score: 0 The student made a conceptional error graphing $y < x$ and graphed $x=5$.

Question 37

37 The Rock Solid Concrete Company has been asked to pave a rectangular area surrounding a circular fountain with a diameter of 8 feet, as shown in the diagram.



Find the area, to the *nearest square foot*, that must be paved.

$A = l \cdot w$
$A = 36 \cdot 15$
$A = 540$

$A = \pi r^2$
$A = \pi (4)^2$
$A = 50.26548$

$540 - 16\pi$

$A = 489.734$
$A = 489.8$
$A = 490$ sq. ft.

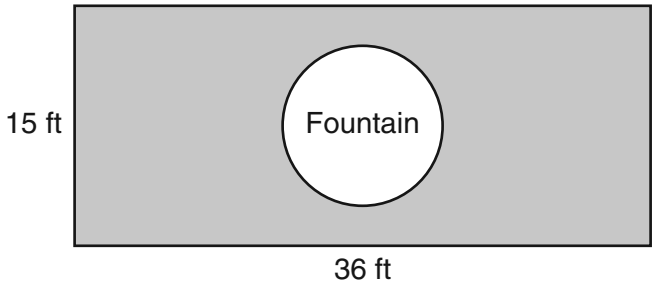
Find the cost, *in dollars*, of paving the area if the Rock Solid Concrete Company charges $8.95 per square foot.

$$\begin{array}{r} 490 \\ \times\ 8.95 \\ \hline \$\ 4385.5 \end{array}$$

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

Question 37

37 The Rock Solid Concrete Company has been asked to pave a rectangular area surrounding a circular fountain with a diameter of 8 feet, as shown in the diagram.



Find the area, to the *nearest square foot*, that must be paved.

Rectangle – fountain

$36 \cdot 15 - 16\pi = 489.7345175$

Area = 490

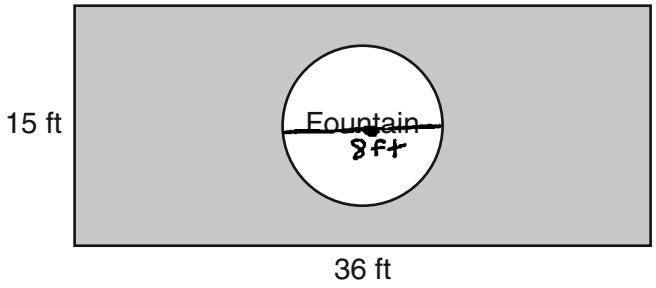
Find the cost, *in dollars*, of paving the area if the Rock Solid Concrete Company charges $8.95 per square foot.

$490 \cdot 8.95 = \$4385.50$

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

Question 37

37 The Rock Solid Concrete Company has been asked to pave a rectangular area surrounding a circular fountain with a diameter of 8 feet, as shown in the diagram.



Find the area, to the *nearest square foot*, that must be paved.

$A = lw$
$= 36 \cdot 15$
$= 540 ft^2$

$A = \pi r^2$
$= \pi(4^2)$
$= 16\pi ft$
$= 50.26548246$

$540 - 50.26548246$
489.7345175

$490 ft^2$

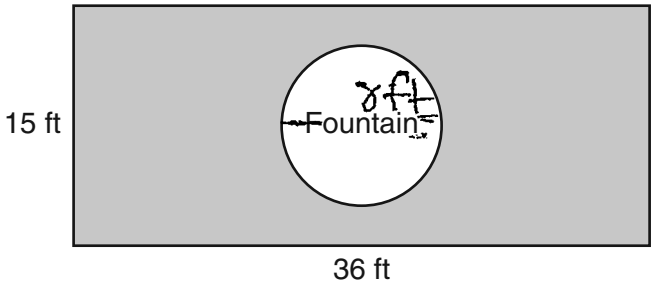
Find the cost, *in dollars*, of paving the area if the Rock Solid Concrete Company charges $8.95 per square foot.

$490(8.95) =$ $4386

Score: 3 The student rounded the cost to the nearest dollar.

Question 37

37 The Rock Solid Concrete Company has been asked to pave a rectangular area surrounding a circular fountain with a diameter of 8 feet, as shown in the diagram.



Find the area, to the *nearest square foot*, that must be paved.

$(15)(36)=540$

$A=\pi r^2$

$A=\pi 4^2$

$A=\pi 16$

$A=50.26$

$540-50.26=489.74ft^2$

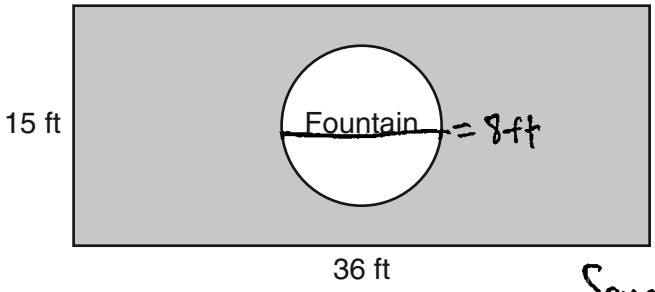
Find the cost, *in dollars*, of paving the area if the Rock Solid Concrete Company charges $8.95 per square foot.

$(\$8.95)(489.74)=\$4383.173=\$4383.17$

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

Question 37

37 The Rock Solid Concrete Company has been asked to pave a rectangular area surrounding a circular fountain with a diameter of 8 feet, as shown in the diagram.



Square (A) = 540 ft²

Find the area, to the *nearest square foot*, that must be paved.

490 ft²

$A_O = \pi(4)^2$

$A_O = 16\pi$

$A_O = 50$

$540 - 50 = 490$

Find the cost, *in dollars*, of paving the area if the Rock Solid Concrete Company charges $8.95 per square foot.

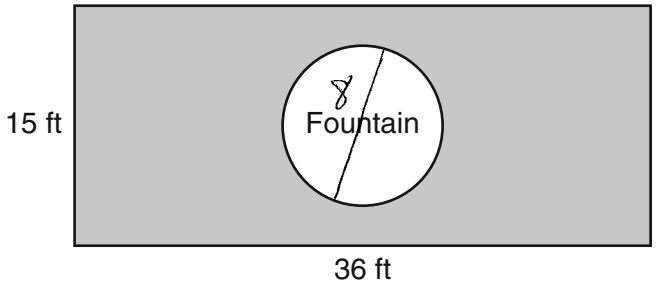
$8.95 = 1$ ft

$\frac{490}{8.95} = \$54.75$

Score: 3 The student correctly found 490, but showed no further correct work.

Question 37

37 The Rock Solid Concrete Company has been asked to pave a rectangular area surrounding a circular fountain with a diameter of 8 feet, as shown in the diagram.



Find the area, to the *nearest square foot*, that must be paved.

$A = \pi \cdot 8^2$

$A = 201$

$A = 15 \cdot 36$

$A = 540$

$540 - 201 = 339$

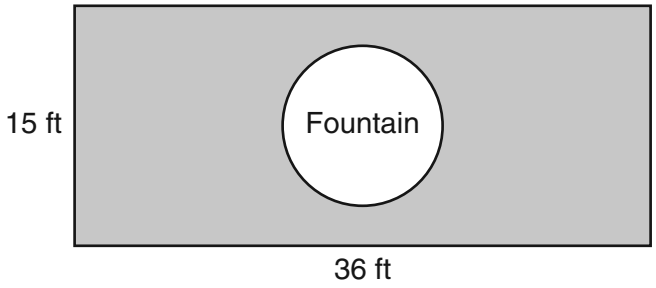
Find the cost, *in dollars*, of paving the area if the Rock Solid Concrete Company charges $8.95 per square foot.

$339 \cdot 8.95 = \$3034.05$

Score: 2 The student made a conceptual error by using 8, the diameter, for the radius.

Question 37

37 The Rock Solid Concrete Company has been asked to pave a rectangular area surrounding a circular fountain with a diameter of 8 feet, as shown in the diagram.



Find the area, to the *nearest square foot*, that must be paved.

36×15
540

$4^2\pi$
50.3

540
− 50.3
490.3

Find the cost, *in dollars*, of paving the area if the Rock Solid Concrete Company charges $8.95 per square foot.

490.3 × 8.95

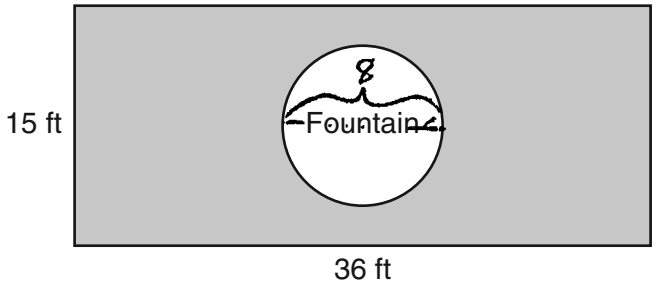
4388.185

$4388.19

Score: 2 The student made a rounding error and a computational error.

Question 37

37 The Rock Solid Concrete Company has been asked to pave a rectangular area surrounding a circular fountain with a diameter of 8 feet, as shown in the diagram.



Find the area, to the *nearest square foot*, that must be paved.

$A = l \cdot w$

$A = 36\text{ft} \cdot 15\text{ft}$

$A = 540$

$A = 515$

$A = \frac{\pi r^2}{2}$ $\quad \frac{A = \pi(4)^2}{2}$ $\quad A = \frac{16\pi}{2}$ $\quad A = 8\pi = 25$

Find the cost, *in dollars*, of paving the area if the Rock Solid Concrete Company charges $8.95 per square foot.

515

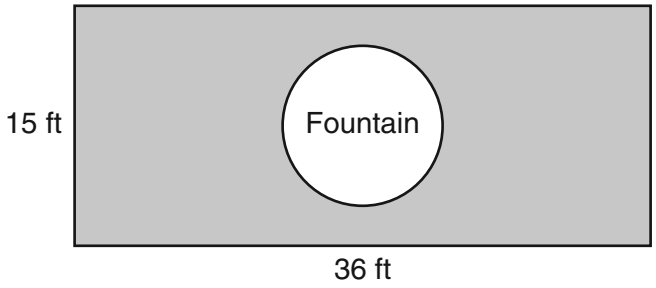
$\times 8.95$

$\$4609$

Score: 1 The student made a conceptual error by using the wrong formula for the area of a circle. The student rounded the cost to the nearest dollar.

Question 37

37 The Rock Solid Concrete Company has been asked to pave a rectangular area surrounding a circular fountain with a diameter of 8 feet, as shown in the diagram.



Find the area, to the *nearest square foot*, that must be paved.

Area shaded = $A_{\square} - A_{\odot}$

$= 36 \times 15 - \frac{\pi r^2}{2}$

$= 540 - \frac{\pi(4)^2}{2}$

Area shaded $= 540 - 8\pi$

$= 540 - 8(3.14)$

$= 540 - 25.12$

$= 514.88$

Nearest square foot = 514.9

Find the cost, *in dollars*, of paving the area if the Rock Solid Concrete Company charges $8.95 per square foot.

$36 \times 15 = 540$

$540 \times 8.95 = 4833$

Answer: $4,833.00

Score: 0 The student used an incorrect formula to find the area of the circle, and did not round to the nearest square foot. The student used the area of the rectangle to find the cost.

Question 38

38 Solve the following system of equations algebraically:

$$y = x^2 + 5x - 17$$
$$y = x - 5$$

$x - 5 = x^2 + 5x - 17$

$0 = x^2 + 4x - 12$

$0 = (x+6)(x-2)$

$x = -6$

$x = 2$

$y = x - 5$

$y = -6 - 5 = -11$

$(-6, -11)$

$y = 2 - 5 = -3$

$(2, -3)$

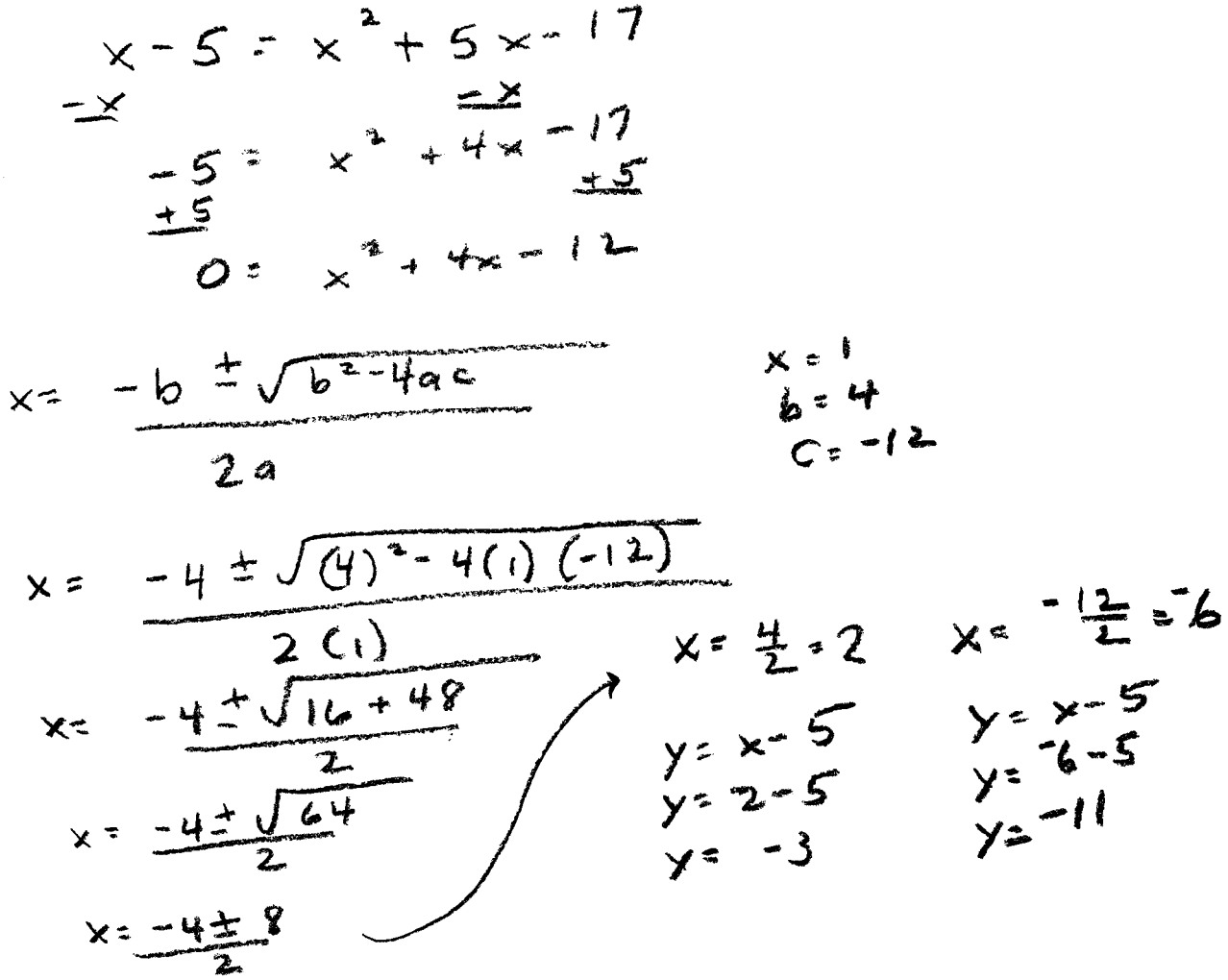
$(2, -3)$ and $(-6, -11)$

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

Question 38

38 Solve the following system of equations algebraically:

$$y = x^2 + 5x - 17$$
$$y = x - 5$$



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

Question 38

38 Solve the following system of equations algebraically:

$$y = x^2 + 5x - 17$$
$$y = x - 5$$

$x^2 + 5x - 17 = x - 5$

$-y \qquad +17$

$x^2 + 4x = 12$

$x^2 + 4x + 4 = 12 + 4$

$x^2 + 4x + 4 = 16$

$(x+2)^2 = 16$

$x + 2 = \sqrt{16} = \pm 4$

$y = x - 5$

$x = 4 - 2 = 2 \qquad y = 2 - 5 = -3$

$x = -4 - 2 = -6 \qquad y = -6 - 5 = -11$

$(2, -3)$ and $(-6, -11)$

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

Question 38

38 Solve the following system of equations algebraically:

$$y = x^2 + 5x - 17$$
$$y = x - 5$$

$x =$

$x - 5 = x^2 + 5x - 17$

$-x + 5 \qquad -x \qquad +5$

$0 = x^2 + 4x - 12$

$0 = (x + 6)(x - 2)$

$x = -6 \qquad x = 2$

Score: 3 The student showed correct work, but only found the correct values of x.

Question 38

38 Solve the following system of equations algebraically:

$$y = x^2 + 5x - 17$$
$$y = x - 5$$

$x^2 + 5x - 17 = x - 5$

$x^2 + 4x - 12 = 0$

$(x+6)(x-2) = 0$

$x = -6$

$x = 2$

$y = x + 5$

$y = -6 + 5 = -1$

$y = 2 + 5 = 7$

So $x = -6, y = -1$ or $x = 2, y = 7$

Score: 3 The student found correct values of x, but used an incorrect equation to find the values of y.

Question 38

38 Solve the following system of equations algebraically:

$$y = x^2 + 5x - 17$$
$$y = x - 5$$

$x - 5 = x^2 + 5x - 17$
$-x \quad -5$
$0 = x^2 + 4x - 21$
$0 = (x + 7)(x - 3)$

$x = -7$	$x = 3$
$y = x - 5$	$y = 3 - 5$
$-7 - 5$	-2
-12	

$(-7, -12)$ $(3, -2)$

Score: 2 The student added -5 instead of $+5$ to both sides, and added -17 and -5 incorrectly.

Question 38

38 Solve the following system of equations algebraically:

$$y = x^2 + 5x - 17$$
$$y = x - 5$$

(2, -3) (-6, -11)

I used my calculator.

X	Y_1	Y_2
-6	-11	-11
2	-3	-3

Score: 2 The student used a method other than algebraic.

Question 38

38 Solve the following system of equations algebraically:

$$y = x^2 + 5x - 17$$
$$y = x - 5$$

(2, -3) (-6, -11)

Score: 1 The student wrote correct points, but showed no work.

Question 38

38 Solve the following system of equations algebraically:

$$y = x^2 + 5x - 17$$
$$y = x - 5$$

$x - 5 = x^2 + 5x - 17$

$+5$

$-x$

$x^2 - x - 12 = 0$

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

$x = -3$

$x = -4$

Score: 1 The student wrote $x^2 + 5x - 17 = x - 5$, but showed no further correct work.

Question 38

38 Solve the following system of equations algebraically:

$$y = x^2 + 5x - 17$$
$$y = x - 5$$

$x = -6$

Score: 0 The student showed only one correct value of x, but showed no further correct work.

Question 39

39 Perform the indicated operations and express the result in simplest form:

$$\left(\frac{10x^2y}{x^2+xy}\right)\cdot\left(\frac{(x+y)^2}{2x}\right)\div\left(\frac{x^2-y^2}{5y^2}\right)$$

$$\frac{\overset{5}{\cancel{10}}x^{\cancel{2}}y}{x\cancel{(x+y)}} \cdot \frac{\cancel{(x+y)}\cancel{(x+y)}}{\cancel{2}x} \cdot \frac{5y^2}{(x-y)\cancel{(x+y)}}$$

$$\frac{5\cdot 1\cdot y\cdot 1\cdot 5\cdot y^2}{1\cdot 1\cdot (x-y)} = \frac{25y^3}{(x-y)}$$

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

Question 39

39 Perform the indicated operations and express the result in simplest form:

$$\left(\frac{10x^2y}{x^2+xy}\right)\cdot\left(\frac{(x+y)^2}{2x}\right)\div\left(\frac{x^2-y^2}{5y^2}\right)$$

$$\frac{\overset{5\cdot1\cdot1}{10x^2y}\cdot\overset{1\cdot1}{(x+y)(x+y)}\cdot5y^2}{x(x+y)\cdot2x\cdot(x-y)(x+y)} = \frac{25y}{x-y}$$

$$1\cdot1 \qquad 1\cdot1 \quad (x+y)\cdot1\cdot$$

Score: 3 The student made a simplification error in the numerator.

Question 39

39 Perform the indicated operations and express the result in simplest form:

$$\left(\frac{10x^2y}{x^2+xy}\right)\cdot\left(\frac{(x+y)^2}{2x}\right)\div\left(\frac{x^2-y^2}{5y^2}\right)$$

$$\frac{10x^2y}{x(x+y)}\cdot\frac{(x+y)^2}{2x}\cdot\frac{5y^2}{x^2-y^2}=\frac{(x+y)^2\cdot 5y^2}{2x^2(x^2-y^2)}$$

Score: 2 The student made one conceptual error by not multiplying by the reciprical.

Question 39

39 Perform the indicated operations and express the result in simplest form:

$$\left(\frac{10x^2y}{x^2+xy}\right)\cdot\left(\frac{(x+y)^2}{2x}\right)\div\left(\frac{x^2-y^2}{5y^2}\right)$$

$$\frac{10x^2y}{x(x+y)}\cdot\frac{(x+y)(x+y)}{2x}\cdot\frac{(x-y)(x+y)}{5y^2}=\frac{x-y}{y}$$

Score: 1 The student made one conceptual error (didn't multiply by the recriprocal) and one simplification error in the numerator.

Question 39

39 Perform the indicated operations and express the result in simplest form:

$$\left(\frac{10x^2y}{x^2+xy}\right)\cdot\left(\frac{(x+y)^2}{2x}\right)\div\left(\frac{x^2-y^2}{5y^2}\right)$$

x

$$\frac{5xy}{x}\cdot(x+y)\cdot\frac{x^2-1}{1}=y(x+y)(x^2-1)$$

$$\frac{1}{1}$$

Score: 0 The student has a completely incorrect response.