The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA I

Wednesday, June 19, 2019 — 1:15 to 4:15 p.m.

MODEL RESPONSE SET

Table of Contents

25 Solve algebraically for x:

$$-\frac{2}{3}(x+12)+\frac{2}{3}x=-\frac{5}{4}x+2$$

$$-\frac{2}{3}x-8+\frac{2}{3}x=\frac{-5}{4}x+2$$

$$\frac{-8}{-2}=\frac{-5}{4}x+\frac{2}{-2}$$

$$\frac{-10}{-1.25}=\frac{-1.25x}{-1.25}$$

$$\boxed{8=x}$$

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

25 Solve algebraically for x:

$$-\frac{2}{3}(x+12)+\frac{2}{3}x=-\frac{5}{4}x+2$$

$$-\frac{2}{3}x-8+\frac{2}{3}x=\frac{-5}{4}x+2$$

$$-10=\frac{-5}{4}x$$

$$\boxed{x=8}$$

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

25 Solve algebraically for *x*:

$$-\frac{2}{3}(x+12)+\frac{2}{3}x=-\frac{5}{4}x+2$$

$$\frac{-2}{3}x-8+\frac{2}{3}x$$

$$-8=-\frac{5}{4}x+2$$
$$\underline{-2 \qquad\qquad -2}$$

$$-10=\frac{-5}{4}x$$
$$\underline{\,\Big|\,}$$
$$\frac{-5}{4}\,\Big|\,\frac{-5}{4}$$

$$\boxed{x=\frac{1}{2}}$$

Score 1: The student made a computational error when dividing by $-\frac{5}{4}$.

25 Solve algebraically for x:

$$-\frac{2}{3}(x+12)+\frac{2}{3}x = -\frac{5}{4}x+2$$

$$-\frac{2}{3}x-8+\frac{2}{3}x = -\frac{5}{4}x+2$$

$$x-8 = -\frac{5}{4}x+2$$

$$\left(\frac{4}{9}\right)\frac{9}{4}x \quad = 10\left(\frac{4}{9}\right)$$

$$x = 4.\overline{4}$$

Score 1: The student made an error when combining $-\frac{2}{3}x$ and $\frac{2}{3}x$.

25 Solve algebraically for x:

$$-\frac{2}{3}(x+12)+\frac{2}{3}x=-\frac{5}{4}x+2$$

$$-\frac{2}{3}\left(x+12\right)+\frac{2}{3}x=-\frac{5}{4}x+2$$

$$-\frac{2}{3}x+12+\frac{2}{3}x=\frac{-5}{4}x+2$$

$$12=-\frac{5}{4}x+2$$

$$10=\frac{-5}{4}x$$

$$x=-\frac{40}{9}$$

Score 0: The student did not distribute $-\frac{2}{3}$ to both terms and wrote an incorrect denominator.

25 Solve algebraically for x:

$$-\frac{2}{3}(x+12)+\frac{2}{3}x = -\frac{5}{4}x+2$$

$$-\frac{2}{3}(x+12)+\frac{2}{3}x = -\frac{5}{4}x+2$$

$$-\frac{2}{3}x-8+\frac{2}{3}x = -\frac{5}{4}x+2 -2$$

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

$$0-10 = -\frac{5}{4}x$$

$$\left(\frac{5}{5}\right)10 = -\frac{5}{4}x\left(\frac{5}{4}\right)$$

$$\boxed{12.5 = x}$$

Score 0: The student made a computational error simplifying $0-10$ and did not multiply by the reciprocal of $-\frac{5}{4}$.

26 If $C = G - 3F$, find the trinomial that represents C when $F = 2x^2 + 6x - 5$ and $G = 3x^2 + 4$.

$$-3\left(2x^2 + 6x - 5\right)$$

$$-6x^2 - 18x + 15$$

$$3x^2 + 4 - 6x^2 - 18x + 15$$

$$\boxed{-3x^2 - 18x + 19}$$

negative three X squared — eighteen X + nineteen

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

26 If $C = G - 3F$, find the trinomial that represents C when $F = 2x^2 + 6x - 5$ and $G = 3x^2 + 4$.

$$3x^2 + 4 - 3(2x^2 + 6x - 5)$$

$$3x^2 + 4 - 6x^2 - 18x + 15$$

$$19 - 18x - 3x^2$$

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

26 If $C = G - 3F$, find the trinomial that represents C when $F = 2x^2 + 6x - 5$ and $G = 3x^2 + 4$.

$$3x^2 + 4 - 3(2x^2 + 6x - 5)$$
$$3x^2 + 4 - 6x^2 - 18x + 15$$
$$-3x^2 - 18 + 19$$

Score 1:   The student wrote -18 instead of $-18x$.

26 If $C = G - 3F$, find the trinomial that represents C when $F = 2x^2 + 6x - 5$ and $G = 3x^2 + 4$.

$$C = (3x^2 + 4) - 3(2x^2 + (6x - 5))$$
$$C = (3x^2 + 4) - (6x^2 + 18x - 15)$$
$$C = -3x^2 + 18x - 11$$

Score 1: The student only negated the $6x^2$ when subtracting the trinomial.

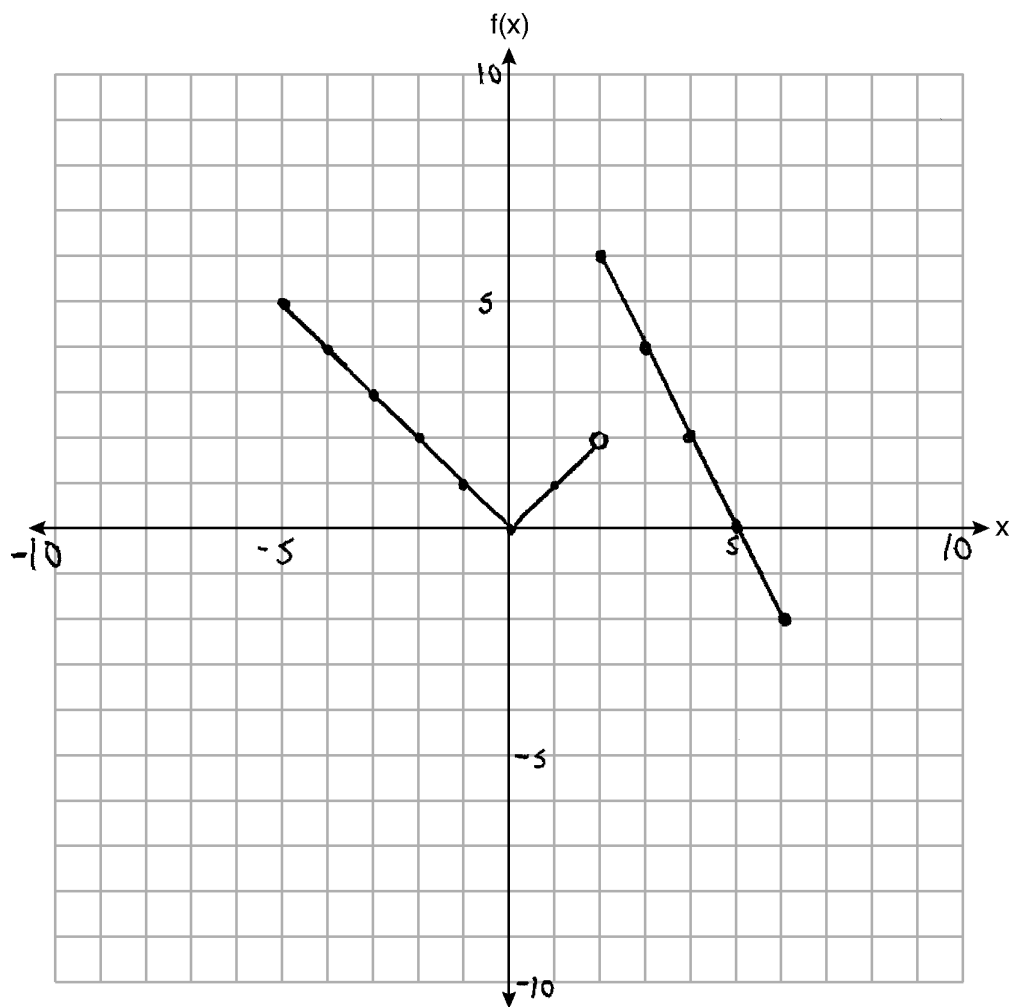**26** If $C = G - 3F$, find the trinomial that represents C when $F = 2x^2 + 6x - 5$ and $G = 3x^2 + 4$.

$$3\left(2x^2 + 6x - 5\right) = 6x^2 + 18x - 15$$
$$- \quad 3x^2 \qquad +4$$
$$\overline{\qquad\qquad\qquad\qquad}$$
$$3x^2 + 18x - 11$$

Score 0: The student did not subtract in the correct order and made an error when subtracting.

27 Graph the following piecewise function on the set of axes below.

$$f(x) = \begin{cases} |x|, & -5 \le x < 2 \\ -2x + 10, & 2 \le x \le 6 \end{cases}$$

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

27 Graph the following piecewise function on the set of axes below.

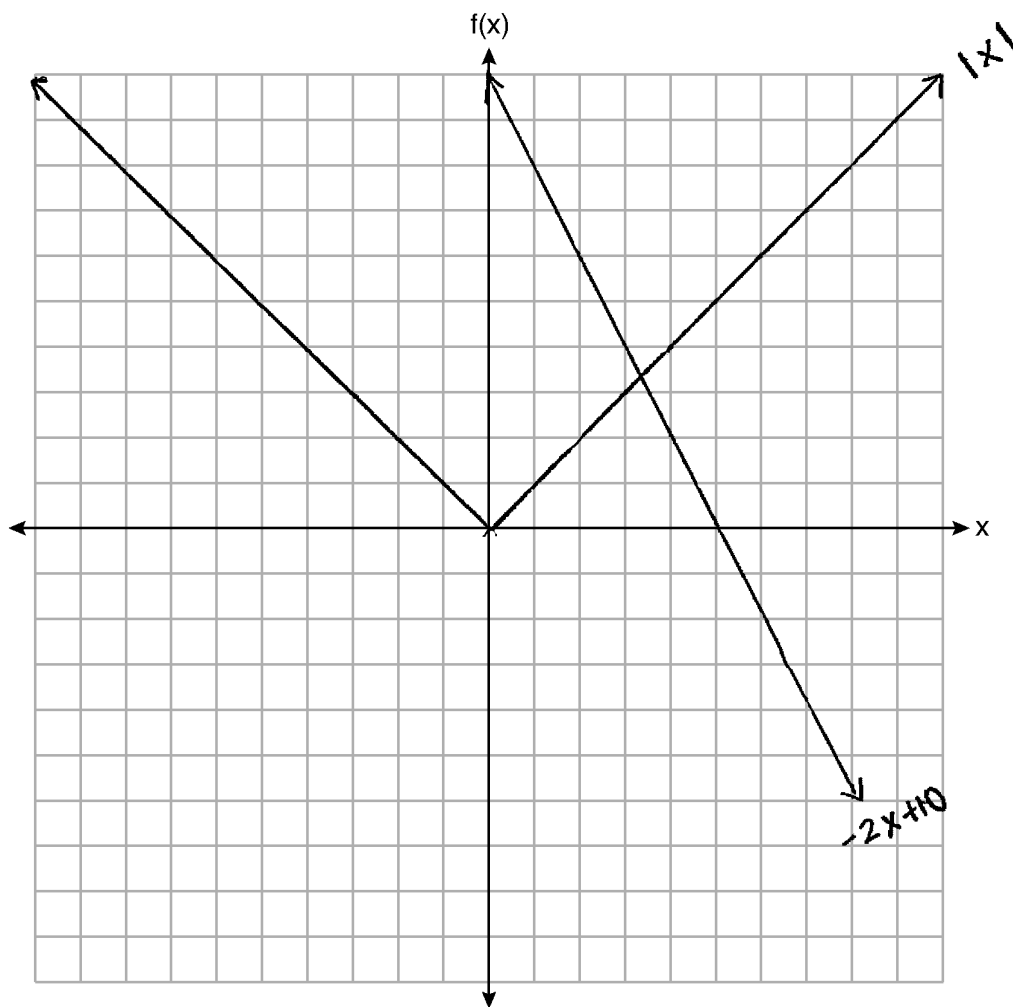$$f(x) = \begin{cases} |x|, & -5 \le x < 2 \\ -2x + 10, & 2 \le x \le 6 \end{cases}$$

Score 1: The student graphed both functions appropriately, but disregarded the domain restrictions.

27 Graph the following piecewise function on the set of axes below.

$$f(x) = \begin{cases} |x|, & -5 \le x < 2 \\ -2x + 10, & 2 \le x \le 6 \end{cases}$$

Score 1: The student graphed the endpoints of both functions incorrectly.

27 Graph the following piecewise function on the set of axes below.

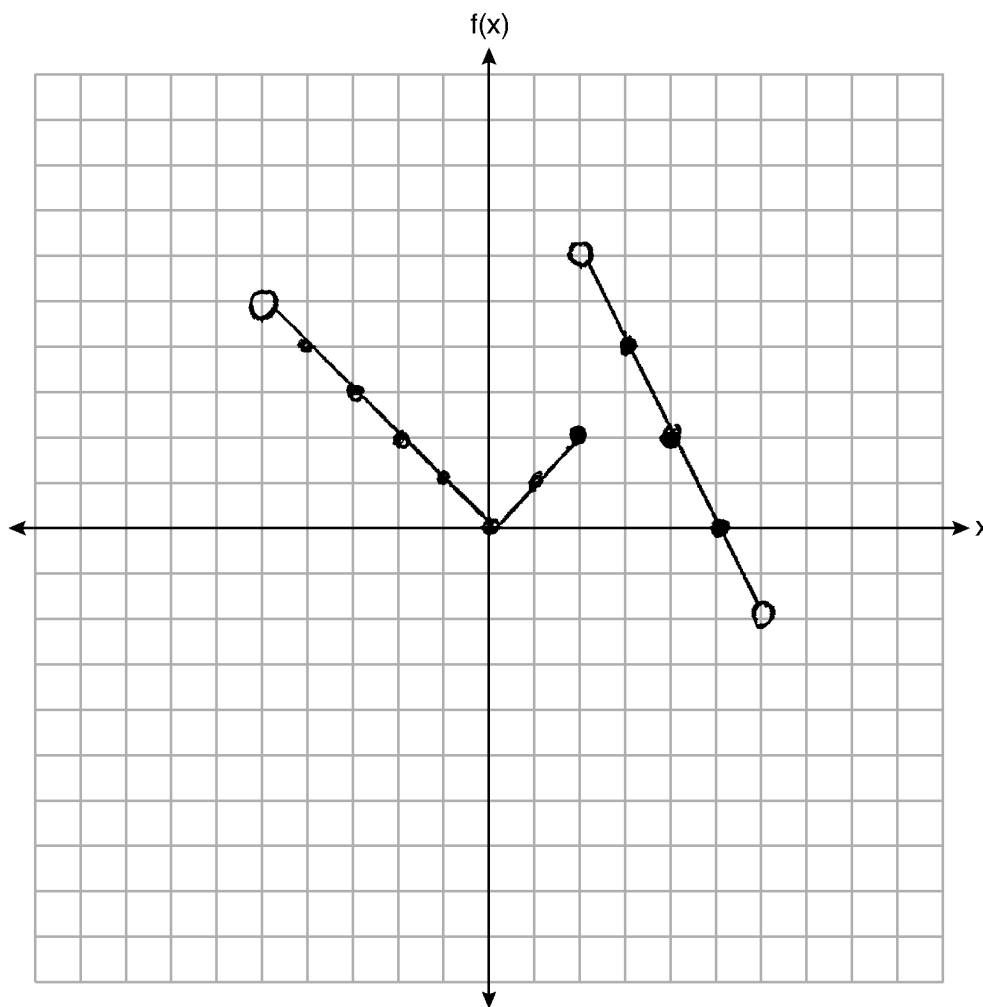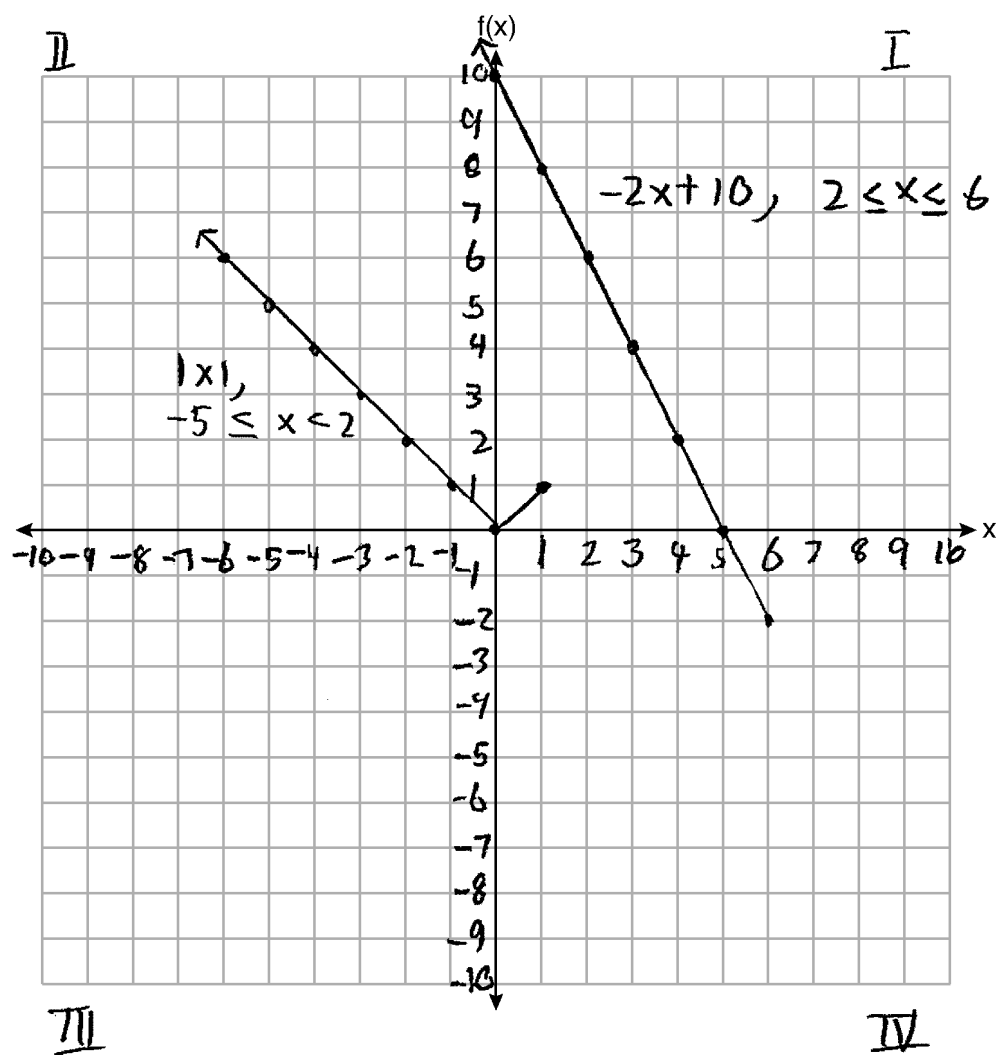$$f(x) = \begin{cases} |x|, & -5 \le x < 2 \\ -2x + 10, & 2 \le x \le 6 \end{cases}$$

$-2x+10, \quad 2 \le x \le 6$

$|x|,$
$-5 \le x < 2$

Score 0: The student made multiple graphing errors.

28 Solve $5x^2 = 180$ algebraically.

$$x^2 = 36$$

$$x = \pm 6$$

$$\boxed{x = +6, -6}$$

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

28 Solve $5x^2 = 180$ algebraically.

$$5x^2 - 180 = 0$$

$$x = \frac{0 \pm \sqrt{0 - 4(5)(-180)}}{2(5)}$$

$$x = \frac{\pm\sqrt{3600}}{10}$$

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

28 Solve $5x^2 = 180$ algebraically.

$$\frac{5x^2}{x} = \frac{180}{x}$$

$$\frac{5^2}{x} = \frac{180}{x}$$

$$25 \neq \frac{180}{x}$$

$$\frac{5x^2}{5} = \frac{180}{5}$$

$$\sqrt{x^2} = \sqrt{\frac{180}{5}}$$

$$x = \sqrt{\frac{180}{5}}$$

$$\boxed{x = \sqrt{36}}$$

Score 1: The student only found the positive value of x.

28 Solve $5x^2 = 180$ algebraically.

$$5x^2 - 180 = 0$$

$a = 5$
$b = 0$
$c = -180$

$$x = \frac{0 \pm \sqrt{0^2 - 4(5)(-180)}}{2(5)}$$

$$x = \frac{0 \pm \sqrt{360}}{10}$$

Score 1: The student substituted into the quadratic formula correctly, but no further correct work was shown.

28 Solve $5x^2 = 180$ algebraically.

$$\frac{\cancel{5}x^2}{\cancel{5}} = \frac{108}{5}$$

$$\sqrt{x^2} = \sqrt{36}$$

$$(x+6)^2 \quad or \quad (x+6)(x+6)$$

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

29 A blizzard occurred on the East Coast during January, 2016. Snowfall totals from the storm were recorded for Washington, D.C. and are shown in the table below.

Washington, D.C.	
Time	**Snow** (inches)
1 a.m.	1
3 a.m.	5
6 a.m.	11
12 noon	33
3 p.m.	36

(handwritten annotations to left of table: 1, 3, 6, 12, 15)

1:00   12:00   6:00   15:00

Which interval, 1 a.m. to 12 noon or 6 a.m. to 3 p.m., has the greatest rate of snowfall, in inches per hour? Justify your answer.

1:00 – 12:00   (1am–12noon)
(1, 1)
(12, 33)

$m = \dfrac{y_2 - y_1}{x_2 - x_1}$

$m = \dfrac{33 - 1}{12 - 1}$

$m = \dfrac{32}{11}$

$m = 2.\overline{90}$ in/hr

6:00 – 15:00 (6am – 3pm)
(6, 11)
(15, 36)

$m = \dfrac{y_2 - y_1}{x_2 - x_1}$

$m = \dfrac{36 - 11}{15 - 6}$

$m = \dfrac{25}{9}$

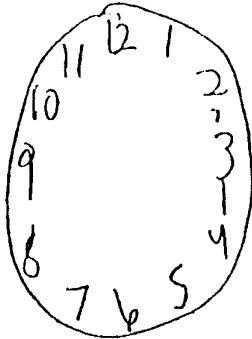$m = 2.7$ in/hr

[from 1 am – 12 noon]

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

29 A blizzard occurred on the East Coast during January, 2016. Snowfall totals from the storm were recorded for Washington, D.C. and are shown in the table below.

Washington, D.C.	
Time	**Snow** (inches)
1 a.m.	1
3 a.m.	5
6 a.m.	11
12 noon	33
3 p.m.	36

Which interval, 1 a.m. to 12 noon or 6 a.m. to 3 p.m. has the greatest rate of snowfall, in inches per hour? Justify your answer.

From 1am to 12 noon had the greater snowfall rate per hour

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

29 A blizzard occurred on the East Coast during January, 2016. Snowfall totals from the storm were recorded for Washington, D.C. and are shown in the table below.

Washington, D.C.	
Time	**Snow** (inches)
1 a.m.	1
3 a.m.	5
6 a.m.	11
12 noon	33
3 p.m.	36

Which interval, 1 a.m. to 12 noon or 6 a.m. to 3 p.m., has the greatest rate of snowfall, in inches per hour? Justify your answer.

$$\boxed{1\ AM - noon}$$

$$\frac{33-1}{12-1} = \frac{32}{11}$$

$$6AM - 3PM$$

$$\frac{36-11}{15-6} = \frac{25}{9}$$

$$\frac{32}{11} \qquad \frac{25}{9}$$

$$288 > 275$$

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

29 A blizzard occurred on the East Coast during January, 2016. Snowfall totals from the storm were recorded for Washington, D.C. and are shown in the table below.

Washington, D.C.	
Time	**Snow** (inches)
1 a.m.	1
3 a.m.	5
6 a.m.	11
12 noon	33
3 p.m.	36

Which interval, 1 a.m. to 12 noon or 6 a.m. to 3 p.m., has the greatest rate of snowfall, in inches per hour? Justify your answer.

$$\frac{33}{11} = 3 \text{ inches per hour}$$

$$\frac{36}{9} = 4 \text{ inches per hour}$$

From 6am to 3pm, there was the greater snowfall rate.

Score 1: The student used the accumulated amount of snow in determining the rate of snowfall during both intervals.

29 A blizzard occurred on the East Coast during January, 2016. Snowfall totals from the storm were recorded for Washington, D.C. and are shown in the table below.

Washington, D.C.	
Time	**Snow** (inches)
1 a.m.	1
3 a.m.	5
6 a.m.	11
12 noon	33
3 p.m.	36

11 hours

9 hours

32 in

25 in

Which interval, 1 a.m. to 12 noon or 6 a.m. to 3 p.m., has the greatest rate of snowfall, in inches per hour? Justify your answer.

$$\frac{32}{11} \approx 2.9$$

$$\frac{25}{9} \approx 2.8$$

Score 1: The student showed a correct justification, but did not indicate an interval.

29 A blizzard occurred on the East Coast during January, 2016. Snowfall totals from the storm were recorded for Washington, D.C. and are shown in the table below.

Washington, D.C.	
Time	**Snow** (inches)
1 a.m.	1
3 a.m.	5
6 a.m.	11
12 noon	33
3 p.m.	36

(handwritten annotations in right margin: 4, 6, 22, 3)

Which interval, 1 a.m. to 12 noon or 6 a.m. to 3 p.m., has the greatest rate of snowfall, in inches per hour? Justify your answer.

1 am to 12 noon

Score 0: The student did not give a justification.

30 The formula for the volume of a cone is $V = \frac{1}{3}\pi r^2 h$. Solve the equation for h in terms of V, r, and π.

$$\frac{3V}{\pi r^2} = \frac{\pi r^2 h}{\pi r^2}$$

$$\frac{3V}{\pi r^2} = h$$

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

30 The formula for the volume of a cone is $V = \frac{1}{3}\pi r^2 h$. Solve the equation for h in terms of V, r, and π.

$$\frac{V}{\frac{1}{3}\pi r^2} = h$$

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

30 The formula for the volume of a cone is $V = \frac{1}{3}\pi r^2 h$. Solve the equation for h in terms of V, r, and π.

$$V = \frac{\frac{1}{3}\pi r^2 h}{\frac{1}{3}\pi h}$$

$$\sqrt{\frac{V}{\frac{1}{3}\pi h}} = \sqrt{r^2}$$

$$\sqrt{\frac{V}{\frac{1}{3}\pi h}} = r$$

$$\boxed{\sqrt{\frac{V}{\frac{1}{3}\pi h}} = r}$$

Score 1: The student showed appropriate work to solve the formula for r.

30 The formula for the volume of a cone is $V = \frac{1}{3}\pi r^2 h$. Solve the equation for h in terms of V, r, and π.

$$(3)V = \frac{1}{3}\pi r^2 h\ (3)$$

$$\frac{3V}{\pi} = \frac{\pi r^2 h}{\pi}$$

$$\sqrt{\frac{3V}{\pi}} = \sqrt{r^2 h}$$

$$\sqrt{\frac{3V}{\pi}} = h$$

Score 0: The student made multiple errors involving the radical.

31 Given the recursive formula:

$$a_1 = 3$$
$$a_n = 2(a_{n-1} + 1)$$

State the values of a_2, a_3, and a_4 for the given recursive formula.

$$a_n = 2(a_{n-1} + 1)$$
$$a_2 = 2(3+1)$$
$$a_2 = 2(4)$$
$$\boxed{a_2 = 8}$$

$$a_n = 2(a_{n-1} + 1)$$
$$a_3 = 2(8+1)$$
$$a_3 = 2(9)$$
$$\boxed{a_3 = 18}$$

$$a_n = 2(a_{n-1} + 1)$$
$$a_4 = 2(18+1)$$
$$a_4 = 2(19)$$
$$\boxed{a_4 = 38}$$

The 3 next terms in the sequence are 8, 18, 38

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

31 Given the recursive formula:

$$a_1 = 3$$
$$a_n = 2(a_{n-1} + 1)$$

State the values of a_2, a_3, and a_4 for the given recursive formula.

$$8, 18, 38$$

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

31 Given the recursive formula:

$$a_1 = 3$$
$$a_n = 2(a_{n-1} + 1)$$

State the values of a_2, a_3, and a_4 for the given recursive formula.

Arithmetic sequence:

$$a_2 = 2(3+1)$$
$$a_2 = 8 \quad {}^{4}$$

$$a_3 = 2(8+1)$$
$${}_{9}$$
$$a_3 = 18$$

$$\{3, 8, 18\}$$

Score 1: The student stated the first three values in the sequence.

31 Given the recursive formula:

$$a_1 = 3$$
$$a_n = 2\left(a_{n-1} + 1\right)$$

State the values of a_2, a_3, and a_4 for the given recursive formula.

8 and 18

Score 1: The student stated a_2 and a_3 correctly.

31 Given the recursive formula:

$$a_1 = 3$$
$$a_n = 2(a_{n-1} + 1)$$

State the values of a_2, a_3, and a_4 for the given recursive formula.

$$a_1 = 3$$
$$a_2 = 2(3+1) = 7$$
$$a_3 = 2(7+1) = 15$$
$$a_4 = 2(15+1) = 31$$

Score 1: The student distributed incorrectly.

31 Given the recursive formula:

$$a_1 = 3$$
$$a_n = 2(a_{n-1} + 1)$$

State the values of a_2, a_3, and a_4 for the given recursive formula.

$a_2 = 2(3 - 1 + 1)$

$a_2 = 6 - 1 + 1$

$a_2 = 6$

$a_3 = 2(6 - 1 + 1)$

$a_3 = 12 - 1 + 1$

$a_3 = 12$

$a_4 = 2(12 - 1 + 1)$

$a_4 = 24 - 1 + 1$

$a_4 = 24$

Score 0: The student subtracted 1 from the a_{n-1} term and distributed incorrectly.

32 Determine and state the vertex of $f(x) = x^2 - 2x - 8$ using the method of completing the square.

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

$$f(x) = x^2 - 2x + 1 - 1 - 8$$

$$f(x) = (x - 1)^2 - 9$$

$$\boxed{(1, -9)}$$

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

32 Determine and state the vertex of $f(x) = x^2 - 2x - 8$ using the method of completing the square.

$$x^2 - 2x - 8 = 0$$
$$+8$$

$$x^2 - 2x = 8$$

$$C = \left(\frac{b}{2}\right)^2$$

$$x^2 - 2x + 1 = 9$$

$$C = \left(\frac{-2}{2}\right)^2$$

$$(x - 1)^2 = 9$$

$$C = 1$$

$$x - 1 = \pm 3$$

$$x = 1 + 3 \qquad x = 4$$
$$\text{or}$$
$$x = 1 - 3 \qquad x = -2$$

Score 1: The student used the method of completing the square to determine the zeros of $f(x)$.

32 Determine and state the vertex of $f(x) = x^2 - 2x - 8$ using the method of completing the square.

$$f(x) (x^2 - 2x + 1) - 1 - 8$$
$$f(x) = (x-1)^2 - 9$$
$$f(x) = \{1, -9\}$$

$$f(x) = \{1, -9\}$$

Score 1: The student showed correct work to find $f(x) = (x - 1)^2 - 9$, but the vertex is stated incorrectly.

32 Determine and state the vertex of $f(x) = x^2 - 2x - 8$ using the method of completing the square.

x	f(x)
-1	-5
0	-8
1	-9
2	-8
3	-8

$(1, -9)$

Score 1: The student found the correct vertex, but used a method other than completing the square.

32 Determine and state the vertex of $f(x) = x^2 - 2x - 8$ using the method of completing the square.

$$f(x) = x^2 - 2x - 8$$

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

$$
\begin{array}{ll}
x + 2 = 0 & \text{or} \quad x - 4 = 0 \\
-2 \;\; -2 & +4 \;\; +4 \\ \hline
x = -2 & x = 4
\end{array}
$$

Roots

$\{-2, 4\}$

Score 0: The student did not use the method of completing the square and did not state the vertex.

33 A school plans to have a fundraiser before basketball games selling shirts with their school logo. The school contacted two companies to find out how much it would cost to have the shirts made. Company *A* charges a $50 set-up fee and $5 per shirt. Company *B* charges a $25 set-up fee and $6 per shirt.

Write an equation for Company *A* that could be used to determine the total cost, *A*, when *x* shirts are ordered. Write a second equation for Company *B* that could be used to determine the total cost, *B*, when *x* shirts are ordered.

$$A = 5x + 50$$

$$B = 6x + 25$$

Determine algebraically and state the *minimum* number of shirts that must be ordered for it to be cheaper to use Company *A*.

$$5x + 50 = 6x + 25$$
$$-5x \qquad -5x$$

$$5(25) + 50 = 175$$

$$50 = x + 25$$
$$-25 \qquad -25$$

$$6(25) + 25 = 175$$

$$\boxed{x = 25}$$

Minimum of 26 Shirts

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

33 A school plans to have a fundraiser before basketball games selling shirts with their school logo. The school contacted two companies to find out how much it would cost to have the shirts made. Company *A* charges a $50 set-up fee and $5 per shirt. Company *B* charges a $25 set-up fee and $6 per shirt.

Write an equation for Company *A* that could be used to determine the total cost, *A*, when *x* shirts are ordered. Write a second equation for Company *B* that could be used to determine the total cost, *B*, when *x* shirts are ordered.

$$A = 50 + 5x$$
$$B = 25 + 6x$$

Determine algebraically and state the *minimum* number of shirts that must be ordered for it to be cheaper to use Company *A*.

$$50 + 5x < 25 + 6x$$
$$25 < x$$
$$\boxed{x = 26}$$

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

33 A school plans to have a fundraiser before basketball games selling shirts with their school logo. The school contacted two companies to find out how much it would cost to have the shirts made. Company *A* charges a $50 set-up fee and $5 per shirt. Company *B* charges a $25 set-up fee and $6 per shirt.

Write an equation for Company *A* that could be used to determine the total cost, *A*, when *x* shirts are ordered. Write a second equation for Company *B* that could be used to determine the total cost, *B*, when *x* shirts are ordered.

$$\text{Company } A = 50 + 5x$$

$$\text{Company } B = 25 + 6x$$

Determine algebraically and state the *minimum* number of shirts that must be ordered for it to be cheaper to use Company *A*.

$$50 + 5x < 25 + 6x$$
$$-25 \qquad -25$$

$$25 + 5x < +6x$$
$$-5x \quad -5x$$

$$25 < x$$

The minimum is
25 shirts

Score 3: The student showed correct algebraic work to find $x > 25$, but stated an incorrect minimum.

33 A school plans to have a fundraiser before basketball games selling shirts with their school logo. The school contacted two companies to find out how much it would cost to have the shirts made. Company *A* charges a $50 set-up fee and $5 per shirt. Company *B* charges a $25 set-up fee and $6 per shirt.

Write an equation for Company *A* that could be used to determine the total cost, *A*, when *x* shirts are ordered. Write a second equation for Company *B* that could be used to determine the total cost, *B*, when *x* shirts are ordered.

$$y = 50 + 5x$$

$$y = 25 + 6x$$

Determine algebraically and state the *minimum* number of shirts that must be ordered for it to be cheaper to use Company *A*.

26 Shirts

Company A = 180

Company B = 181

Score 2: The student wrote two appropriate equations, but not in terms of *A* and *B*, and 26 was stated.

33 A school plans to have a fundraiser before basketball games selling shirts with their school logo. The school contacted two companies to find out how much it would cost to have the shirts made. Company *A* charges a $50 set-up fee and $5 per shirt. Company *B* charges a $25 set-up fee and $6 per shirt.

Write an equation for Company *A* that could be used to determine the total cost, *A*, when *x* shirts are ordered. Write a second equation for Company *B* that could be used to determine the total cost, *B*, when *x* shirts are ordered.

$$y = {}^\$5x + {}^\$50$$
$$y = {}^\$6x + {}^\$25$$

Determine algebraically and state the *minimum* number of shirts that must be ordered for it to be cheaper to use Company *A*.

Minimum 10 shirts

$$5(2) + 50 = 60$$
$$5(3) + 50 = 65$$
$$5(4) + 50 = 70$$
$$5(5) + 50 = 75$$
$$5(6) + 50 = 80$$
$$5(7) + 50 = 85$$
$$5(8) + 50 = 90$$
$$5(10) + 50 = 95$$
$$5(10) + 50 = 100$$

Score 1: The student wrote two appropriate equations, but not in terms of *A* and *B*.

33 A school plans to have a fundraiser before basketball games selling shirts with their school logo. The school contacted two companies to find out how much it would cost to have the shirts made. Company *A* charges a $50 set-up fee and $5 per shirt. Company *B* charges a $25 set-up fee and $6 per shirt.

Write an equation for Company *A* that could be used to determine the total cost, *A*, when *x* shirts are ordered. Write a second equation for Company *B* that could be used to determine the total cost, *B*, when *x* shirts are ordered.

$$Company\ A = 50f + 5s$$
$$Company\ B = 25f + 6s$$

Determine algebraically and state the *minimum* number of shirts that must be ordered for it to be cheaper to use Company *A*.
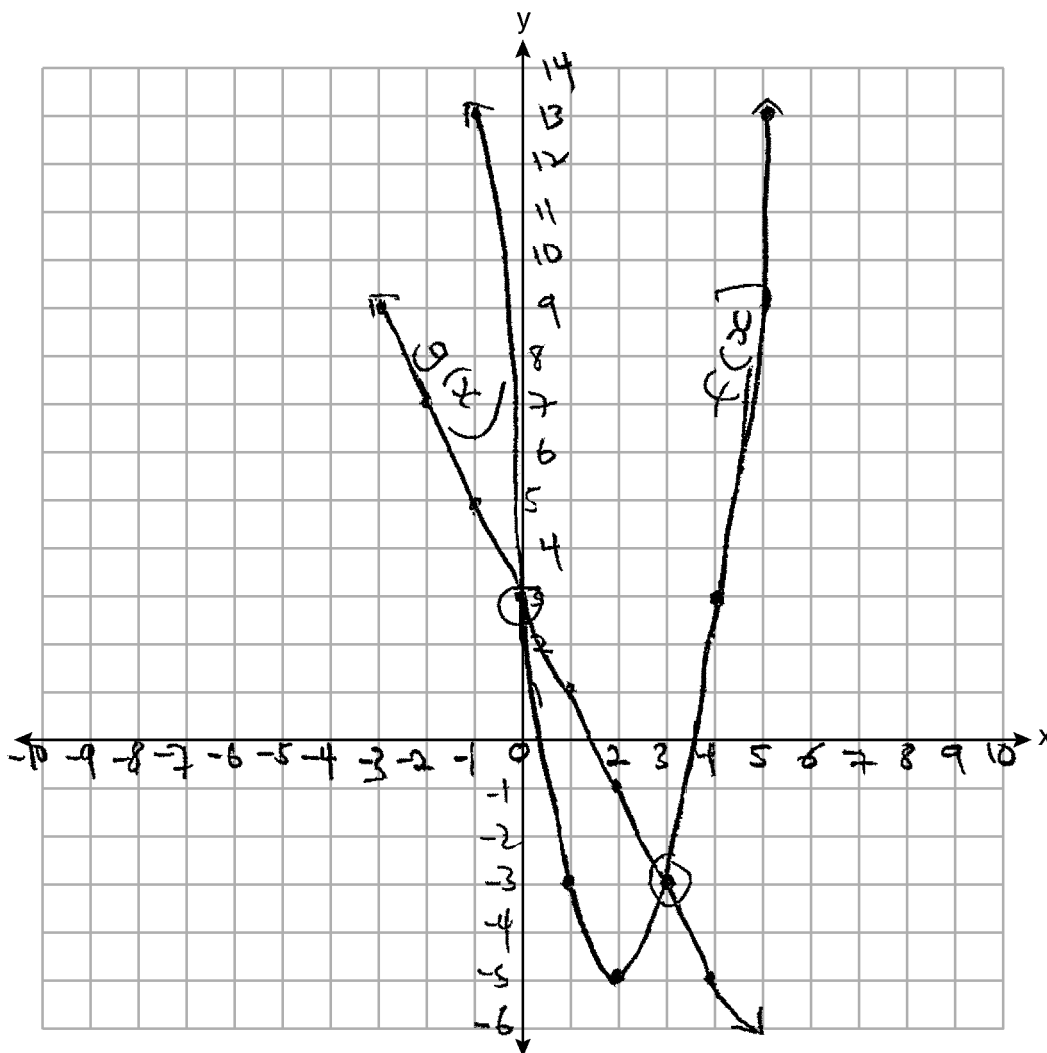
6 shirts

Score 0: The student did not show any correct work.

34 Graph $y = f(x)$ and $y = g(x)$ on the set of axes below.

$$f(x) = 2x^2 - 8x + 3$$
$$g(x) = -2x + 3$$

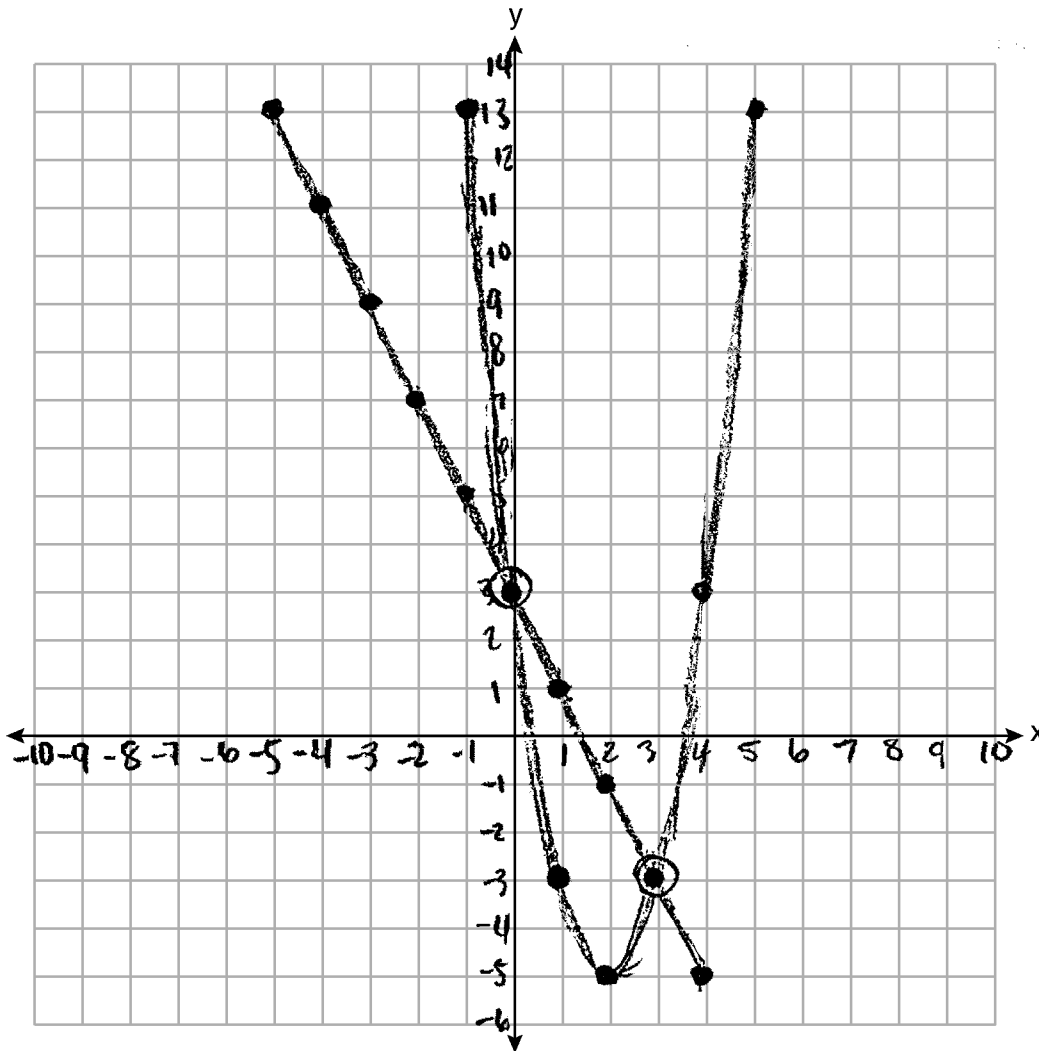Determine and state all values of x for which $f(x) = g(x)$.

$$0, 3$$

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

34 Graph $y = f(x)$ and $y = g(x)$ on the set of axes below.

$$f(x) = 2x^2 - 8x + 3$$
$$g(x) = -2x + 3$$

Determine and state all values of x for which $f(x) = g(x)$.
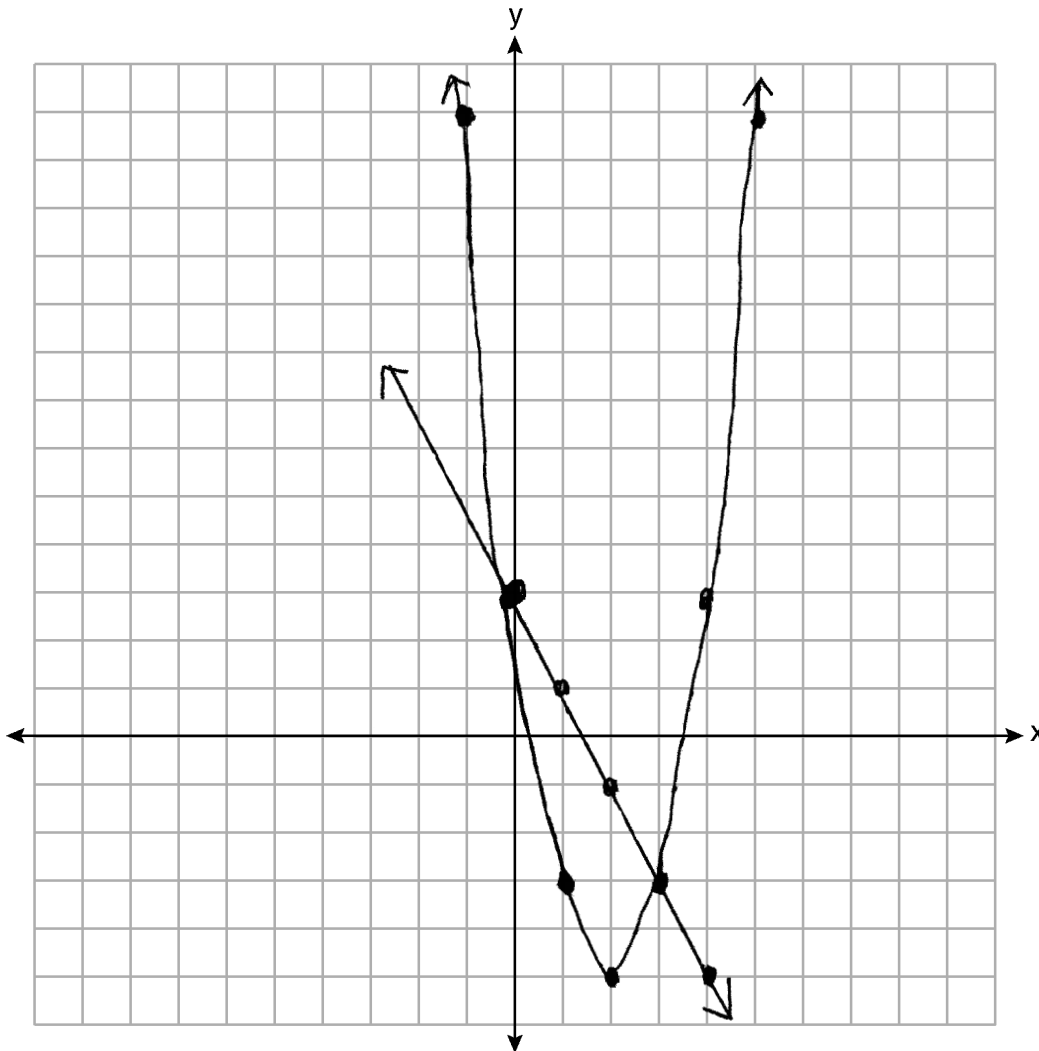
$f(x) = g(x)$ when $X = 0$ and 3

Score 3: The student did not use arrows or the entire grid when graphing the functions.

34 Graph $y = f(x)$ and $y = g(x)$ on the set of axes below.

$$f(x) = 2x^2 - 8x + 3$$
$$g(x) = -2x + 3$$

Determine and state all values of x for which $f(x) = g(x)$.

$$(3, 0)$$

Score 2: The student graphed both functions correctly, but no further correct work was shown.

34 Graph $y = f(x)$ and $y = g(x)$ on the set of axes below.

$$f(x) = 2x^2 - 8x + 3$$
$$g(x) = -2x + 3$$

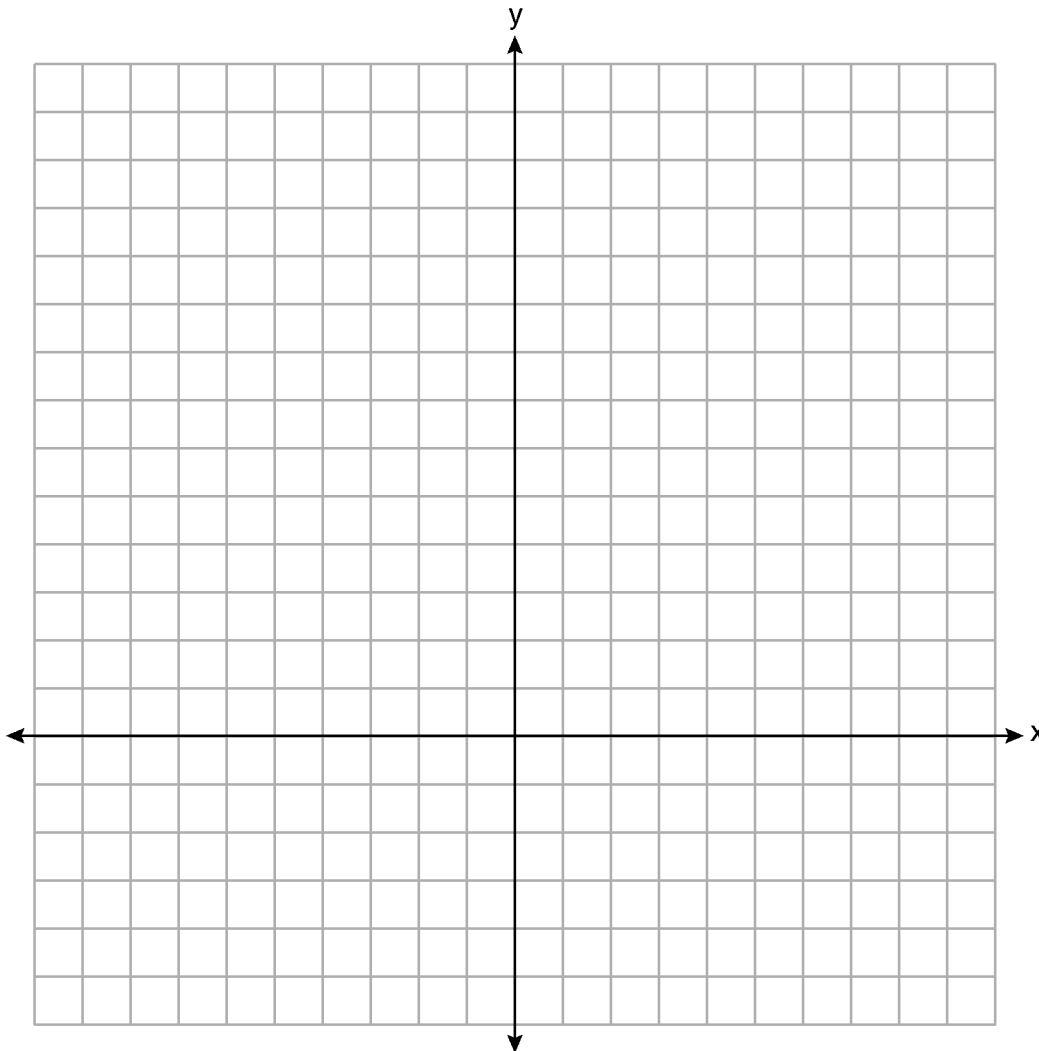Determine and state all values of x for which $f(x) = g(x)$.

$$2x^2 - 8x + 3 = -2x + 3$$
$$+2x \quad -3 \qquad +2x \quad -3$$
$$2x^2 - 6x = 0$$
$$2x(x-3) = 0$$
$$x = 3$$

Score 1: The student showed correct algebraic work to find $x = 3$.

34 Graph $y = f(x)$ and $y = g(x)$ on the set of axes below.

$$f(x) = 2x^2 - 8x + 3$$
$$g(x) = -2x + 3$$

x	f(x)
-3	45
-2	27
-1	13
0	3
1	3
2	3
3	-3

x	g(x)
-3	9
-2	7
-1	5
0	3
1	1
2	-1

Determine and state all values of x for which $f(x) = g(x)$.

$$(0, 3)$$

Score 0: The student graphed both functions incorrectly and stated only one point of intersection.

35 The table below shows the number of hours ten students spent studying for a test and their scores.

Hours Spent Studying (x)	0	1	2	4	4	4	6	6	7	8
Test Scores (y)	35	40	46	65	67	70	82	88	82	95

Write the linear regression equation for this data set. Round all values to the *nearest hundredth*.

$$y = 7.79x + 34.27$$

State the correlation coefficient of this line, to the *nearest hundredth*.

$$r = 0.98$$

Explain what the correlation coefficient suggests in the context of the problem.

The correlation coefficient suggests that there is a strong correlation between the hours spent studying and test scores.

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

35 The table below shows the number of hours ten students spent studying for a test and their scores.

Hours Spent Studying (x)	0	1	2	4	4	4	6	6	7	8
Test Scores (y)	35	40	46	65	67	70	82	88	82	95

Write the linear regression equation for this data set. Round all values to the *nearest hundredth*.

$$y = 7.79x + 34.27$$

State the correlation coefficient of this line, to the *nearest hundredth*.

$$r = .9815741571$$

$$r = .98$$

Explain what the correlation coefficient suggests in the context of the problem.

The correlation coefficient suggests that there is a strong positive correlation of the data because it is close to 1.

Score 3: The student did not write the explanation in context.

35 The table below shows the number of hours ten students spent studying for a test and their scores.

Hours Spent Studying (x)	0	1	2	4	4	4	6	6	7	8
Test Scores (y)	35	40	46	65	67	70	82	88	82	95

Write the linear regression equation for this data set. Round all values to the *nearest hundredth*.

$$y = ax + b \qquad a = 7.79$$
$$b = 34.27$$

State the correlation coefficient of this line, to the *nearest hundredth*.

Explain what the correlation coefficient suggests in the context of the problem.

Score 2:   The student wrote a correct linear regression equation.

35 The table below shows the number of hours ten students spent studying for a test and their scores.

Hours Spent Studying (x)	0	1	2	4	4	4	6	6	7	8
Test Scores (y)	35	40	46	65	67	70	82	88	82	95

Write the linear regression equation for this data set. Round all values to the *nearest hundredth*.

$$7.79x + 34.27.$$

State the correlation coefficient of this line, to the *nearest hundredth*.

$$r = .98$$

Explain what the correlation coefficient suggests in the context of the problem.

The closer to one the higher the test scores and hours spent studying.

Score 2: The student wrote an expression and did not explain the correlation coefficient correctly.

35 The table below shows the number of hours ten students spent studying for a test and their scores.

Hours Spent Studying (x)	0	1	2	4	4	4	6	6	7	8
Test Scores (y)	35	40	46	65	67	70	82	88	82	95

Write the linear regression equation for this data set. Round all values to the *nearest hundredth*.

$$y = ax + b$$

$$y = 7.8x + 34.3$$

$$r = 1$$

State the correlation coefficient of this line, to the *nearest hundredth*.

? not sure what is

$$r = .98$$

$$r^2 = .96$$

Explain what the correlation coefficient suggests in the context of the problem.

Score 1: The student made a rounding error when writing the linear regression equation and did not indicate which value was the correlation coefficient.

35 The table below shows the number of hours ten students spent studying for a test and their scores.

Hours Spent Studying (x)	0	1	2	4	4	4	6	6	7	8
Test Scores (y)	35	40	46	65	67	70	82	88	82	95

Write the linear regression equation for this data set. Round all values to the *nearest hundredth*.

$$y = .35x + 0$$

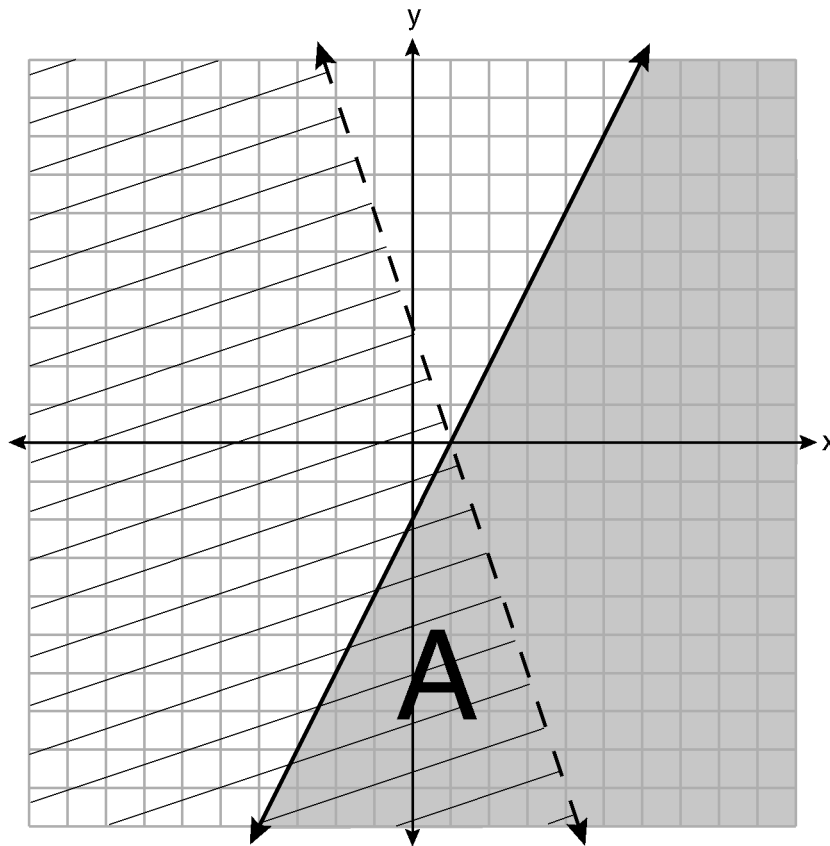State the correlation coefficient of this line, to the *nearest hundredth*.

.96

Explain what the correlation coefficient suggests in the context of the problem.

The correlation suggests that their is a positive correlation in time spent studying for thest and their grades.

Score 0: The student did not indicate "strong" when explaining their correlation coefficient.

36 A system of inequalities is graphed on the set of axes below.

State the system of inequalities represented by the graph.

$$y \leq 2x - 2$$
$$y < -3x + 3$$

State what region *A* represents.
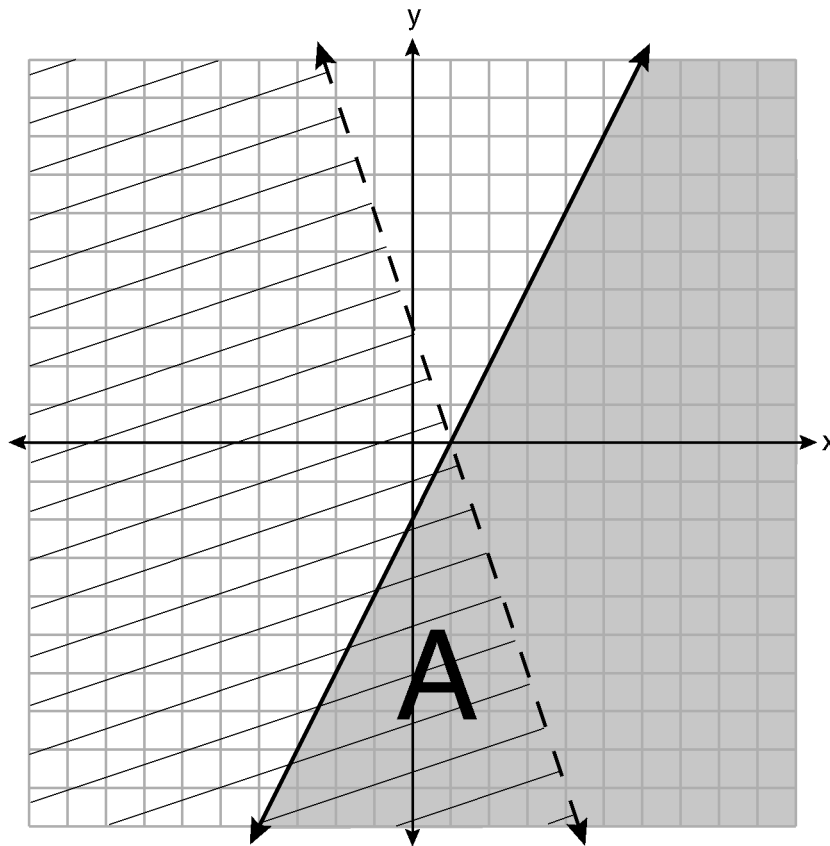
The Solution to the System

State what the entire gray region represents.

Solution to $y \leq 2x - 2$ only

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

36 A system of inequalities is graphed on the set of axes below.

State the system of inequalities represented by the graph.

$$y = 2x - 2$$
$$y = -3x + 3$$

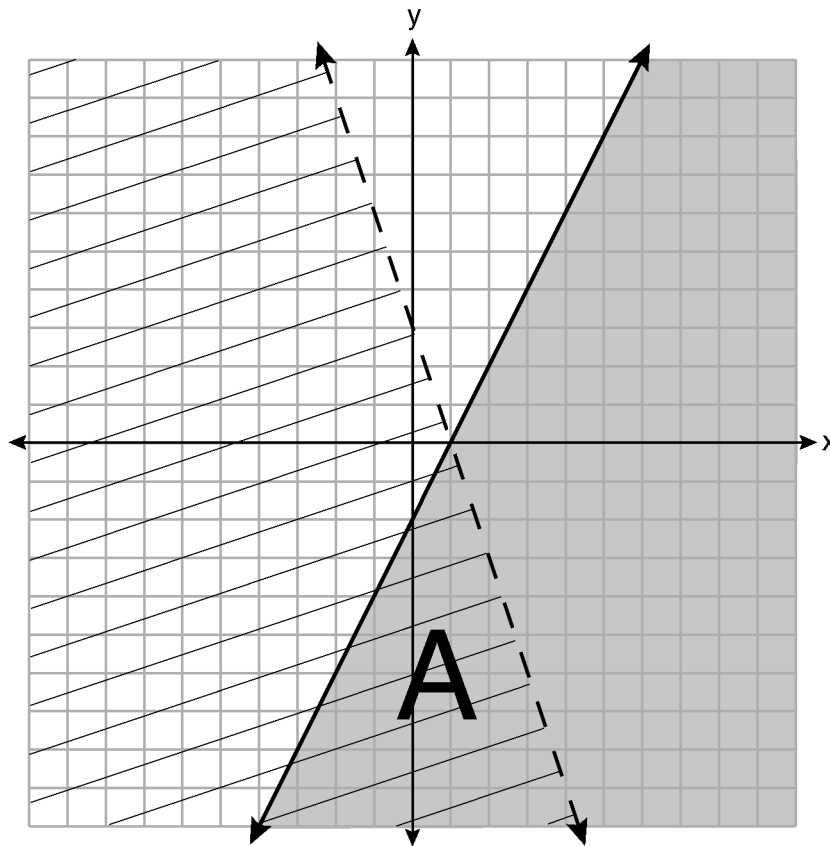State what region *A* represents.

The solution set for the system

State what the entire gray region represents.

The solution for $y = 2x - 2$

Score 3: The student wrote equations instead of inequalities.

36 A system of inequalities is graphed on the set of axes below.

State the system of inequalities represented by the graph.

① . $2x - 2 \leq 1$

② $\angle$

State what region *A* represents.

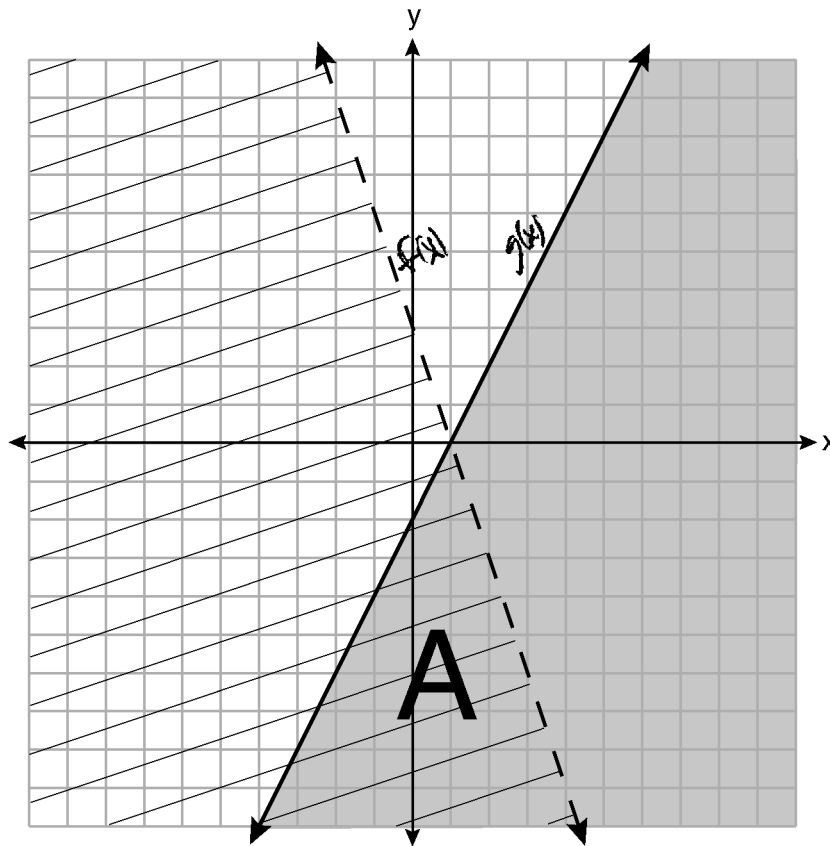Region A represents the solution set shared by both inequalities

State what the entire gray region represents.

It represents the solution set of one of the inequalities

Score 2: The student correctly stated what each of the two regions represent.

36 A system of inequalities is graphed on the set of axes below.

State the system of inequalities represented by the graph.

$$f(x) > 3x + 3$$
$$g(x) \le 2x - 2$$

State what region A represents.

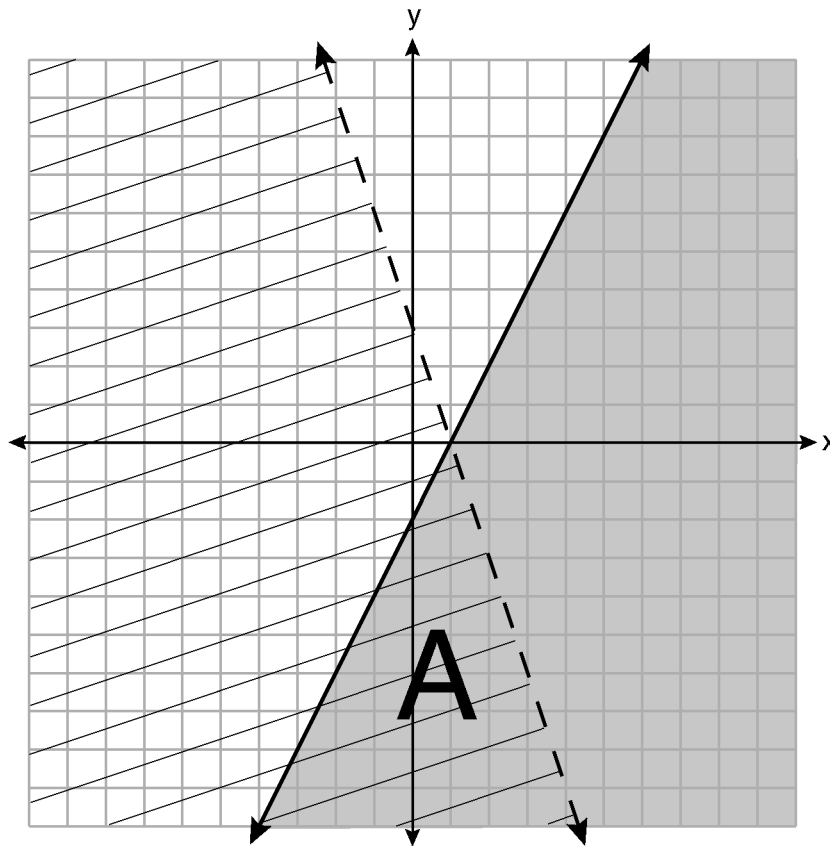It represents the area in which he systems equal each other

State what the entire gray region represents.

It represents the values which make up that system.

Score 1: The student wrote one correct inequality.

36 A system of inequalities is graphed on the set of axes below.

State the system of inequalities represented by the graph.

State what region *A* represents.

All of the points That work with the equations

State what the entire gray region represents.

Which points do not work

Score 0: The student did not show any correct work.

37 When visiting friends in a state that has no sales tax, two families went to a fast-food restaurant for lunch. The Browns bought 4 cheeseburgers and 3 medium fries for $16.53. The Greens bought 5 cheeseburgers and 4 medium fries for $21.11.

Using c for the cost of a cheeseburger and f for the cost of medium fries, write a system of equations that models this situation.

$$4c + 3f = 16.53$$
$$5c + 4f = 21.11$$

The Greens said that since their bill was $21.11, each cheeseburger must cost $2.49 and each order of medium fries must cost $2.87 each. Are they correct? Justify your answer.

$$5c + 4f = 21.11$$
$$5(2.49) + 4(2.87) = 21.11$$
$$12.45 + 11.48 = 23.93$$
$$\text{No, } 23.93 \text{ does not} = 21.11$$

Using your equations, algebraically determine both the cost of one cheeseburger and the cost of one order of medium fries.

$$4(4c + 3f = 16.53)$$
$$3(5c + 4f = 21.11)$$

$$16c + 12f = 66.12$$
$$-(15c + 12f = 63.33)$$
$$\overline{\qquad c \qquad = 2.79}$$

$$5(2.79) + 4f = 21.11$$
$$13.95 + 4f = 21.11$$
$$4f = 7.16$$
$$f = 1.79$$

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

37 When visiting friends in a state that has no sales tax, two families went to a fast-food restaurant for lunch. The Browns bought 4 cheeseburgers and 3 medium fries for $16.53. The Greens bought 5 cheeseburgers and 4 medium fries for $21.11.

Using c for the cost of a cheeseburger and f for the cost of medium fries, write a system of equations that models this situation.

$$5c + 4f = 21$$
$$4c + 3f = 16.53$$

The Greens said that since their bill was $21.11, each cheeseburger must cost $2.49 and each order of medium fries must cost $2.87 each. Are they correct? Justify your answer.

$$B = 4c + 3f = 16.53 \quad G = 5c + 4f = 21.11$$

$$5c + 4f = 21.11$$

$$5(2.49) + 4(2.87) \neq 21.11$$

The Green's is incorrect because when I plugged it into the equation $5c+4f=21.11$, it was not equivalent.

Using your equations, algebraically determine both the cost of one cheeseburger and the cost of one order of medium fries.

$$3(\ 5c + 4f = 21 \ ) \ 3$$
$$-4(\ 4c + 3f = 16.53) \ -4$$

$$15c + 12f = 63$$
$$-16c - 12f = -66.12$$
$$\overline{\qquad\qquad\qquad}$$
$$-1c = -3.12$$
$$\overline{-1 \qquad -1}$$
$$c = 3.12$$

$$4(3.12) + 3f = 16.53$$
$$12.48 + 3f = 16.53$$
$$-12.48 \qquad -12.48$$
$$\overline{\qquad\qquad\qquad}$$
$$\frac{3f}{3} = \frac{4.05}{3}$$
$$f = 1.35$$

$3.12 was the cost for cheesburgers | $1.35 was the cost for fries

Score 5: The student wrote one incorrect equation, but solved the system appropriately.

37 When visiting friends in a state that has no sales tax, two families went to a fast-food restaurant for lunch. The Browns bought 4 cheeseburgers and 3 medium fries for $16.53. The Greens bought 5 cheeseburgers and 4 medium fries for $21.11.

Using c for the cost of a cheeseburger and f for the cost of medium fries, write a system of equations that models this situation.

$$4c + 3f = 16.53$$
$$5c + 4f = 21.11$$

The Greens said that since their bill was $21.11, each cheeseburger must cost $2.49 and each order of medium fries must cost $2.87 each. Are they correct? Justify your answer.

$$5(2.49) = 12.45$$
$$4(2.87) = \frac{11.48}{\$23.93}$$

The prices are incorrect because they don't add to $21.11

Using your equations, algebraically determine both the cost of one cheeseburger and the cost of one order of medium fries.

$$4[4c + 3f = 16.53]$$
$$-3[5c + 4f = 21.11]$$

$$16c + 12f = 66.12$$
$$+ \quad -15c - 12f = -63.33$$
$$\overline{}$$
$$c = 2.79$$

Cheeseburgers cost $2.79 each.

Score 5: The student showed correct work, but only found the cost of one cheeseburger.

37 When visiting friends in a state that has no sales tax, two families went to a fast-food restaurant for lunch. The Browns bought 4 cheeseburgers and 3 medium fries for $16.53. The Greens bought 5 cheeseburgers and 4 medium fries for $21.11.

Using c for the cost of a cheeseburger and f for the cost of medium fries, write a system of equations that models this situation.

Let x = cheeseburger $16.53 = 4x+3y
     y = fries $21.11 = 5x+4y

The Greens said that since their bill was $21.11, each cheeseburger must cost $2.49 and each order of medium fries must cost $2.87 each. Are they correct? Justify your answer.

```
  2.49      2.87
x    5    x   4
―――――     ―――――
 12.45     11.48

12.45+11.48 = 23.93
```

They are incorrect because when you multiply $2.49 by 5 cheeseburgers and $2.87 by 4 fries. You'll get $12.45 and $11.48. Then you add them and get the total of $23.93 which isn't the bill's amount.

Using your equations, algebraically determine both the cost of one cheeseburger and the cost of one order of medium fries.

```
4(16.53 = 4x+3y) → 66.12 = 4x +12y
-3(21.11 = 5x+4y) → -63.33 = -15x-12y
                    ―――――――――――――
                       2.79 = 19x
                       ――    ――
                       19    19
                    0.146842053 = x
                    0.15 = x
```

```
21.11 = 5x+4y
21.11 = 5(0.15) +4y
21.11 = 0.75 +4y
-.75 -  .75
―――――――――――
  20.36 = 4y
  ――     ――
  4      4
  5.09 = y
```

A cheeseburger cost $0.15
A medium fry cost $5.09

37 When visiting friends in a state that has no sales tax, two families went to a fast-food restaurant for lunch. The Browns bought 4 cheeseburgers and 3 medium fries for $16.53. The Greens bought 5 cheeseburgers and 4 medium fries for $21.11.

Using c for the cost of a cheeseburger and f for the cost of medium fries, write a system of equations that models this situation.

$$5c + 4f = 21.11$$
$$4c + 3f = 16.53$$

The Greens said that since their bill was $21.11, each cheeseburger must cost $2.49 and each order of medium fries must cost $2.87 each. Are they correct? Justify your answer.

$$2.49(5) + 2.87(4) =$$

No, the price would have come out to 23.93 $ $11.48 + 12.45 = 23.93$

Using your equations, algebraically determine both the cost of one cheeseburger and the cost of one order of medium fries.

$$5c + 4f = 21.11$$
$$-4c - 3f = -16.53$$
$$\overline{}$$
$$c + f = 4.58$$

Score 4:   The student only found the sum of one cheeseburger and one order of medium fries.

37 When visiting friends in a state that has no sales tax, two families went to a fast-food restaurant for lunch. The Browns bought 4 cheeseburgers and 3 medium fries for $16.53. The Greens bought 5 cheeseburgers and 4 medium fries for $21.11.

Using c for the cost of a cheeseburger and f for the cost of medium fries, write a system of equations that models this situation.

$$5c + 4f = 21.11$$

$$+4c + 3f = 16.53$$

The Greens said that since their bill was $21.11, each cheeseburger must cost $2.49 and each order of medium fries must cost $2.87 each. Are they correct? Justify your answer.

$$5(2.49) + 4(2.87) = 23.93$$

No, the total would have been $23.93 instead of 21.11

Using your equations, algebraically determine both the cost of one cheeseburger and the cost of one order of medium fries.

$$9c + 7f = 37.64$$

Score 3: The student wrote two correct equations and a correct justification.

37 When visiting friends in a state that has no sales tax, two families went to a fast-food restaurant for lunch. The Browns bought 4 cheeseburgers and 3 medium fries for $16.53. The Greens bought 5 cheeseburgers and 4 medium fries for $21.11.

Using c for the cost of a cheeseburger and f for the cost of medium fries, write a system of equations that models this situation.

$$3c + 4f = 16.53$$
$$5c + 4f = 21.11$$

The Greens said that since their bill was $21.11, each cheeseburger must cost $2.49 and each order of medium fries must cost $2.87 each. Are they correct? Justify your answer.

$$5(2.49) + 4(2.87) = 21.11$$
$$12.45 + 11.48 = 23.93 \quad No$$

Using your equations, algebraically determine both the cost of one cheeseburger and the cost of one order of medium fries.

Score 2: The student wrote one correct equation and gave a correct justification.

37 When visiting friends in a state that has no sales tax, two families went to a fast-food restaurant for lunch. The Browns bought 4 cheeseburgers and 3 medium fries for $16.53. The Greens bought 5 cheeseburgers and 4 medium fries for $21.11.

Using c for the cost of a cheeseburger and f for the cost of medium fries, write a system of equations that models this situation.

$$4 \times f + 5 \times c \geq 21.11$$

The Greens said that since their bill was $21.11, each cheeseburger must cost $2.49 and each order of medium fries must cost $2.87 each. Are they correct? Justify your answer.

$$4 \times 2.87 = 11.48$$
$$5 \times 2.49 = \underline{12.45}$$
$$23.93$$

No, because it does not add up

Using your equations, algebraically determine both the cost of one cheeseburger and the cost of one order of medium fries.

Cost of one cheeseburger = 4.dollars

Cost of one medium frie= 5.dollars

Score 1: The student gave a correct justification.

37 When visiting friends in a state that has ~~no sales tax~~, two families went to a fast-food restaurant for lunch. The Browns bought 4 cheeseburgers and 3 medium fries for \$16.53. The Greens bought 5 cheeseburgers and 4 medium fries for \$21.11.

Using c for the cost of a cheeseburger and f for the cost of medium fries, write a system of equations that models this situation.

$$9c + 7f = 37.64$$

The Greens said that since their bill was \$21.11, each cheeseburger must cost \$2.49 and each order of medium fries must cost \$2.87 each. Are they correct? Justify your answer.

No, according to a calculator, the total would be \$23.93

Using your equations, algebraically determine both the cost of one cheeseburger and the cost of one order of medium fries.

$$9c + 7f = 37.64$$

Score 0: The student did not justify the \$23.93, and no further correct work was shown.