

Final Exam Review

Chapter 2a – Trigonometry - Outcome 20.4

Level 2

1. Sketch an angle in standard position with each given measure.

a) 24° b) 104°

c) 204° d) 304°

2. State the reference angle for each angle in standard position.

a) 55° b) 155° c) 255° d) 355°

3. Determine the measure of the three other angles in standard position, $0^\circ < \theta < 360^\circ$, that have a reference angle of

a) 40° b) 72° c) 88° d) 3°

4. Complete the table. Determine the measure of each angle in standard position given its reference angle and the quadrant in which the terminal arm lies.

	Reference Angle	Quadrant	Angle in Standard Position
a)	30°	II	
b)	45°	III	
c)	60°	IV	

5. Determine if the pair of angles have the same reference angle.

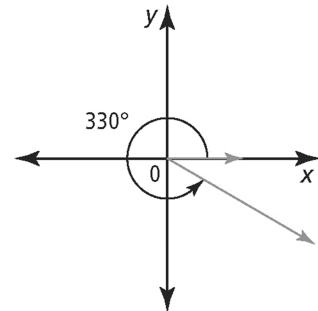
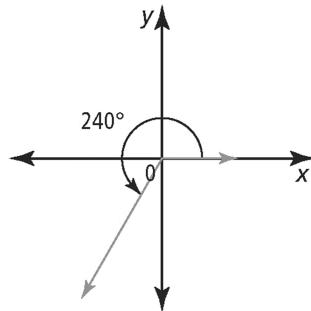
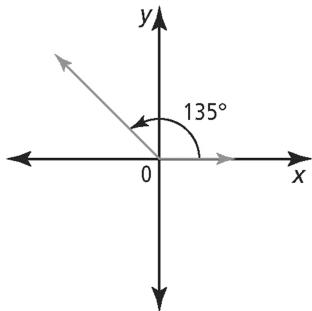
a) $50^\circ, 140^\circ$ b) $200^\circ, 290^\circ$

c) $216^\circ, 324^\circ$

d) $91^\circ, 181^\circ$

Level 3

6. Determine the exact values of the sine, cosine, and tangent ratios for each angle.



7. Without using a calculator, state whether each ratio is positive or negative.

a) $\sin 100^\circ$

b) $\cos 200^\circ$

c) $\tan 300^\circ$

d) $\sin 350^\circ$

8. An angle is in standard position with its terminal arm in the stated quadrant. Determine the exact values for the other two primary trigonometric ratios for each.

a) $\sin \theta = \frac{-3}{5}$; quadrant III

b) $\cos \theta = \frac{2}{3}$; quadrant IV

c) $\tan \theta = \frac{-5}{12}$; quadrant II

9. Solve each equation, for $0^\circ \leq \theta < 360^\circ$. Use a diagram involving a special right triangle.

a) $\sin \theta = \frac{-1}{\sqrt{2}}$

b) $\tan \theta = \frac{1}{\sqrt{3}}$

c) $\cos \theta = \frac{\sqrt{3}}{2}$

d) $\sin \theta = -1$

10. Solve each equation, for $0^\circ \leq \theta < 360^\circ$.

a) $\sin \theta = 0.7760$

b) $\cos \theta = -0.8090$

c) $\tan \theta = -0.9004$

d) $\sin \theta = -0.9848$

11. Determine the exact values for sine, cosine and tangent for each angle below. Show your work

a) 225°

b) 150°

c) 300°

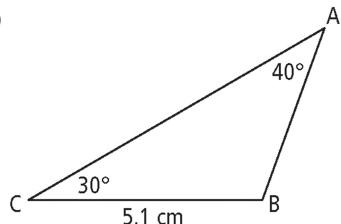
d) 30°

Chapter 2b – Sine and Cosine Law – Outcome 20.5

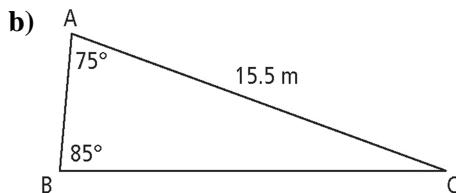
Level 2

1. Determine the length of AB in each triangle.

a)

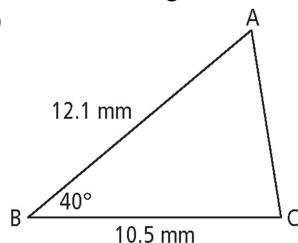


b)

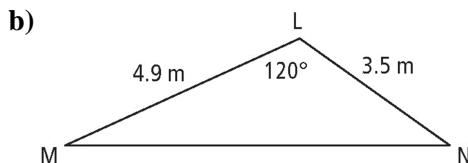


2. Determine the length of the unknown side of each triangle.

a)

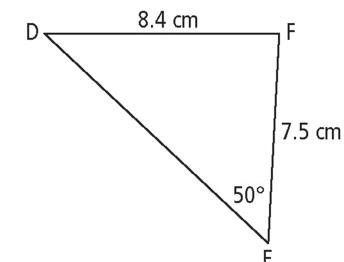


b)

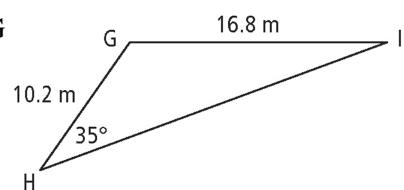


3. Determine the measure of the indicated angle.

a) $\angle D$

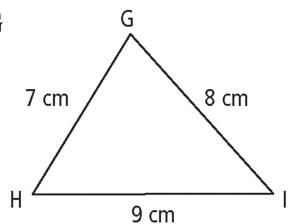


b) $\angle G$

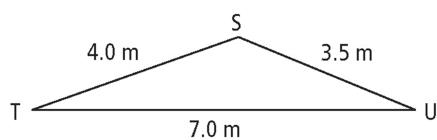


4. Determine the measure of the indicated angle.

a) $\angle G$



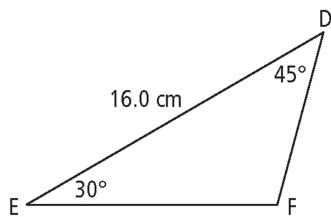
b) $\angle T$



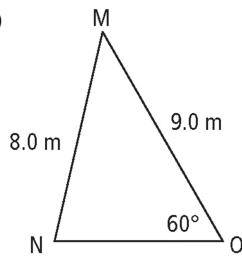
Level 3

5. Solve each triangle by determining the unknown sides and angles.

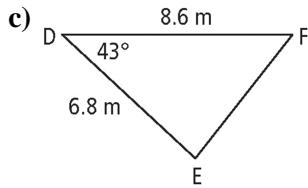
a)



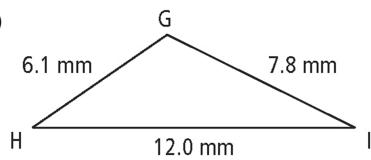
b)



c)



d)



6. Sketch each triangle. Then, determine the unknown side and angles. If two solutions are possible, give both.

a) In $\triangle ABC$, $AB = 15$ m, $BC = 5$ m, and $\angle A = 20^\circ$.

b) In $\triangle PQR$, $PQ = 12.5$ cm, $QR = 13.0$ cm, and $\angle P = 103^\circ$.

c) In $\triangle DEF$, $DE = 8.0$ cm, $EF = 6.0$ cm, and $\angle D = 40^\circ$.

d) In $\triangle RST$, $RS = 4.3$ mm, $ST = 4.0$ mm, and $\angle R = 65^\circ$.

Chapter 3a – Outcome 20.7a

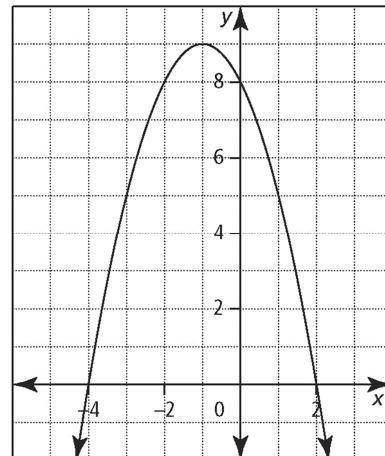
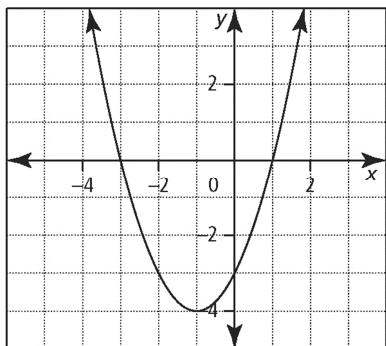
Level 2

1. Complete the following table

Function	Vertex	Width (normal, narrow or wide)	Direction (Concave up or Concave down)	Axis of Symmetry
$y = -(x + 4)^2 + 5$				
$y = \frac{2}{3}(x - 8)^2 + 4$				
$y = 3(x - 2)^2$				
$y = -\frac{5}{9}(x + 6)^2$				
$y = -2.5(x)^2 - 3$				

2. For each graph, identify the following:

- the coordinates of the vertex
- the equation of the axis of symmetry
- the x -intercepts and y -intercept
- the direction of opening
- the maximum or minimum value
- the domain and range



Level 3

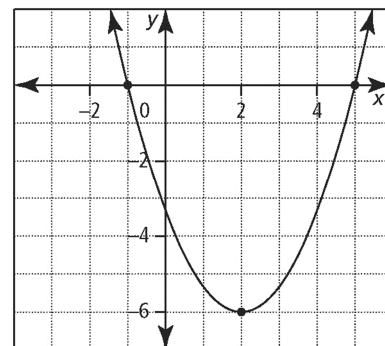
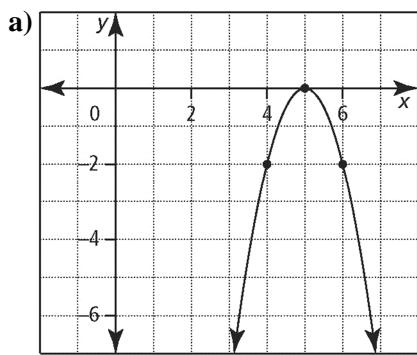
3. Determine a quadratic function in vertex form that has the given characteristics.

a) its vertex at $(-2, 3)$ and passes through the point $(-1, 1)$

b) its vertex at $(3, -2)$ and has an x -intercept of $(5, 0)$

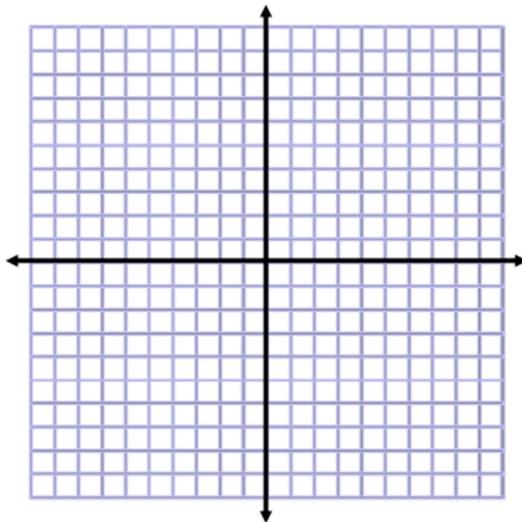
c) its vertex at $(4, 1)$ and has a y -intercept of $(0, -15)$

4. Determine a quadratic function in vertex form for each parabola.

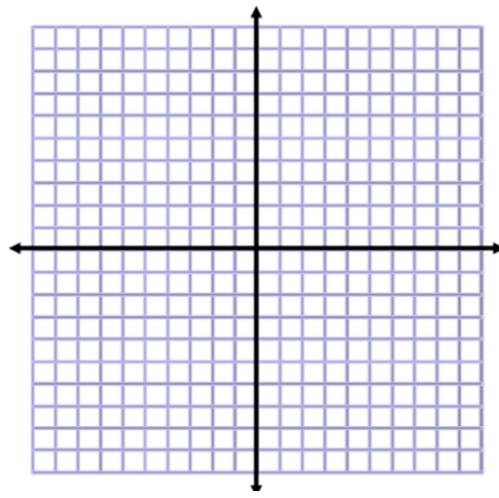


5. For each function below, state the domain, range, vertex, direction of opening, max or min value, number of x-intercepts and the width (narrow, normal or wide) Then sketch the graph.

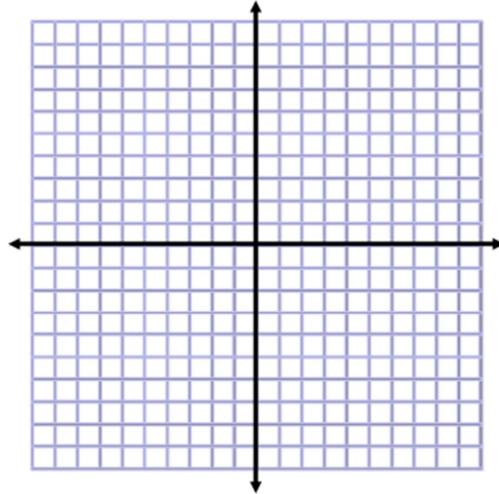
a) $y = (x + 3)^2 - 9$.



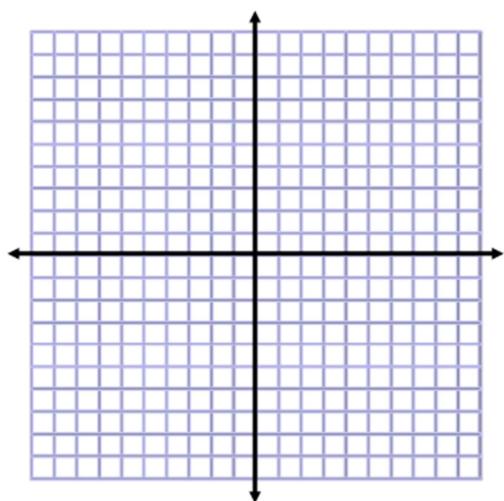
b) $y = -2(x - 1)^2 + 8$. Sketch the graph.



c) $y = -(x + 1)^2 - 2$.



d) $y = \frac{2}{3}(x - 2)^2 - 4$

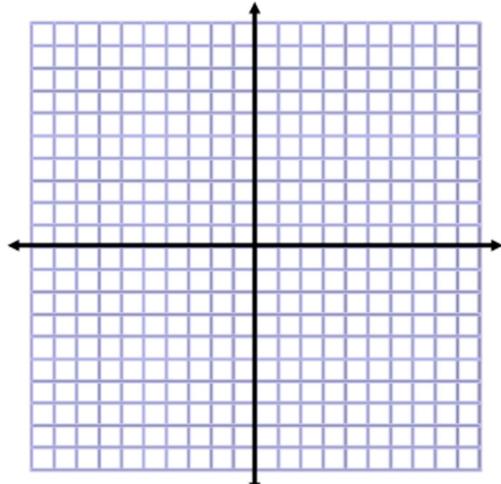


Chapter 3b – Outcome 20.7b – Graphing in standard form

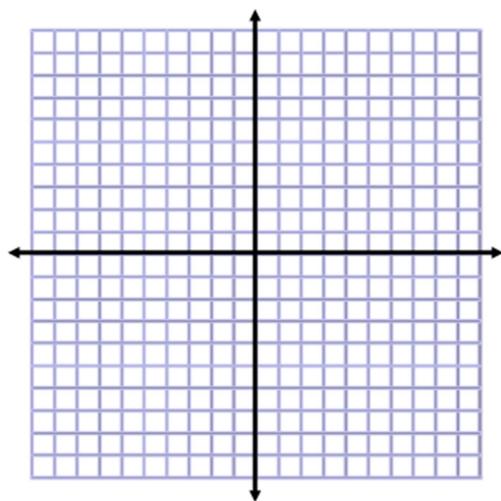
Level 2

1. Determine the characteristics of each quadratic function below. State the vertex, domain, range, axis of symmetry, number of x-intercepts, the y-intercept point, and write the equation in vertex form. Then sketch the function.

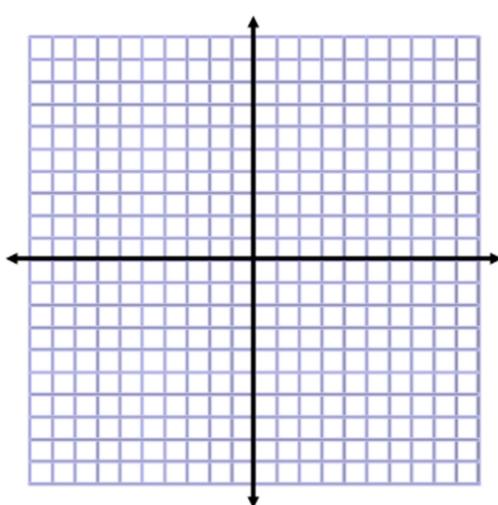
a) $y = x^2 - 6x + 10$



b) $y = x^2 + 8x + 6$



c) $y = 3x^2 - 12x + 9$



Level 3

Write each function in vertex form by completing the square. State the vertex of the function

a) $y = x^2 + 2x - 4$

b) $y = x^2 + 24x + 54$

c) $y = -2x^2 - 20x - 56$

d) $y = 6x^2 - 48x$

e) $y = 2x^2 - 16x + 31$

Chapter 4a – Outcome 20.6 – Factoring

Level 2

1. Factor the following

a) $x^2 - x - 20$ b) $3x^2 - 30x + 63$ c) $-4x^2 - 12x - 8$

d) $14x^2 + 3x - 5$ e) $3x^2 + 11x - 20$ f) $4x^2 + 7xy + 3y^2$

g) $12x^2 - 4xy - 8y^2$ h) $x^2 - 49y^2$ i) $25x^2 - 9$

j) $x^2 - \frac{25}{4}y^2$

Level 3

2. Factor the following

a) $(x + 1)^2 - (x - 7)^2$ b) $(x - 1)^2 - 2(x - 1) - 35$

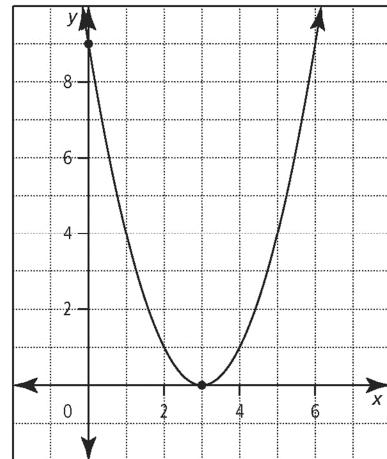
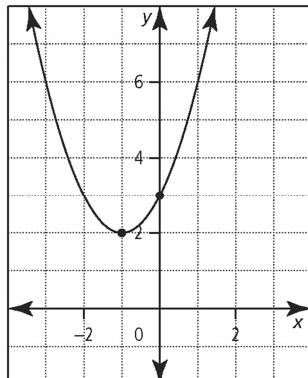
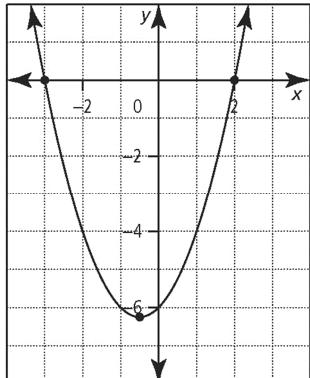
c) $6(2x + 1)^2 - 7(2x + 1) - 20$ d) $(x^2 - 2x)^2 - 11(x^2 - 2x) + 24$

e) $(2x^2 + 2x - 4)^2 - (x^2 + 2x + 5)^2$

Chapter 4b – Outcome 20.8b – Solving quadratic equation

Level 2

- Determine the solutions to each equation graphically.



- Solve each of the following algebraically.

a. $x^2 - 2x - 15 = 0$

e) $7x^2 = 34x + 5$

b. $2x^2 + 8x = 64$

f) $5x^2 = 9x + 2$

c. $7x^2 - 28 = 0$

g) $2x^2 + 9x = 18$

d. $6x^2 - 5x = 4$

Level 3

3. Solve the following equations algebraically.

a) $x^2 + 2x - 2 = 0$

b) $x^2 - 5x + 3 = 0$

c) $4x^2 + x - 3 = 0$

d) $2x^2 - 16x + 10 = 0$

e) $10x^2 - 15x = 0$

f) $x^2 - 10x + 23 = 0$

4. Use the discriminant to determine the number of solutions for each equation below.

a) $7x^2 + x - 1 = 0$

b) $3x^2 - 4x + 5 = 0$

c) $8y^2 - 8y + 2 = 0$

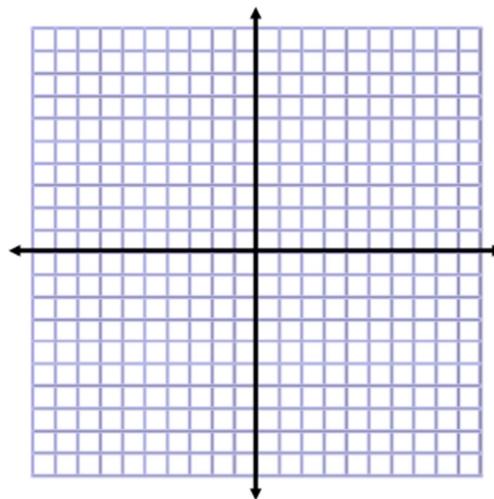
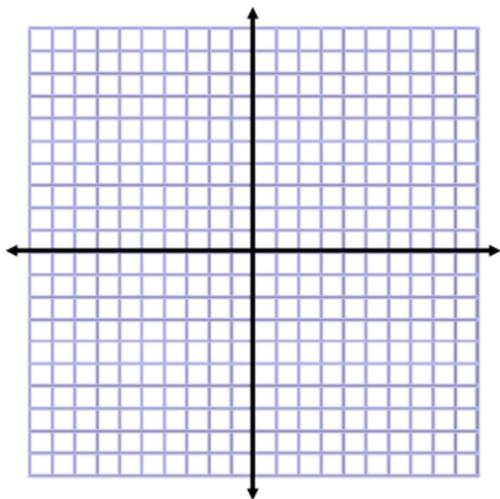
d) $3x^2 + 6 = 0$

Outcomes 3a (20.7a), 3b (20.7b) and 4b (20.8b)

Accurately graph the following quadratic functions. Please include the roots, vertex and y-intercept on your graph

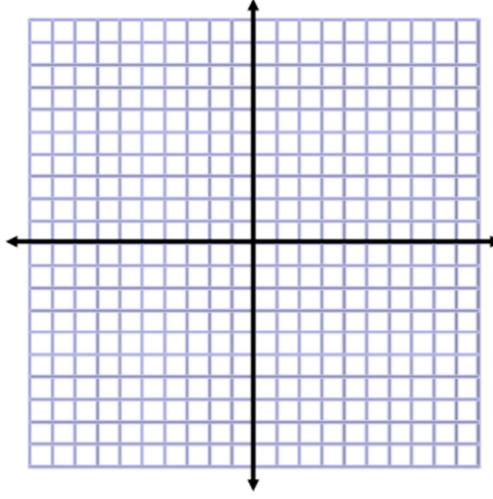
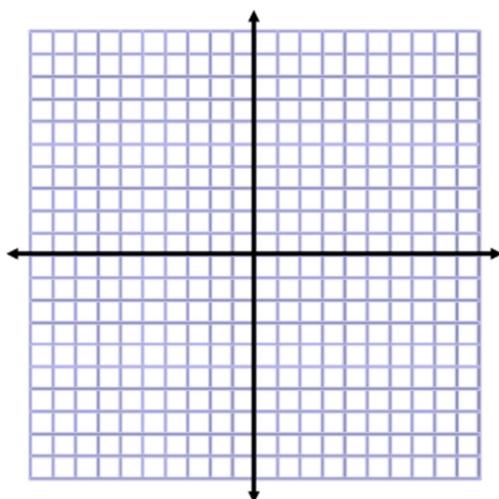
a) $f(x) = (x + 7)^2 - 3$

b) $f(x) = 4(x + 2)^2 - 1$

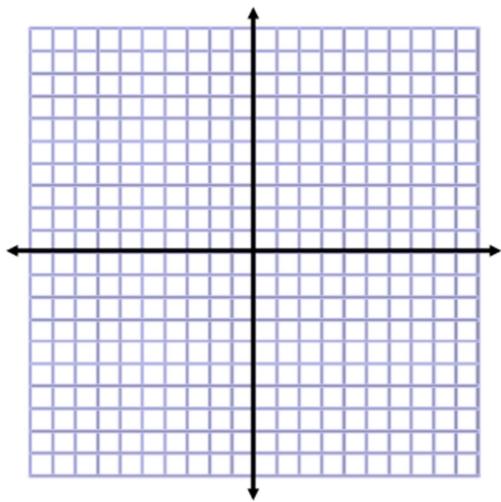


c) $y = x^2 - 8x + 7$

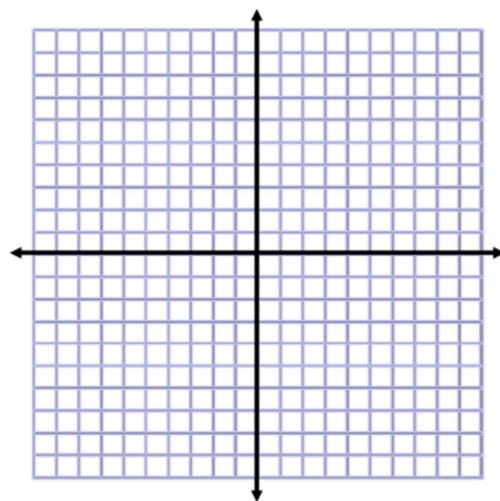
d) $y = x^2 - 4x$



e) $y = x^2 + 2x - 4$

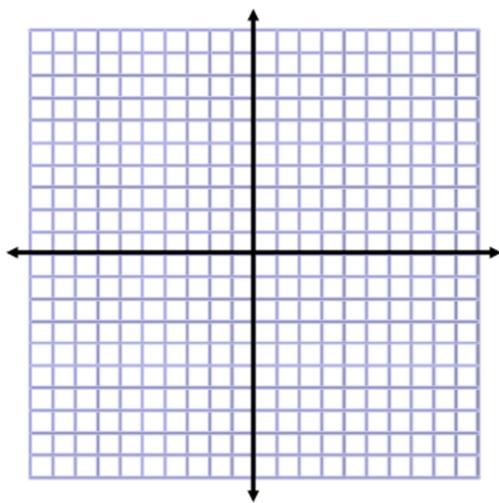
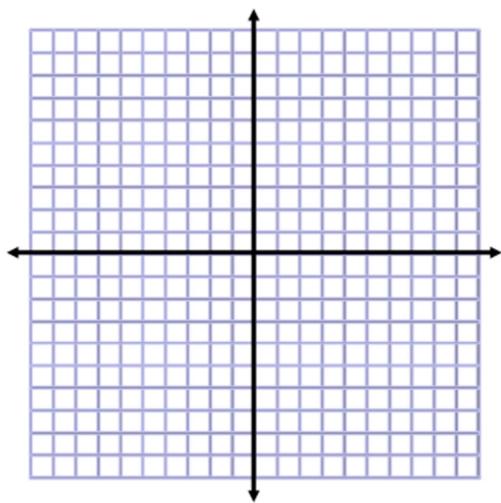


f) $f(x) = -2(x - 2)^2 + 8$



g) $y = 3x^2 - 12x + 9$

h) $y = \frac{1}{2}x^2 - 6x + 8$



Chapter 5a – Outcome 20.2a – Radicals

1. Express each radical as a simplified mixed radical.

a) $\sqrt{54}$

b) $\sqrt{350}$

c) $\sqrt{98x^2}, x \geq 0$

d) $\sqrt{363x^5y^3}, x \geq 0, y \geq 0$

2. Express each mixed radical as an equivalent entire radical.

a) $4\sqrt{5}$

b) $23\sqrt{13}$

c) $9x^2\sqrt{x}, x \geq 0$

d) $5xy\sqrt{7y}, x \geq 0, y \geq 0$

3. Order each set of numbers from least to greatest.

a) $-2\sqrt{3}, \sqrt{50}, -\sqrt{14}, 3\sqrt{5}$

b) $4\sqrt{3}, \sqrt{12}, 2\sqrt{6}, \sqrt{20}$

4. Simplify each expression.

a) $7\sqrt{11} - 3\sqrt{11} + 8\sqrt{11}$

b) $4\sqrt{3x} - 4\sqrt{2} + \sqrt{3x} - \sqrt{2}$

c) $3\sqrt{20d} + 5\sqrt{45d}$

d) $\sqrt{10e} - \sqrt{90e} + 4\sqrt{40e}$

e) $5\sqrt{3} + \sqrt{12} - \sqrt{48} + 2\sqrt{75}$

f) $\sqrt{63} + \sqrt{75} - 2\sqrt{28} - 3\sqrt{27}$

5. Multiply. Express each answer as a mixed radical in simplest form.

a) $(6\sqrt{5})(2\sqrt{3})$

b) $(\sqrt{27x^5})(\sqrt{3x^7})$

6. Simplify each expression.

a) $\sqrt{10}(2\sqrt{10} + \sqrt{5})$

b) $\sqrt{15}(3\sqrt{5} - \sqrt{3})$

c) $2\sqrt{2}(1 + \sqrt{2})$

7. Rationalize each denominator. Express each radical in simplest form.

a) $\frac{\sqrt{10}}{\sqrt{3}}$

b) $\frac{8\sqrt{15}}{5\sqrt{2}}$

c) $\frac{25}{\sqrt{75}}$

d) $\frac{5\sqrt{21}}{7\sqrt{70}}$

e) $\frac{\sqrt{20}}{\sqrt{5}}$

Level 3

8. Multiply using the distributive property. Simplify each expression.

a) $(3\sqrt{2} - 5\sqrt{10})(\sqrt{6} + 8\sqrt{12})$

b) $(3 + 4\sqrt{7})(5\sqrt{7} + 2)$

c) $(3\sqrt{15} + \sqrt{10})(2\sqrt{5} - 7)$

d) $(4\sqrt{3} + 3\sqrt{5})^2$

9. Rationalize each denominator. Simplify.

a) $\frac{\sqrt{3} - 1}{\sqrt{3}}$

b) $\frac{6\sqrt{2} + 2\sqrt{6}}{3\sqrt{6}}$

10. Rationalize each denominator. Simplify.

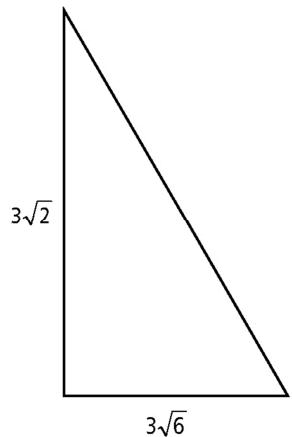
a) $\frac{4}{\sqrt{3} + 1}$

b) $\frac{\sqrt{5}}{\sqrt{5} - 5}$

c) $\frac{\sqrt{15}}{\sqrt{2} - \sqrt{3}}$

d) $\frac{2\sqrt{2} - \sqrt{6}}{2\sqrt{6} - \sqrt{5}}$

11. What is the perimeter and area of the right triangle shown? State the answer as an exact value.



Chapter 5b – Outcome 20.2b – Solving Radical Equations

Level 2

1. Solve for x in each equation.

a) $\sqrt{x+3} = 7$

b) $\sqrt{5x} = 4$

c) $\sqrt{-2x} = 24$

2. Solve and verify.

a) $\sqrt{7x} + 1 = 15$

b) $8 - \sqrt{1+v} = 5$

c) $\sqrt{3x + 15} = 3$

Level 3

3. Solve and verify.

a) $\sqrt{4-3m} = m$

b) $\sqrt{x^2 - 1} = 2\sqrt{x+1}$

c) $n - \sqrt{n} = 4$

d) $\sqrt{3x^2 + 2} = 2x + 1$

$$\mathbf{e}) \quad \sqrt{y^2 + 1} - y = 1$$

$$\mathbf{f}) \quad \sqrt{3x + 4} = \sqrt{x - 2}$$

$$\mathbf{g}) \quad \sqrt{2p^2 - 3} = \sqrt{5p}$$

$$\mathbf{h}) \quad \sqrt{w} + 1 = \sqrt{w + 4}$$

$$\mathbf{i}) \quad \sqrt{2x + 4} - \sqrt{x} = 2$$

$$\mathbf{j}) \quad \sqrt{5y + 1} - \sqrt{3y - 5} = 2$$

$$\mathbf{k}) \quad \sqrt{x - 5} - \sqrt{x + 10} = -3$$

Chapter 6a – Outcome 20.3a – Rational Expressions

Level 2

Determine the non-permissible value(s) for each rational expression.

a) $\frac{5}{x+3}$

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

c) $\frac{1-x}{3x+5}$

c) $\frac{2a}{a^2 - 3a}$

d) $\frac{m+1}{m^2 + 5m + 6}$

3. Simplify each rational expression. State any non-permissible values.

a) $\frac{3(x+5)}{(x+5)(x-5)}$

b) $\frac{(x-7)(x+2)}{-5x(7-x)}$

c) $\frac{(x+3)^2}{3(x+3)(x-3)}$

d) $\frac{3x(4x-1)}{(4x-1)(3x+1)}$

e) $\frac{25(x-5)(x+1)}{10(2x+1)(x-5)}$

f) $\frac{4xy(y-9)}{(y-9)(x+4)}$

Level 3

4. Simplify. State any non-permissible values.

a) $\frac{6r^2st}{10rs^2t^2}$

b) $\frac{3x-6}{x^2 - 4}$

c) $\frac{cd}{cd+d}$

d) $\frac{7m-c}{4c-28m}$

e) $\frac{x^2+x}{x^2 - 4x - 5}$

f) $\frac{y^2 - 2y - 3}{y^2 - 3y}$

5. Simplify. Identify any non-permissible values.

a) $\frac{3x^2 + 11x - 4}{x^2 + 8x + 16}$

b) $\frac{4 + 8a + 4a^2}{16 - 16a^2}$

c) $\frac{2x^2 + 5x + 2}{5x^2 - 5x - 30}$

d) $\frac{12x^2 + 4x}{3x^2 - 5x - 2}$

e) $\frac{4t^3 - 16t}{6 + t - 2t^2}$

f) $\frac{15x^3 + 5x^2}{6x^2 - 13x - 5}$

Chapter 6b – Outcome 20.3b – Operations with Rational Expressions

1. Simplify each expression. List all non-permissible values

a) $\left(\frac{9x}{14y^2} \right) \left(\frac{7y^3}{3x^2} \right)$

b) $\left(\frac{x-2}{x^2-4} \right) \left(\frac{x^2-2x-8}{x+2} \right)$

c) $\left(\frac{x+1}{3x+5} \right) \div \left(\frac{x+3}{3x+5} \right)$

d) $\frac{x^2+8x+7}{x^2-6x-7} \div \frac{x^2+7x+6}{x^2-x-42}$

e) $\frac{x+1}{3x} + \frac{4x-5}{3x}$

f) $\frac{4x^2}{x+5} + \frac{x+1}{x+5} - \frac{x^2}{x+5}$

g) $\frac{7x+6}{(x+2)(x-2)} - \frac{3x-2}{(x+2)(x-2)}$

Level 3

2. Simplify the following completely. List all non-permissible values

a) $\left(\frac{5y-5}{y^2+4y-5} \right) \left(\frac{y^2-25}{y^2-2y-15} \right)$

b) $\left(\frac{x^3-9x}{2x^2-x-15} \right) \left(\frac{2x^2+x-10}{x^2+x-6} \right)$

$$\mathbf{c)} \frac{x^2 + 8x + 16}{(x - 3)(x + 5)} \div \frac{3x^2 - 3}{(x + 4)}.$$

$$\mathbf{d)} \quad \frac{16a^2b}{a^2 - 2a} \div \frac{4ab^2}{a^2b - 4b}$$

$$\mathbf{e)} \frac{9y^2 - 1}{y + 3} \div \frac{3y^2 - 8y - 3}{9 - y^2}$$

$$\mathbf{f)} \quad \frac{9}{x^2 - 36} + \frac{3x}{x - 6}$$

$$\mathbf{g)} \frac{3}{x - 5} + \frac{2}{x + 7}$$

$$\mathbf{h)} \quad \frac{x^2 - 144}{12x^2} \div \left(\frac{x^2 - x - 6}{x^2 - 2x} \right) \left(\frac{x^2 + 4x + 4}{x^2 + 10x - 24} \right)$$

$$\mathbf{i)} \quad \frac{2a}{2a + 6} - \frac{a^2 + 9}{a^2 - 9}$$

$$\mathbf{j)} \quad \frac{3y}{y^2 - 4} + \frac{6y}{y^2 + 5y + 6}$$

k) $\frac{x-6}{x^2-11x+28} - \frac{x-5}{x^2-8x+7}$ l) $\frac{8}{3x-18} - \frac{x+1}{x^2-5x-6}$

m) $\frac{x^2-49}{x^2-8x+7} + \frac{2-2x}{x^2-1}$ **n)** $\frac{2x+8}{x^2+5x+6} - \frac{x-9}{(x+3)(x-5)}$

3. Simplify.

a) $\frac{\frac{1}{x}+1}{1-\frac{1}{x}}$ **b)** $\frac{\frac{x}{x-3}}{4-\frac{x}{x-3}}$ **c)** $\frac{\frac{1}{4+h}-\frac{1}{4}}{h}$

Chapter 6c – Outcome 20.3 – Solving Rational Equations

Level 2

1. Solve each equation. Identify any non-permissible values

a) $\frac{2x}{3} = \frac{x}{4} + \frac{5}{6}$

b) $\frac{5}{2a} = 3 - \frac{2}{a}$

c) $\frac{x-3}{x^2} = \frac{11}{15x} - \frac{2}{5x}$

d) $\frac{x^2}{3} + \frac{11x}{18} = \frac{1}{9}$

2. Solve each equation. Identify any non-permissible values

a) $\frac{21}{5x+3} = -3$

b) $\frac{x+1}{x-3} = \frac{x}{x-5}$

c) $\frac{x+4}{x-2} = \frac{x-4}{x+4}$

d) $\frac{x-2}{x} = \frac{2-x}{x+1}$

Level 3

3. Solve each rational equation. Identify any non-permissible values

a) $\frac{3}{x+3} = \frac{x+15}{x+3} - 5$ b) $\frac{x}{x+1} - \frac{x+4}{x+1} = \frac{6}{x}$

4. Solve the following equations. Identify any non-permissible values

a) $\frac{x}{x-3} + \frac{x^2+9}{x^2-9} = \frac{2x}{x+3}$ b) $\frac{5}{x+1} - \frac{1}{x^2-x-2} = \frac{3}{x-2}$

c) $\frac{x+5}{2x+4} = \frac{x}{x-3} - \frac{2x+9}{x^2-x-6}$ d) $\frac{3x}{2x+3} + \frac{20}{2x^2-x-6} = \frac{4}{x-2}$

5. Solve each rational equation. Give exact and approximate answer. Round approximate answers to the nearest hundredth.

a) $\frac{x}{2x+3} + \frac{5}{8x+12} = \frac{x+1}{5}$

b) $\frac{x-1}{x} - \frac{(x+2)}{x^2} = \frac{x+1}{3x}$

c) $\frac{x-5}{2x+10} - \frac{8}{x^2-25} = \frac{x}{x-5}$

Chapter 7a – Outcome 20.1a – Absolute Value

Level 2

1 Evaluate.

a) $|-42|$

b) $\left| \frac{-82}{3} \right|$

c) $|3.75|$

2. Evaluate each expression.

a) $|-4 - 10|$

b) $|3 - 5(7)|$

c) $5(|-2|) + |-3|$

Level 3

3. Evaluate the following

a) $|4 - 8| - |1 - 6|$

c) $3|5 - 3| - 3|6 - 9|$

c) $-|-42| - 4|-7| + 5|4 - 6|$

d) $-2(3 - |4| + 3|6 - 4|)$

e) $|2^3 - 4| - 4|5 - 8(2)|$

f) $4|3 - 3^2| - 3 + 7|4 - 3|$

Chapter 7b – Outcome 20.1b – Solving Absolute Value Equations

Level 2

Given the table of values for $y = f(x)$, create a table of values for $y = |f(x)|$.

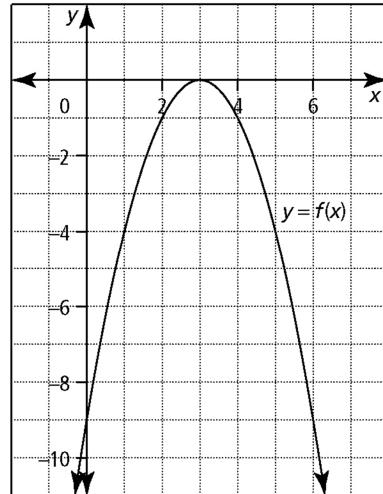
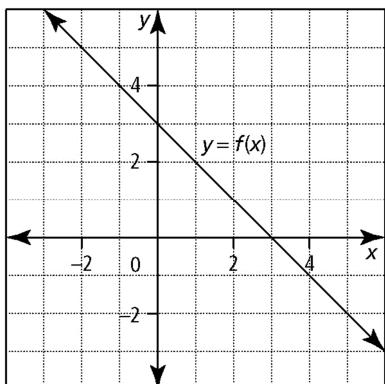
a)

X	y
0	1
2	0
4	-1
6	-2
8	-3

b)

X	y
-4	-8
-2	0
0	0
2	-8
4	-24

2. Use the graph of $y = f(x)$ to sketch the graph of $y = |f(x)|$.



3. Solve each absolute value equation. Verify the solution.

a) $|x + 1| = 2$

b)

$|x - 3| + 1 = 0$

c)

$|2x| = 5$

d) $2|x - 5| = 8$ **e)** $|-2x - 3| = 5$ **f)** $|3x - 2| + 6 = 12$

Level 3

4. Solve each absolute value equation algebraically.

a) $|x - 5| = 3x + 4$ **b)** $|3m + 2| = m$

c) $|x^2 - 3x| = 4$ **d)** $3 = |-4x^2 + 8x|$

e) $|4x| = x^2 - 5$

f) $|2(x - 4)^2 - 5| = 3$

g) $0 = |x^2 - 2x - 3| - 4$

h) $x + 1 = |x^2 - 1|$

i) $|x^2 - 3x| = 3x - 8$

5. For each equation, state the x and y intercepts, and the domain and range.

a) $f(x) = |2x + 1|$

b) $g(x) = |-x - 4|$

c) $y = |x^2 + 6x + 5|$

d) $f(x) = |(2x + 1)(x - 3)|$

Chapter 7c – Reciprocal Functions – Outcome 20.11

Level 2

1. For each function,

i) write the reciprocal function

ii) state the non-permissible values

a) $f(x) = 3 + x$

b) $g(x) = 2x - 1$

c) $h(x) = (x + 2)(x - 3)$

d) $j(x) = -2x^2 - 12x - 10$

2. State the equation(s) of the vertical asymptote(s) for each function.

a) $f(x) = \frac{1}{5-x}$

b) $g(x) = \frac{1}{7x-2}$

c) $h(x) = \frac{1}{(x+1)(2x+1)}$

d) $h(x) = \frac{1}{2x^2 + 2x - 24}$

3. What are the x -intercepts and y -intercepts of each function?

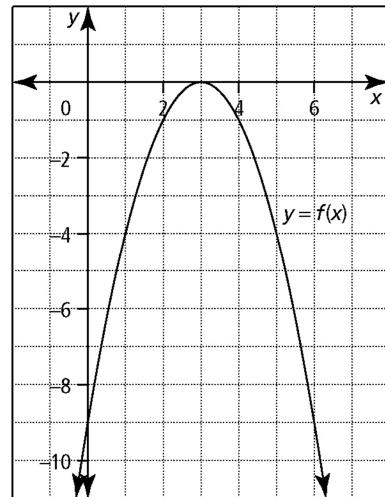
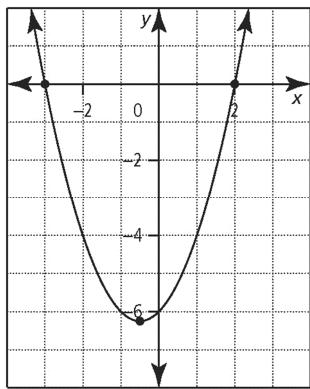
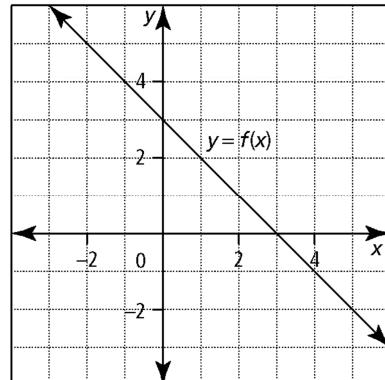
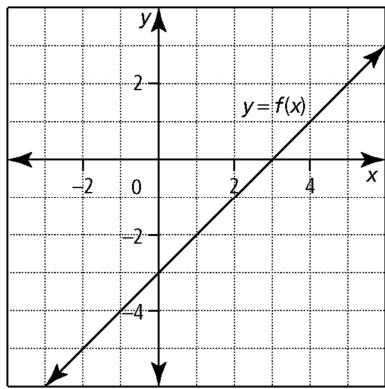
a) $y = \frac{1}{2x+5}$

b) $y = \frac{1}{3-2x}$

c) $f(x) = \frac{1}{(2x+3)(x-1)}$

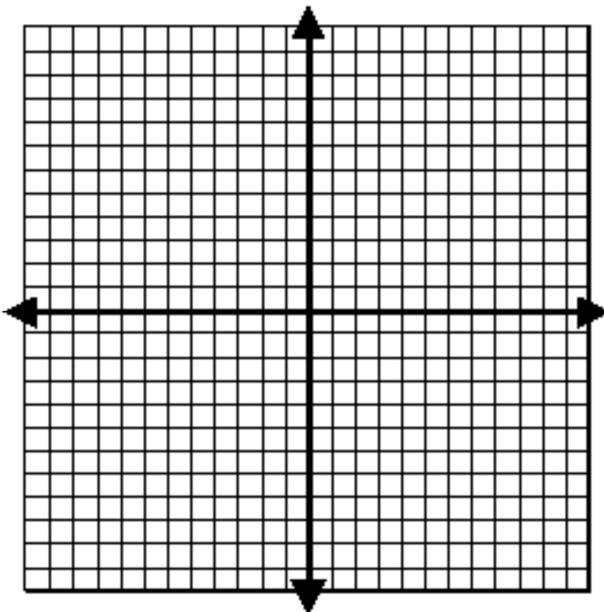
d) $g(x) = \frac{1}{x^2 + 7x + 12}$

4. Given graph of $y = f(x)$, and sketch the graph of the reciprocal function, $y = \frac{1}{f(x)}$.

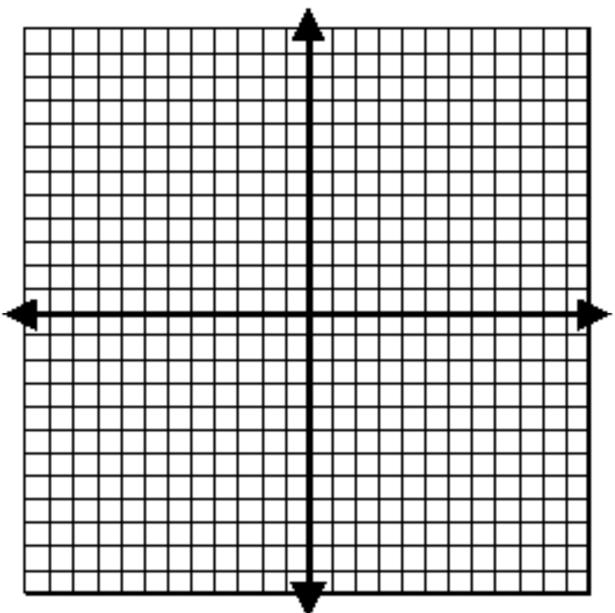


Level 3

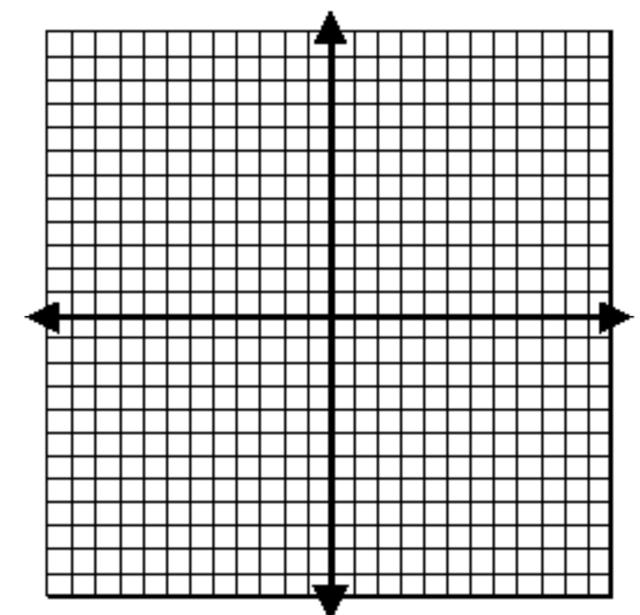
5. Sketch the graph of $y = f(x)$ and the graph of $y = \frac{1}{f(x)}$ on the same set of axes. Label the asymptotes, and the intercepts.
- a) $f(x) = x + 2$



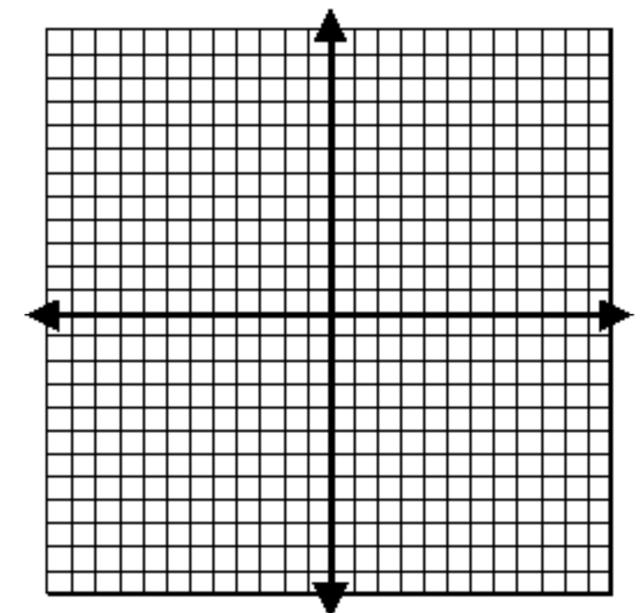
b) $f(x) = 3x - 5$



c) $f(x) = (x - 3)(x + 3)$



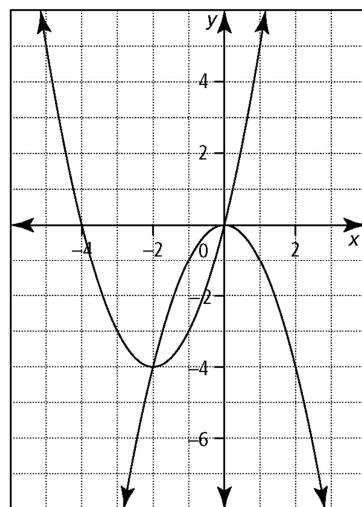
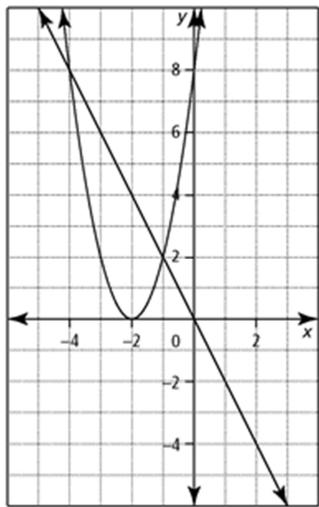
d) $f(x) = (x + 1)^2 - 4$



Chapter 8 – Outcome 20.8a – Solving Systems of Equations

Level 2

1. Solve each system of equations below



2. Solve each linear-quadratic system below

a) $2x^2 - 5x - y = -1$
 $7x + y = 1$

b) $0 = x^2 - 9x - y + 14$
 $y + 7 = x$

$$\text{c)} \quad 2x + y = 9$$

$$2x^2 - 4x - y = -5$$

$$\text{d)} \quad y = 2x + 1$$

$$y = x^2 - 5x + 13$$

$$\text{e)} \quad 3x + y - 4 = 0$$

$$2x^2 - 4x - y - 2 = 0$$

$$\text{f)} \quad 3x^2 + x - 3y = -8$$

$$x + 3y = 9$$

Level 3

3. Solve the following quadratic-quadratic systems

a) $y = x^2 + 2x - 3$

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

b) $y = -x^2 - 3x + 14$

$$y = 3x^2 + 5x - 18$$

c) $4x + y + 5 = x^2$

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

d) $y = 2x^2 - x + 1$
 $2y = 2x^2 - x - 1$

e) $x^2 + y = 4x + 5$
 $5x + \frac{1}{3}y = x^2$

f) $x^2 + 8x - y = -12$
 $x^2 - y = 8$

Chapter 9a – Graphing Inequalities – Outcome 20.9a

Level 2

1. Which ordered pairs are solutions to each given inequality?

a) $x - 6 \leq y$

A (1, 6)

B (6, 1)

C (-1, 6)

D (-1, -6)

b) $y \leq 3(x - 1)^2 + 4$

A (1, 5)

B (0, 7)

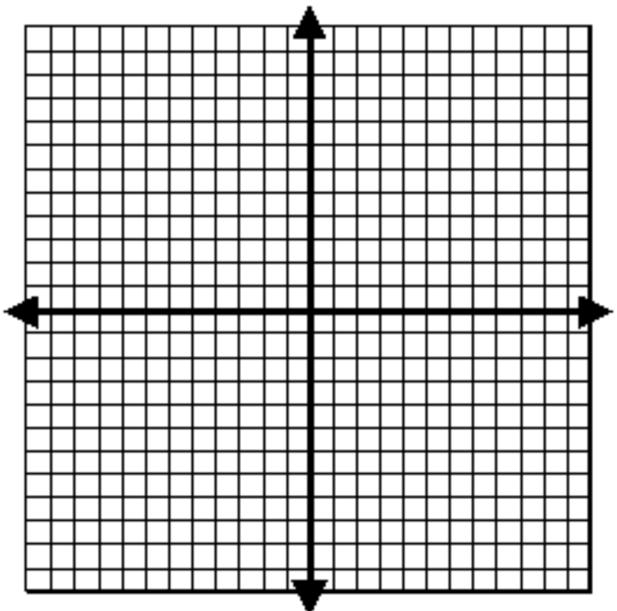
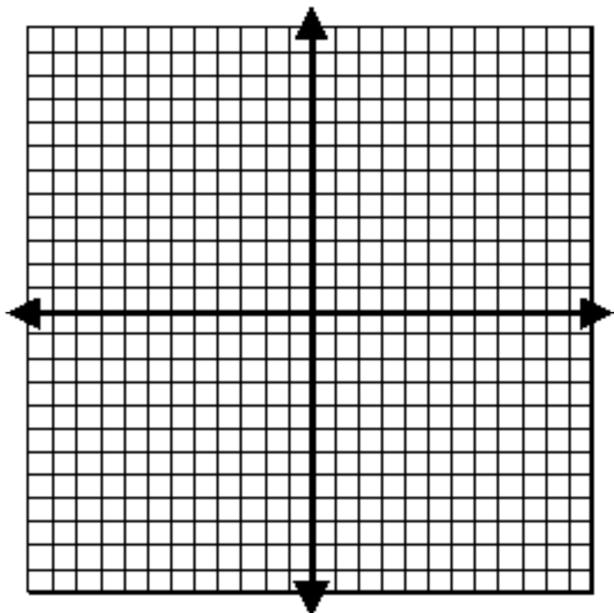
C (-1, 9)

D (3, 18)

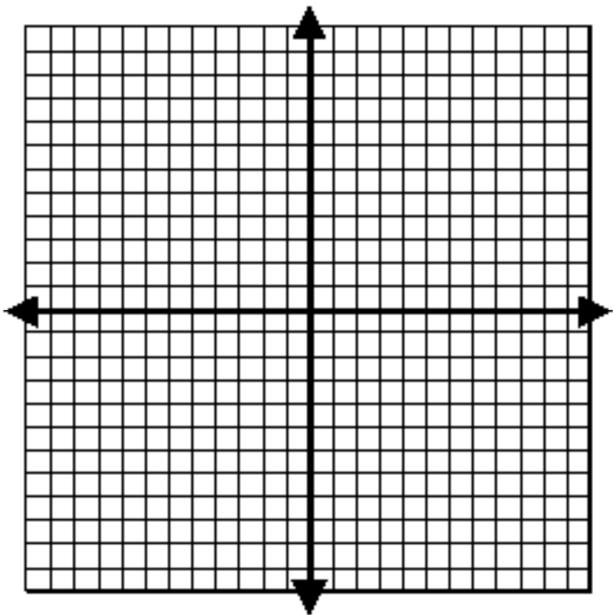
2. Graph each inequality

a) $2x - 7y \geq 14$

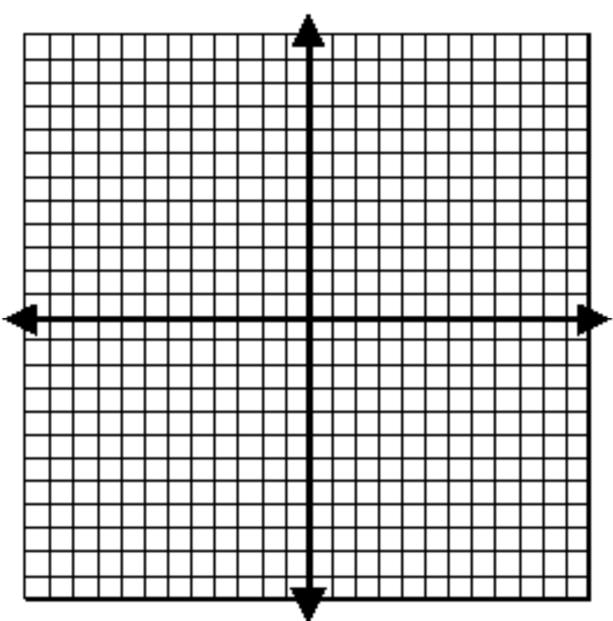
b) $5 - x + 3y < 0$



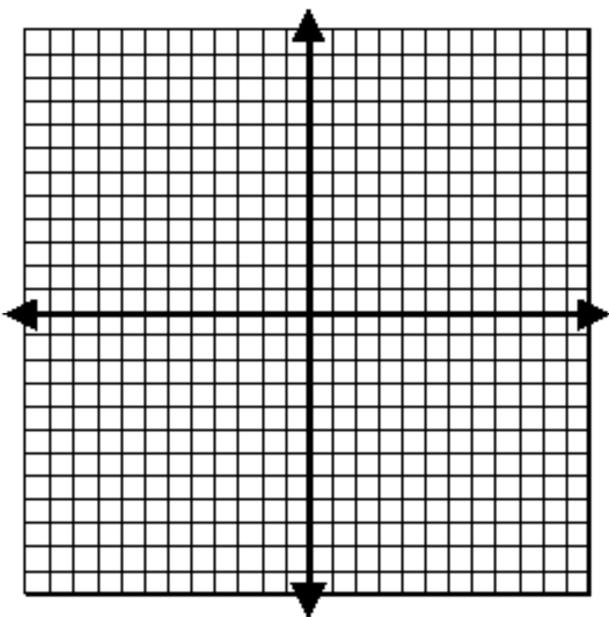
c) $y + 4 > 0$



d) $5x + 2y \leq 4$



e) $y \leq -2x + 5$



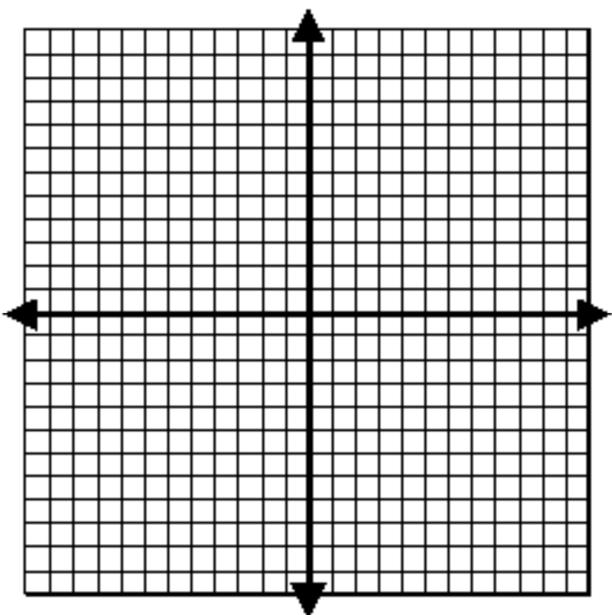
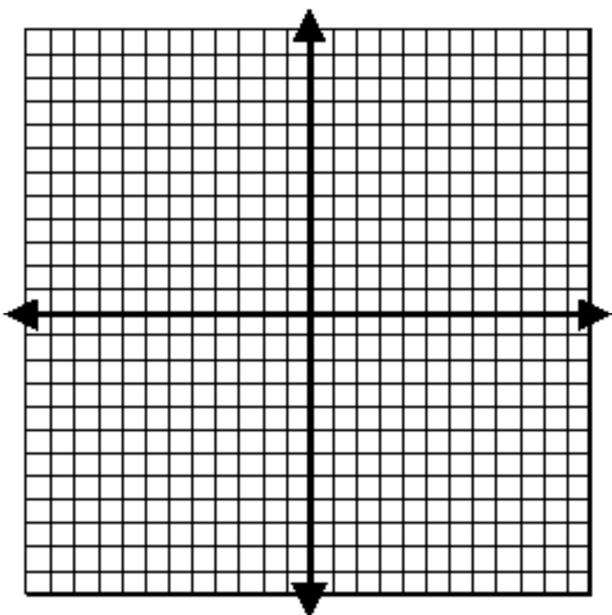
Level 3

3. Graph each inequality

Graph each quadratic inequality.

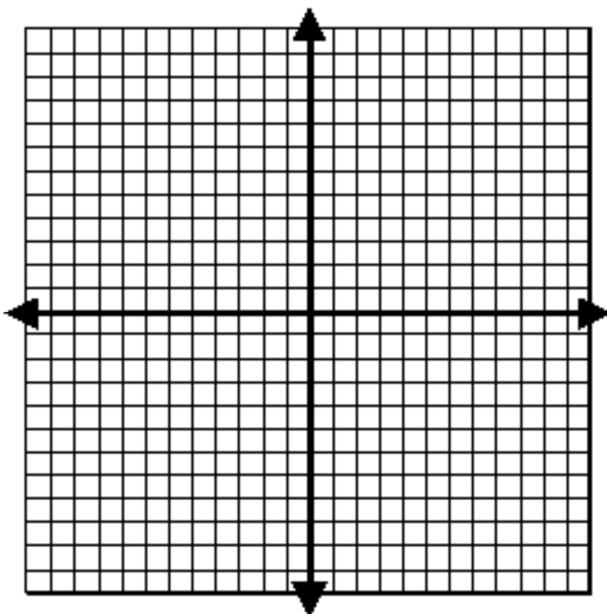
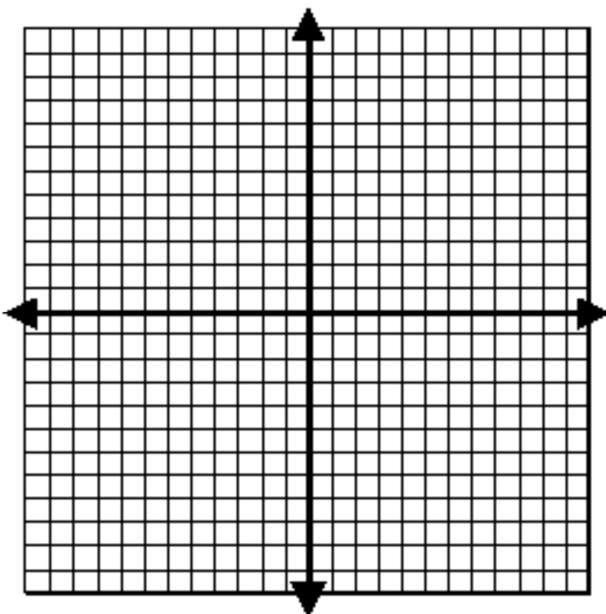
a) $y < (x - 5)^2 + 4$

b) $y - 8 \geq 2(x + 2)^2$

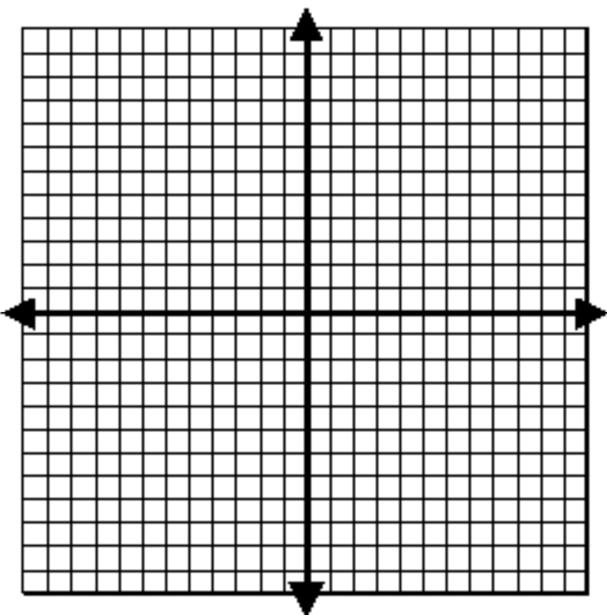


c) $y > -x^2 - 3x - 4$

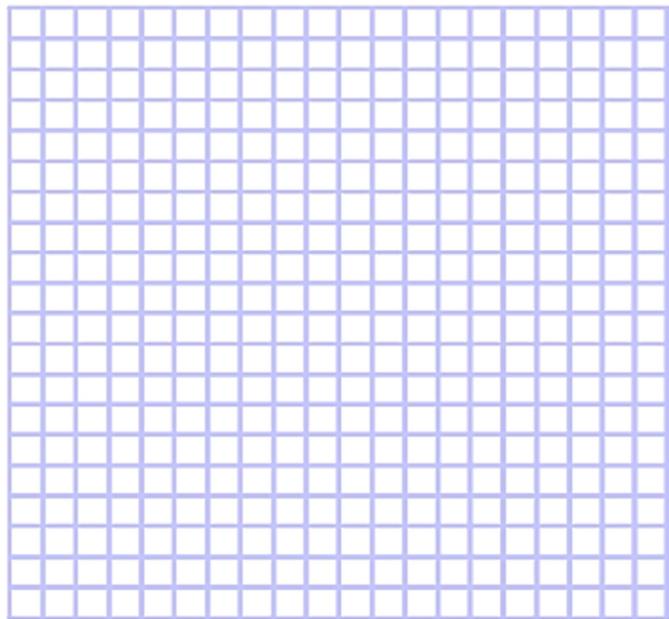
d) $y < (x - 2)(x + 6)$



e) $y \geq 2x^2 - x - 1$



4. Pierre wants to take his extended family to a movie at an IMAX theatre. He has a budget of \$150 to spend on tickets. Tickets for children cost \$9.50, and tickets for adults cost \$13.95.
- Write an inequality that represents the number of tickets that Pierre can afford.
 - Graph the solution region.
 - Interpret the solution set in reference to the number of tickets.



Chapter 9b – Outcome 20.9b – Solving Quadratic inequalities in one variable

Level 2

1. Is the value of x a solution to the given inequality? Show your work.

a) $x^2 + 3x > -5, x = 0$

b) $(x - 4)(x + 3) \leq 7, x = 0$

2. Determine the solution to each inequality.

a) $(x - 1)(x + 5) > 0$

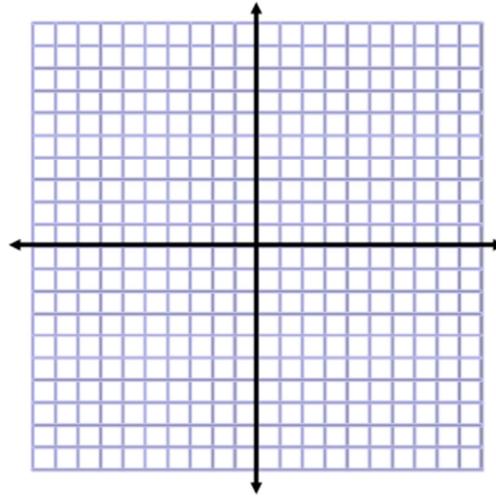
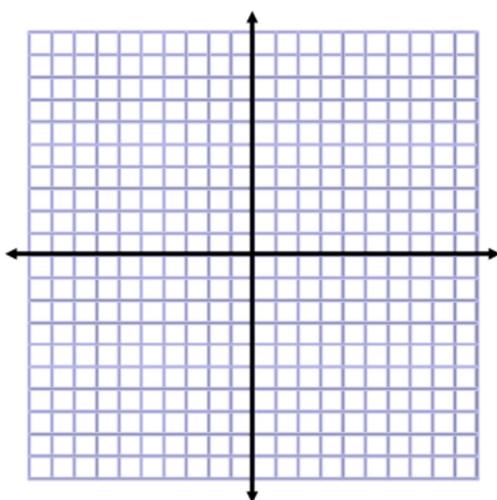
b) $3(x + 1)(2x - 3) \leq 0$

3. Solve each inequality. You may choose any of the methods we have covered during class.

Graph paper is provided if you want it.

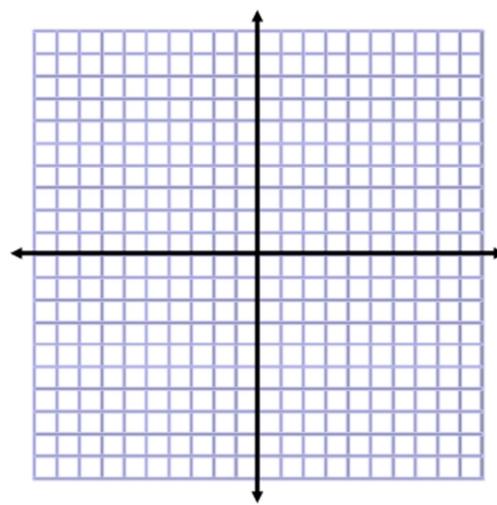
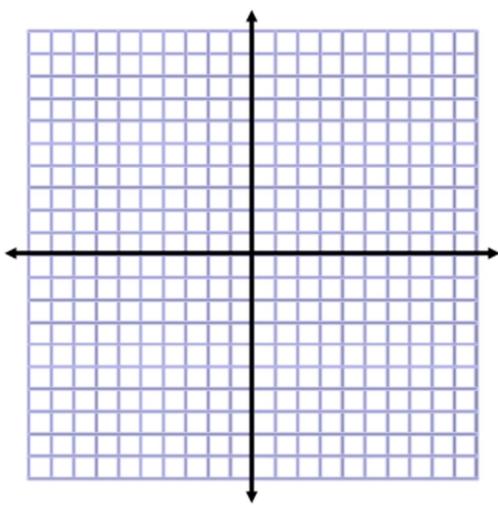
a) $4x^2 + 18 > 17x$

b) $-8x^2 + 2x + 15 \geq 0$

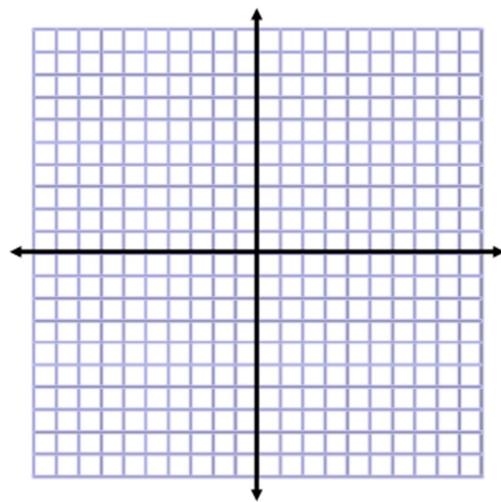


c) $x^2 - x + 2 \leq 0$

d) $4x^2 - 12x + 9 \leq 0$



4. Given the function $f(x) = x^2 + 6x$,
- a) determine the zeros of the function
 - b) solve the inequality $f(x) > 0$
 - c) solve the inequality $f(x) \leq -5$



5. The royalties received by an author depend on the number of books sold and the price of each book. For a particular book, the royalties, R , in dollars, depend on the price, P , in dollars, according to the equation

$R = 0.02P(20\ 000 - 200P)$. For what range of prices would the author receive more than \$8400 in royalties?