

Math 20-1 Ch.1 Sequence and Series Final Exam Review

On a separate sheet of paper, answer the following questions by showing ALL of your work.

1. The common difference in the arithmetic sequence 27, 23, 19, 15, ... is
2. What is the 23rd term of the sequence 32, 41, 50, ...?
3. What is the sum of the arithmetic series where $t_1 = -5$, $t_6 = 10$ and $n = 14$?
4. Alain is saving for college. He saves \$1 the first month, \$5 the second month, \$9 the third month and so on. If he starts saving on Jan.1, 2012, what's the total amount he will have saved on June 15, 2013?
5. A ball is dropped from a height of 3 m. After each bounce, it rises to 85% of its previous height. What is the total distance that the ball has travelled when it comes to rest?
6. Laura inherits \$25 000 in April 2012. She invests the money at an interest rate of 2.7%/ year. What is the value of her investment in April 2025?
7. What is the 36th term in the sequence 4, -10, 25, ...?
8. What is the sum of the geometric series $250 + 50 + 10 + \dots + \frac{2}{625}$?
9. Determine the number of terms in an arithmetic sequence with $t_{12} = 73$ and $t_{17} = 38$ when the final term is -46.
10. An arithmetic series has $S_{15} = 690$, $d = 6$ and $t_{10} = 58$. Determine the first three terms of the series.
11. For the arithmetic series $4 + 11 + 18 + \dots + 116$ determine the values of " d " and " n ".
12. The sequence 6, 18, 54, ... , 28 697 814 has how many terms in it?
13. The terms of a geometric sequence are $4x + 1$, $x + 4$ and $10 - x$. Determine the value of " x ".
14. What is the sum of the infinite geometric series $200 + 50 + 12.5 + \dots$?
15. Bell ExpressVu charges \$65/month for satellite TV service. Each year, the price increase by \$7.
 - a) Write the general term of the sequence representing yearly cost of TV service. (1 mark)
 - b) Use your expression from part "a" to determine the yearly cost of TV service in year 12. (1 mark)
 - c) How many years will have passed if the yearly cost of TV service is \$170?

16. An oil well produces 7500 barrels in the first month. If the number of barrels of oil decreases by 3% each month
- a) Determine the general term of the geometric sequence. (1 mark)
 - b) After 5 months, how many barrels of oil does the well produce? (1 mark)
 - c) What is the total number of barrels of oil the well produces in 4 years? (2 marks)
17. A tree grows 1.2 m in the first year. Each year, the tree grows 75% as much as the previous year. What is the **total height** of the tree if in the last year it grows 0.021 381 54 m? (3 marks)
18. Is it better to be paid \$5 per day for 100 days or be paid \$0.05 the first day, \$0.10 the second day, \$0.20 the third day and so on for 100 days?
- a) Show ALL of your work to support which method of pay is best (2 marks)
 - b) If your boss only had \$100,000, how many days could they afford to pay you if you are paid \$0.05 the first day, \$0.10 the second day, \$0.20 the third day and so on?

Ch.1 Sequence and Series Final Exam Review Answer Key

1. -4
2. 230
3. 203
4. $\$630$
5. 37 m
6. $\$35347.26$
7. -3.388×10^{14}
8. $\frac{195312}{625}$
9. 29
10. $4, 10, 16$
11. $d = 7; n = 17$
12. 15
13. $x = 6$ or $\frac{1}{5}$
14. 266.66666
15. a) $t_n = 7n + 58$
b) $\$142$
c) 16 years
16. a) $t_n = 7\,500 (0.97)^{n-1}$
b) $6\,639 \text{ barrels}$
c) $192\,059 \text{ barrels}$
17. 4.736 m
18. a) First payment method: $5 \times 100 = \$500$
Second payment method: $\$6.338 \times 10^{28}$
b) Could afford to pay you for 20 days

Math 20-1 Ch.2 Radicals Final Exam Review

WRITTEN RESPONSE

Calculate the answers to these questions on a separate sheet of paper.

- Express $\sqrt[5]{32m^7n^{11}}$ in simplified form. (2 marks)
- A radical expression is being simplified. In which step of the process was an error made? Explain what error was made. (2 marks)

$$\frac{3+4\sqrt{c}}{5\sqrt{c}}$$

$$\frac{3+4\sqrt{c}}{5\sqrt{c}} \cdot \frac{\sqrt{c}}{\sqrt{c}} \quad \text{Step A}$$

$$\frac{\sqrt{c}(3+4\sqrt{c})}{\sqrt{c}(5\sqrt{c})} \quad \text{Step B}$$

$$\frac{3\sqrt{c}+4\sqrt{c}}{5\sqrt{c^2}} \quad \text{Step C}$$

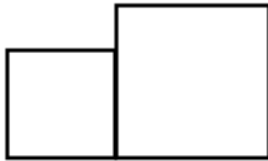
$$\frac{7\sqrt{c}}{5c} \quad \text{Step D}$$

- Write this mixed radical as an entire radical: $7\sqrt{3}$ (1 mark)
- Write this entire radical as a mixed radical: $\sqrt{\frac{45}{96}}$ (2 marks)
- Simplify $3\sqrt{294} - 2\sqrt{180} + 2\sqrt{486} + 4\sqrt{45}$. (2 marks)
- Simplify the expression $\frac{7}{2}\sqrt[3]{56} + \frac{4}{3}\sqrt[3]{108}$ (2 marks)
- Express $4\sqrt{2}(3\sqrt{2} - 5\sqrt{10})$ in simplest form. (1 marks)
- Expand and simplify this expression: $(\sqrt{11} + 3)^2$ (2 marks)
- Expand and simplify this expression: $(4\sqrt{6} - 3\sqrt{3})(\sqrt{6} + 7\sqrt{3})$ (2 marks)
- Expand and simplify this expression: $\sqrt{3}(5 - 4\sqrt{3}) - \sqrt{8}(4\sqrt{3} + 2)$ (2 marks)
- Rationalize the denominator: $\frac{6\sqrt{3}}{5\sqrt{15}}$ (2 marks)

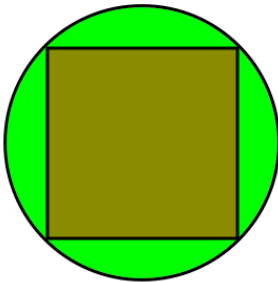
12. Simplify this expression: $\frac{4\sqrt{27} + 2\sqrt{3}}{\sqrt{8}}$ (2 marks)

13. Simplify this expression: $\frac{3\sqrt{5} + \sqrt{3}}{4\sqrt{5} - \sqrt{3}}$ (3 marks)

14. A square with area 54 square units is placed beside a square with area 75 square units. Find the outside perimeter of the given shape, in fully simplified form. (3 marks)



15. A square is inscribed in a circle. The area of the circle is $42\pi \text{ m}^2$. Determine the length of the diagonal of the square as an exact value. Determine the area of the circular portion not covered by the square. (2 marks)



16. Write the expression in simplest form. Show your work. (3 marks)

$$\frac{5\sqrt{x} + 4\sqrt{y}}{3\sqrt{x} - 7\sqrt{y}}$$

Math 20-1 Ch.2 Radicals Final Exam Review Key

1. $2mn^2 \sqrt[5]{m^2n}$

2. Error, step C, $\sqrt{c} \times 4\sqrt{c}$ should be $4\sqrt{c^2}$

3. $\sqrt{147}$

4. $\frac{3}{4}\sqrt{\frac{5}{6}}$

5. $39\sqrt{6}$

6. $7\sqrt[3]{7} + 4\sqrt[3]{4}$

7. $24 - 40\sqrt{5}$

8. $20 + 6\sqrt{11}$

9. $75\sqrt{2} - 39$

10. $5\sqrt{3} - 12 - 8\sqrt{6} - 4\sqrt{2}$

11. $\frac{6\sqrt{5}}{25}$

12. $\frac{7\sqrt{6}}{2}$

13. $\frac{9 + \sqrt{15}}{11}$

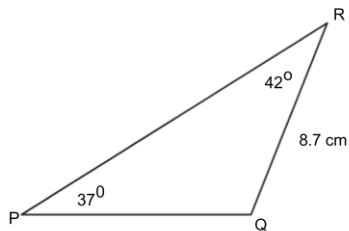
14. $6\sqrt{6} + 20\sqrt{3}$

15. $(42\pi - 84) \text{ m}^2$

16. $\frac{15x + 47\sqrt{xy} + 28y}{9x - 49y}$

Math 20 – 1 Ch.3 Trigonometry Final Exam Review

1. Point $P(-2, -7)$ is on the terminal arm of an angle θ in standard position. Determine the measure of θ to the nearest degree.
2. A guy wire is attached to a tree at a point that is 12 m above the ground. The angle between the wire and the level ground is 63° . To the nearest tenth of a metre, how far from the base of the tower is the wire anchored to the ground?
3. An angle θ has its terminal arm in Quadrant 4. Which primary trigonometric ratio is greater than 0?
4. In which quadrant does the terminal arm of 177° angle in standard position lie?
5. Determine the reference angle for the angle 234° in standard position.
6. Determine the exact values of θ where $0 \leq \theta \leq 360^\circ$ for $\cos \theta = -\frac{\sqrt{2}}{2}$.
7. Determine the exact value of $\cos 330^\circ$.
8. Determine the exact value of $\tan 210^\circ$.
9. Angle θ is in standard position and its terminal arm lies in Quadrant 2. The sine of its reference angle is $\frac{3}{8}$. Determine the exact value of $\cos \theta$.
10. Determine the exact possible coordinates (x, y) of a terminal point for the angle 120° in standard position. The value of r is 7, where $r = \sqrt{x^2 + y^2}$.
11. For $\triangle PQR$, write the Sine Law equation you would use to determine the measure of side “ q ”.



12. What are the three other angles in standard position that have a reference angle of 67° ?
13. The point $(15, -3)$ is on the terminal arm of $\angle A$. Which is the set of exact primary trigonometric ratios for the angle?
14. An angle is in standard position such that $\cos \theta = \frac{2}{5}$. What are the possible values of θ , to the nearest degree, if $0 \leq \theta \leq 360^\circ$?
15. An angle between 0° and 360° that has the same sine value as $\sin 195^\circ$ is _____.

16. OMIT THIS QUESTION as the unit circle is not learned in Math 20-1

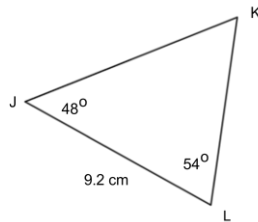
$P\left(\frac{-\sqrt{3}}{2}, \frac{1}{2}\right)$ and $Q\left(\frac{\sqrt{2}}{2}, \frac{-\sqrt{2}}{2}\right)$ are two points on the unit circle. If an object rotates counterclockwise from point P to point Q , the angle it rotates through is _____.

17. To the nearest degree, which values of θ satisfy this equation for $0 \leq \theta \leq 360^\circ$? (2 marks)

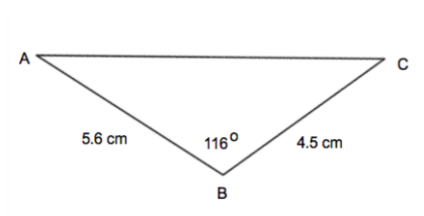
$$\sin \theta = -\frac{4}{7}$$

18. Given the following information about $\triangle ABC$, determine how many triangles can be constructed. $a = 5.1$ cm, $b = 3.9$ cm, $\angle A = 41^\circ$. Explain your answer. (2 marks)

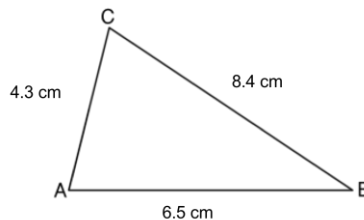
19. For $\triangle JKL$ determine the length of KL to the nearest tenth of a centimetre. (2 marks)



20. For $\triangle ABC$ determine the length of AC to the nearest tenth of a centimetre. (2 marks)



21. In $\triangle ABC$, $\angle A = 47^\circ$, $BC = 4.9$ cm, and $AC = 5.8$ cm. Solve the triangle. Determine the measure of any angle to the nearest degree and any side to the nearest tenth. (3 marks)
22. The following diagram represents a roof on a house. Determine the angle of the roof at $\angle A$. (2 marks)

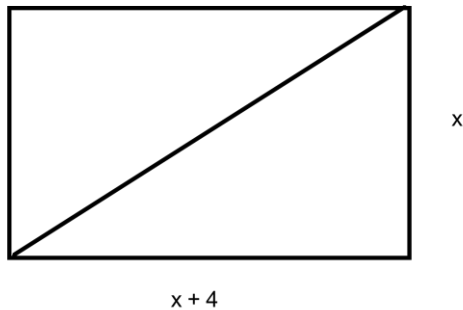


Math 20 – 1 Ch.3 Trigonometry Final Exam Review Key

1. 254°
2. 6.1 m
3. Cosine
4. Quadrant II
5. 54°
6. 135° and 225°
7. $\frac{\sqrt{3}}{2}$
8. $\frac{\sqrt{3}}{3}$
9. $\frac{\sqrt{55}}{8}$
10. $\left(-\frac{7}{2}, \frac{7\sqrt{3}}{2}\right)$
11. $\frac{8.7}{\sin 37} = \frac{q}{\sin 101}$
12. $113^\circ, 247^\circ, 293^\circ$
13. $\tan \theta = -\frac{3}{15}$
 $\sin \theta = -\frac{\sqrt{26}}{26}$
 $\cos \theta = \frac{5\sqrt{26}}{26}$
14. $66^\circ, 294^\circ$
15. 345°
16. 165°
17. $215^\circ, 325^\circ$
18. Because side a is longer than side b , only one triangle can be constructed
19. 6.99 cm
20. 8.6 cm
21. First triangle: $\angle B = 60^\circ$, $\angle C = 73^\circ$ and $c = 6.4$ cm
Second triangle: $\angle B = 120^\circ$, $\angle C = 13^\circ$ and $c = 1.5$ cm
22. 100°

Ch.4 Factoring and Radical Equations Final Exam Review

1. Factor $x^2 + 5x - 24$
2. Factor $16f^2 - 81$
3. Factor $9x^2 - 30x + 25$
4. Factor $36(2x + 3)^2 - 49(y - 5)^2$
5. What are the root(s) of $x = \sqrt{13x - 36}$.
6. What is the restriction on the following expression $\sqrt{2x - 7} = 1$
7. Factor $-5x^2 + 45x + 180$ (2 marks)
8. Factor $64x^2 - 144y^2$ completely (2 marks)
9. Factor $16(x + 3)^2 - 25(x - 6)^2$ completely (3 marks)
10. Factor the quadratic $4(x - 6)^2 + 40(x - 6) - 156$ completely (3 marks)
11. Solve by factoring $4x^4 - 31x^2 - 45 = 0$ (3 marks)
12. Solve $6 + \sqrt{8 + x^2} = x$ (2marks)
13. Solve this equation: $-3\sqrt{x} - 27 = -15\sqrt{x} + 5$ (2 marks)
14. Solve $\sqrt{x + 4} = \sqrt{7x - 6}$ (2 marks)
15. Solve $\sqrt{x + 9} = \sqrt{2 - x} + 1$ (3 marks)
16. A rectangle has a length of $6x + 4$ and a width of $x - 3$. If the area of the rectangle is 28 cm^2 , determine the value of " x ". (2 marks)
17. A rectangle, 4 cm longer than it is wide, has a diagonal that is $\sqrt{250}$ cm long. What are the dimensions of the rectangle? (3 marks)



18. The time, t in seconds, an object takes to reach the ground when dropped from h metres is given by the equation $t = \sqrt{\frac{h}{4.9}}$. If an object takes 4 sec to reach the ground, from what height was it dropped?

Ch.4 Factoring and Radical Equations Final Exam Review Key

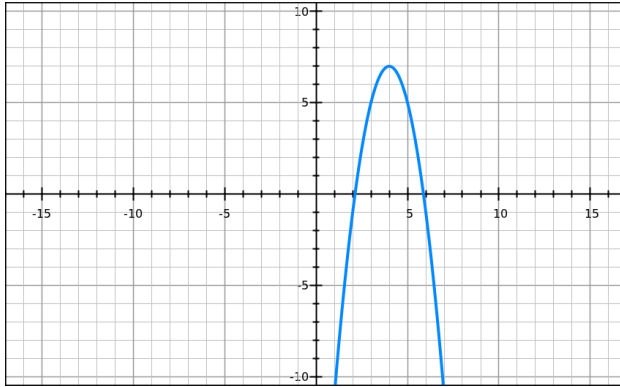
1. $(x + 8)(x - 3)$
2. $(4f - 9)(4f + 9)$
3. $(3x - 5)^2$
4. $(12x - 7y + 53)(12x + 7y - 17)$
5. $x = 9$ and $x = 4$
6. $x \geq \frac{7}{2}$
7. $-5(x - 12)(x + 3)$
8. $16(2x - 3y)(2x + 3y)$
9. $(-x + 42)(9x - 18)$
10. $4(x + 7)(x - 9)$
11. $x = 3$ and -3
12. No solution, or extraneous solution
13. $x = \frac{64}{9}$
14. $x = \frac{5}{3}$
15. $x = \frac{-7 + \sqrt{21}}{2}$
16. $x = 4$ and $-\frac{5}{3}$
17. 9 cm by 13 cm
18. 78.4 m

Unit 5 Quadratic Functions and Equations Final Exam Review

1. For a quadratic function, which characteristic of its graph is equivalent to the zeros of the function?
2. Identify the y -intercept of the graph of this quadratic function: $y = -7(x - 5)^2 + 8$
3. Use a graphing calculator to determine the x -intercepts of the quadratic function $y = 6x^2 - 27x - 12$. Write the intercepts to the nearest hundredth, if necessary.
4. A rectangular horse coral is to be enclosed with 80 m of fencing. The area of the horse coral, A square metres, is modelled by the function $A = 40x - x^2$, where x is the width in metres. What is the width that gives maximum area? Write the answer to the nearest tenth, if necessary.
5. If the graph of a quadratic equation has one x -intercept, what is a possible value of the discriminant?
6. Describe the translation that would be applied to the graph of $y = x^2$ to get the graph of $y = x^2 + 5$?
7. Describes the translation that would be applied to the graph of $y = x^2$ to get the graph of $y = (x - 15)^2$?
8. Which statement is **NOT** true for the graph of $y = ax^2$?
 - A. When a is greater than 1, the graph is the image of the graph of $y = x^2$ after a vertical stretch.
 - B. When $0 < a < 1$, the graph is the image of the graph of $y = x^2$ after a vertical compression.
 - C. The vertex of the graph is never at the origin.
 - D. When a is less than -1 , the graph is the image of the graph of $y = x^2$ after a vertical stretch and a reflection in the x -axis.
9. Expand the quadratic function $y = 4(x - 9)^2 - 2$ and write in general form.
10. A wide screen TV has a diagonal measure of 55 inches. The length of the screen is 24 inches more than the height. Write a quadratic equation that could be used to determine the dimensions of the television.
11. A flare is launched from a boat. The path of the flare is modeled by the function $h(t) = 225t - 7t^2$. Determine the maximum height of the flare to the nearest tenth if $h(t)$ is the height in metres, t seconds after it is launched.
12. What are the domain and range of $y = 5(x - 2)^2 + 6$?
13. Solve $2(x - 5)^2 = 56$. Leave your answers in exact form.

14. Complete the square on $y = -3x^2 + 18x + 22$, then identify the coordinates of the vertex. (3 marks)

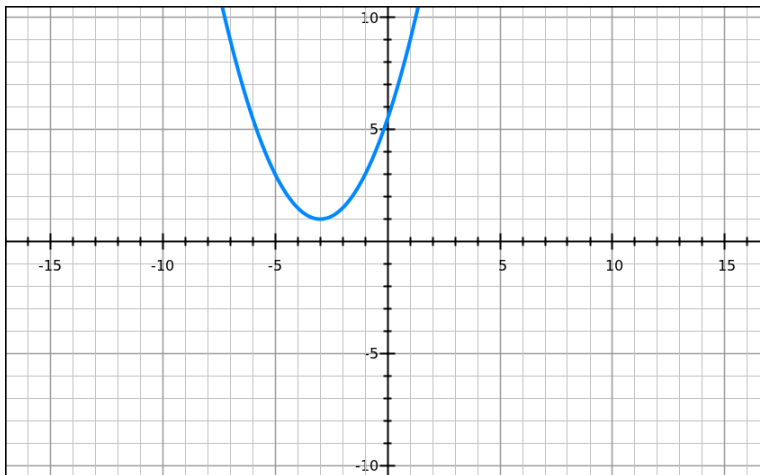
15. Use the following graph to determine: (6 marks)



- a) the x and y -intercepts
- b) the coordinates of the vertex
- c) the equation of the axis of symmetry
- d) the domain of the function
- e) the range of the function

16. The point $(-2, 4)$ lies on the graph of $y = x^2$. What is the transformed point on the graph of $y = -2(x + 4)^2 + 7$? (2 marks)

17. Determine an equation of the following graph of a quadratic function. (3 marks)



18. A flare was shot into the air with an upward velocity of 76 m/s. Its height, h metres, after t seconds is modelled by the equation $h = 200 + 76t - 16t^2$. **Determine the following algebraically.** Give your answers to the nearest tenth, if necessary.

- a) After how many seconds did the ball reach its maximum height? (4 marks)
- b) What was the ball's maximum height? (1 mark)

19. A rectangular playground is to be enclosed by a fence and divided into three sections with fencing parallel to two of its sides as shown. If 1200 m of fence are used to enclose a maximum area, **algebraically determine** the overall dimensions of the playground. (3 marks)



20. McDonald's sells a cheeseburger for \$1.49. At this price, they sell approximately 3 000 cheeseburgers per day. Research indicates that for every \$0.05 increase in price, the store will sell 50 fewer cheeseburgers. Determine the price of a cheeseburger that will maximize the revenue. (Use your graphing calculator to calculate your answer). (3 marks)
21. For what values of k does the equation $x^2 + 23x + k = 0$ have two roots? (2 marks)
22. Find the x -intercepts of the quadratic function $y = 2x^2 + 63x - 300$. Express your answers as exact values. (3 marks)
23. Circle the error in this solution of completing the square. Write the correct solution. (2 marks)
- $$y = 3x^2 + 18x - 7$$
- $$y = 3(x^2 + 9x + 20.25) - 60.75 - 7$$
- $$y = 3(x + 4.5)^2 - 67.75$$

Unit 5 Quadratic Functions and Equations Final Exam Review Key

1. roots or x -intercepts
2. -167
3. -0.41 and 4.91
4. 20 m
5. Discriminant $= 0$
6. translated 5 units up
7. translated 15 units right
8. C
9. $y = 4x^2 - 72x + 322$
10. $2x^2 + 48x - 2\,449 = 0$
11. $1\,808.04$ m
12. D: $x \in R$
R: $y \geq 6$
13. $x = 5 \pm 2\sqrt{7}$
14. $y = -3(x - 3)^2 + 49$
15. a) $x = 2$ and 6
b) vertex $(4, 7)$
c) $x = 4$
d) $x \in R$
e) $y \leq 7$
16. $(-6, -1)$
17. $y = \frac{1}{2}(x + 3)^2 + 1$
18. a) 2.375 sec
b) 290.25 m
19. $w = 150$ m ; $l = 300$ m
20. $\$2.24$
21. $k < 132.25$
22. $x = \frac{-63 \pm \sqrt{6369}}{4}$
23. Error in row 2. $9x$ should be $6x$ and the number to add to and subtract should be 9 .
 $y = 3(x + 3)^2 - 34$

Math 20-1 Ch.6 Rational Expressions and Equations Final Exam Review

1. What are the non-permissible values for the following rational expression?

$$\frac{x^2 - 2x + 35}{3x^2 - 11x - 20}$$

2. Simplify this rational expression. State the non-permissible values of the variable. (3 marks)

$$\frac{2x^2 + 5x - 12}{x^2 - 16}$$

3. Simplify this expression: (3 marks)

$$\frac{4x}{12x^2y} \div \frac{8x^2}{3x} \times \frac{15y}{6xy}$$

4. Simplify this expression: (3 marks)

$$\frac{b^2 + 2b - 8}{b^2 - 4} \times \frac{4b^2 + 3b - 10}{8b^2 + 35b + 12}$$

5. Simplify. (2 marks)

$$\frac{5m}{2m - 4} + 1 - \frac{3}{3m - 6}$$

6. Simplify. (2 marks)

$$\frac{5y^2 + 2}{x^2y^2} - \frac{7}{x}$$

7. Simplify. (2 marks)

$$\frac{x}{3x + 4} + \frac{4}{2x - 1}$$

8. Simplify (3 marks)

$$\frac{\frac{t}{2} + 1}{\frac{1}{4} + \frac{t+1}{t^2}}$$

9. Solve and state the non-permissible values (3 marks)

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

10. Solve and state the non-permissible values (3 marks)

$$\frac{3x}{x+1} - \frac{x}{x-1} = \frac{2x+3}{x+1}$$

11. Find the exact solutions to the rational equation and state the non-permissible values (4 marks)

$$\frac{2}{n^2 - 16} - \frac{1}{n+1} = \frac{3}{n-4}$$

- 12.** Melanie drove 404 km from Edmonton to Banff in the same time that it took Heidi to drive 364 km from Edmonton to Jasper. Melanie drove 10 km/h faster than Heidi. Determine Heidi's speed in km/h (4 marks)
- 13.** Bailey and Morgan paint a room in 8 hours when working together. Bailey can paint twice as fast as Morgan. How long would it take for each of them to paint it if they worked alone?
(3 marks)

Math 20-1 Ch.6 Rational Expressions and Equations Final Exam Review Key

1. $x \neq -\frac{4}{3}, 5$

2. $x \neq \pm 4; \frac{2x-3}{x-4}$

3. $\frac{5}{16x^3y}$

4. $\frac{4b-5}{8b+3}$

5. $\frac{7m-6}{2(m-2)}$

6. $\frac{5y^2-7xy^2+2}{x^2y^2}$

7. $\frac{2x^2+11x+16}{(2x-1)(3x+4)}$

8. $\frac{2t^2}{t+2}$

9. $x=2; x \neq -1, \frac{1}{3}$

10. $x = \frac{3}{5}$

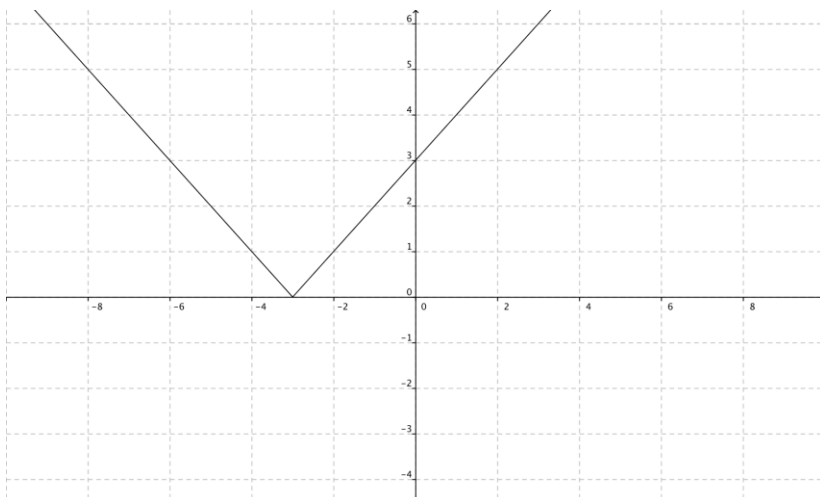
11. $\frac{-13 \pm \sqrt{265}}{8}$

12. 91 km/h

13. It would take Bailey 12 hrs to paint the room the room alone and Morgan would take 24 hrs to paint the room alone.

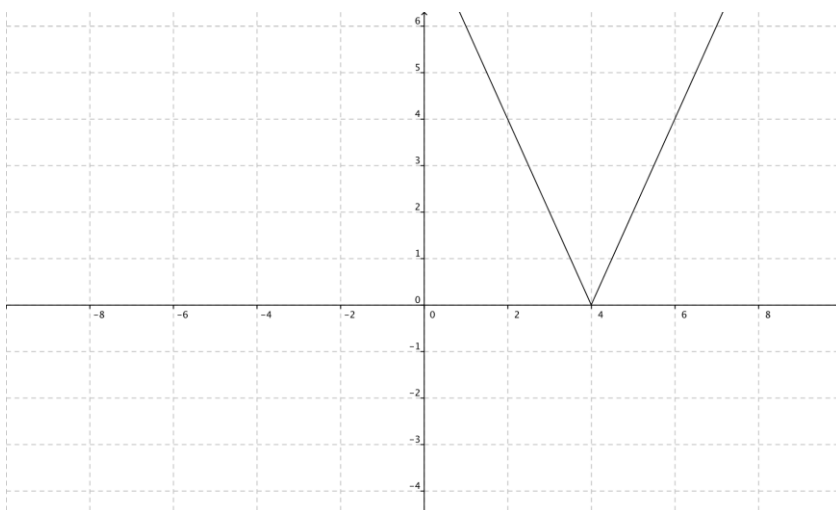
Math 20-1: Chapter 7 Absolute Value and Reciprocal Functions Final Exam Review

1. This is the graph of the absolute value of a linear function.



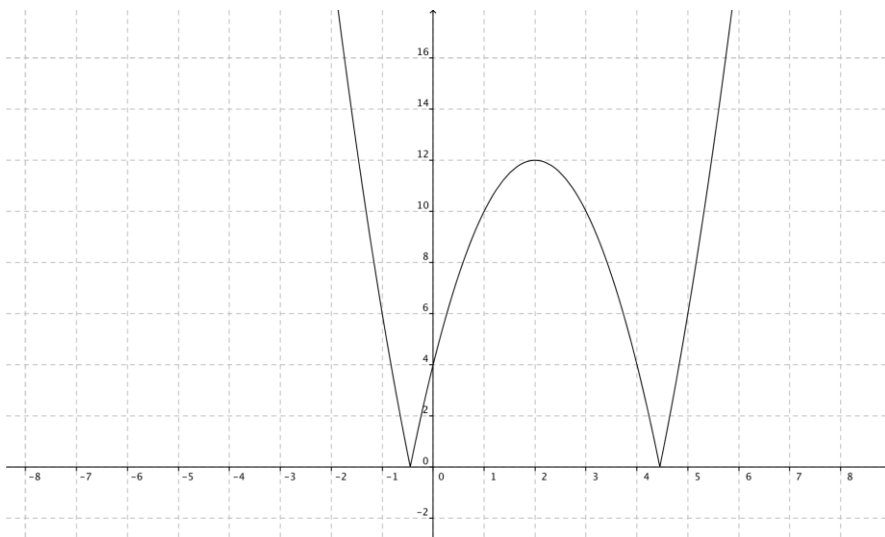
Draw the graph of the original linear function .

2. This graph represents $|-2x + 8|$

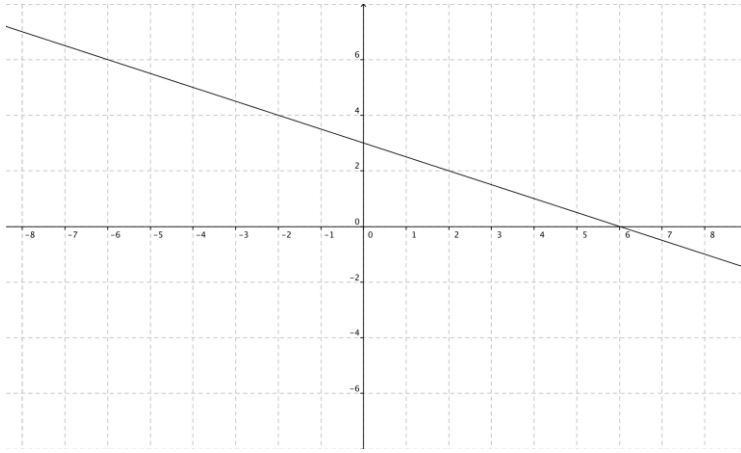


Write the function represented by the graph in piecewise notation.

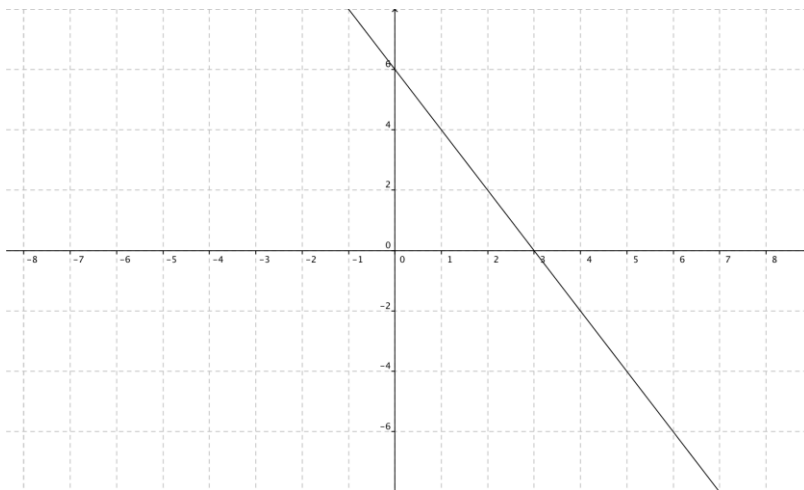
3. This is the graph of the absolute value of a function $f(x)$. What is an equation for $f(x)$?



4. Solve this equation: $|-2x^2 + 5| = 6$ graphically
5. How many solutions does the equation $|3x^2 - 8| = 3$ have?
6. For the function $y = -7x + 6$, write the equation of its reciprocal function.
7. This is the graph of a linear function. Sketch the graph of the reciprocal function.

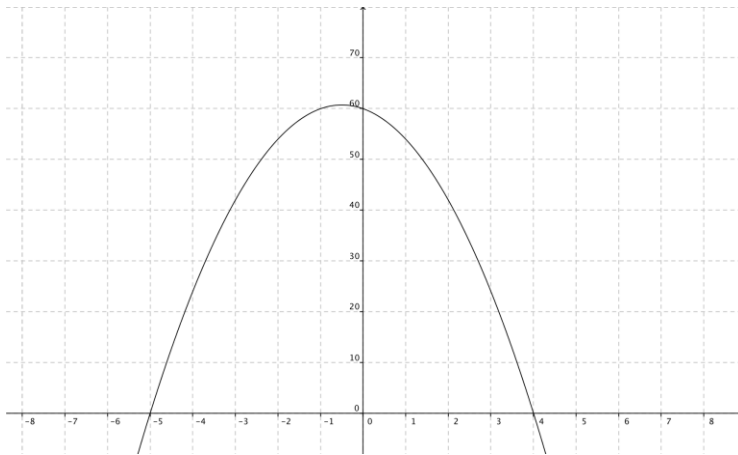


8. This is the graph of a linear function. What is the equation of the vertical asymptote of the graph of its reciprocal function?

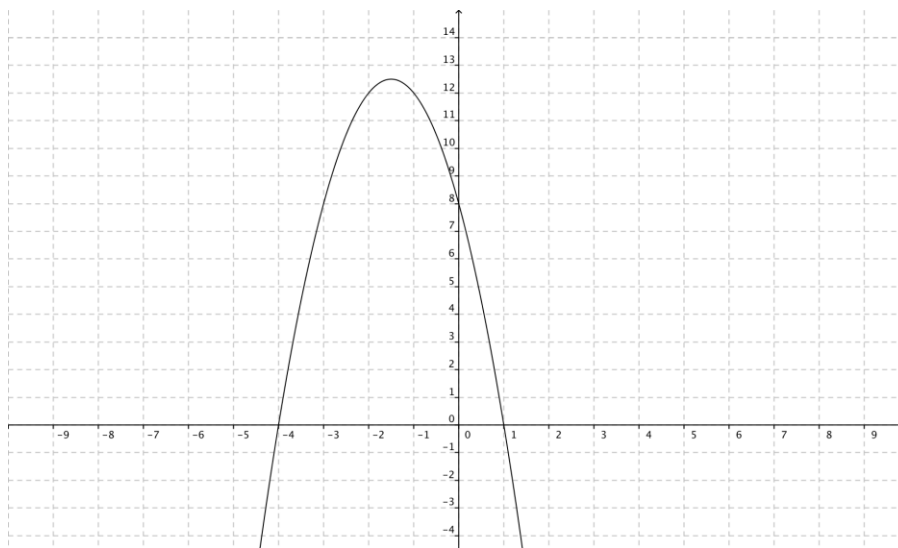


9. What are the domain and range of the reciprocal function $y = \frac{-1}{x-6}$?

10. This is a graph of $f(x)$. Identify the vertical asymptotes of the graph of the reciprocal function.



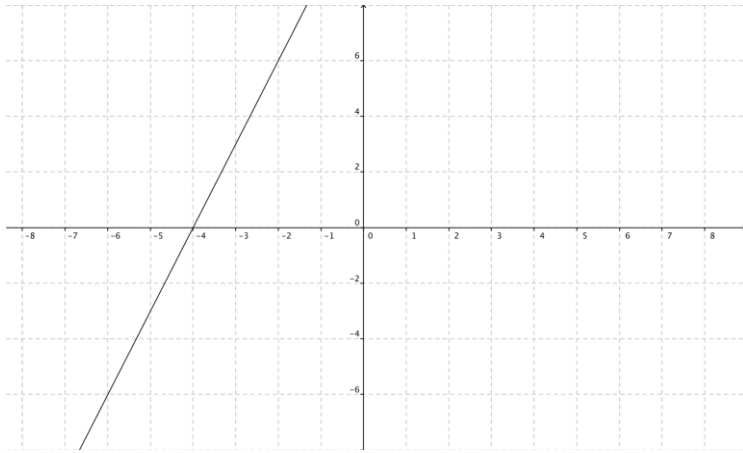
11. Here is the graph of $y = f(x)$. Sketch the graph of its reciprocal function.



12. The result when $|5^2 - 18| + |4^3 \times 6|$ is evaluated is _____.

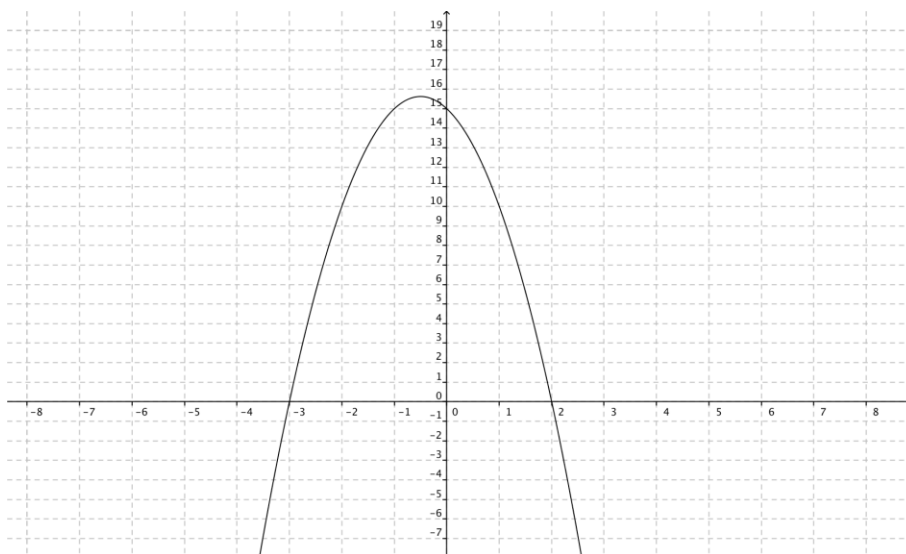
13. The invariant points for the function $f(x) = \frac{1}{2x - 8}$ are _____ and _____.

14. Given the graph of $y = f(x)$:



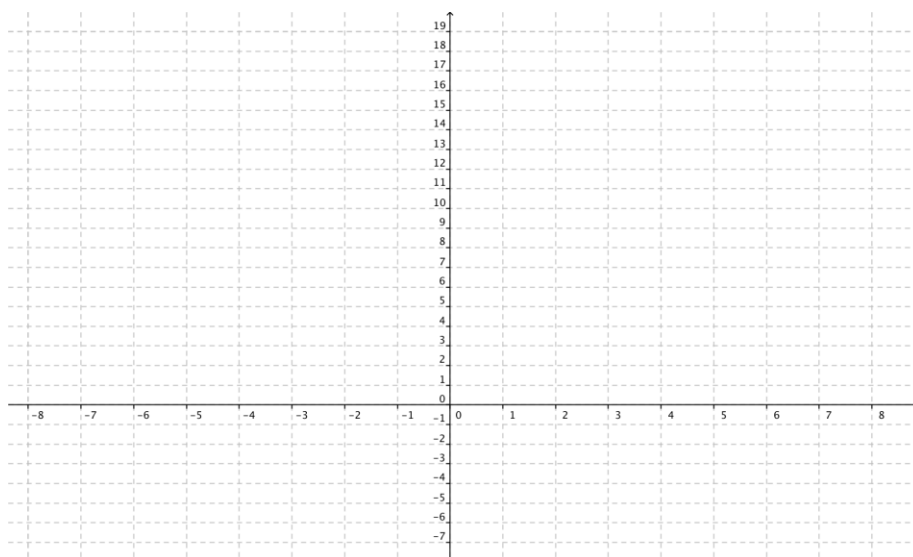
- a) sketch the graph of $y = |f(x)|$. (1 mark)
- b) state the domain and range of the graph of the absolute value function. (1 mark)
- c) express $y = |f(x)|$ as a piecewise function. (2 marks)
15. Determine the solution to $|3x + 5| - 2 = 7$. (2 marks)
16. Solve this equation: $|6x - 5| = -2x + 3$. (2 marks)
17. Solve the equation $|2x^2 - 6| = 12$. (3 marks)
18. Determine the exact solution(s) to $|x^2 + 6x + 8| = 4x + 15$. (3 marks)

19. This is the graph of a quadratic function $y = f(x)$.



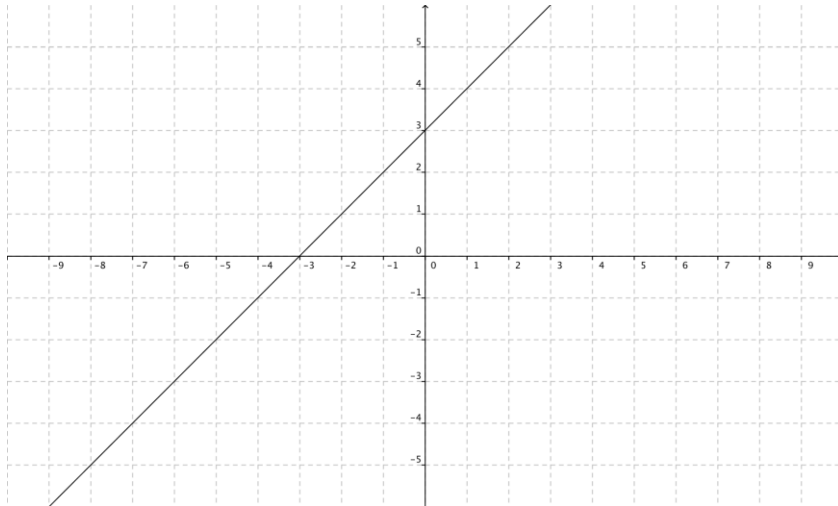
Sketch a graph of the reciprocal function $y = \frac{1}{f(x)}$ and identify the vertical asymptotes, if they exist.

(3 marks)



Math 20-1: Chapter 7 Absolute Value and Reciprocal Functions Final Exam Review Key

1.



2.
$$\begin{cases} -2x + 8, & x \leq 4 \\ 2x - 8, & x > 4 \end{cases}$$

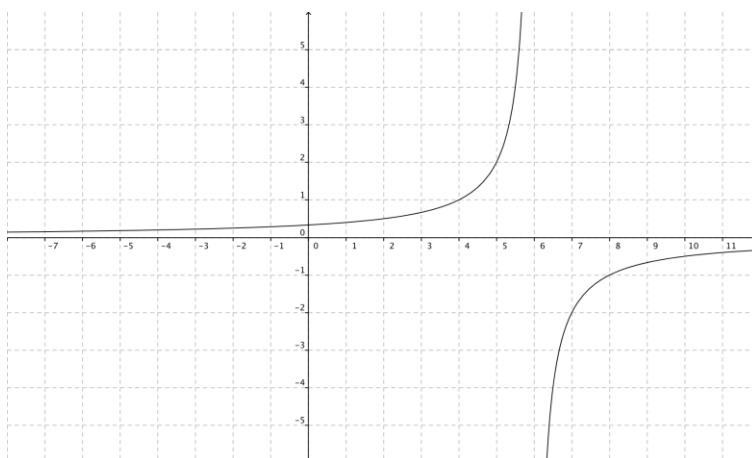
3. $y = -2(x - 2)^2 + 12$

4. $(-2.35, 6)$ $(2.35, 6)$

5. 4 solutions

6. $y = \frac{1}{-7x + 6}$

7.



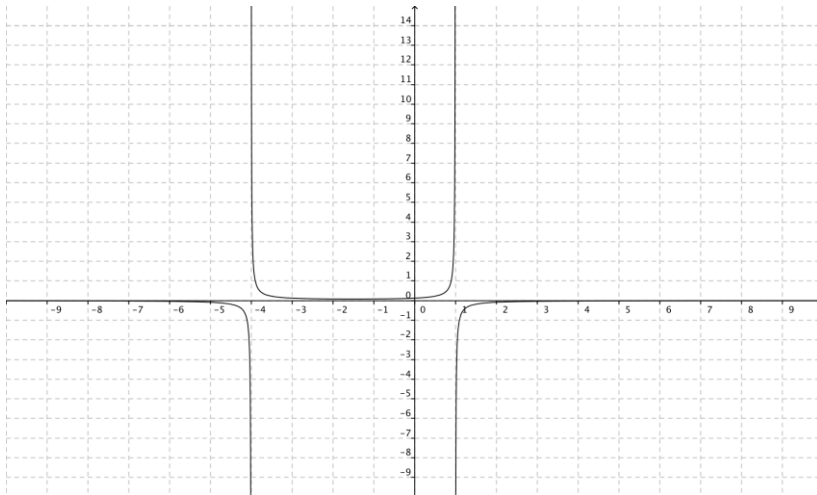
8. $x = 3$

9. D: $x \neq 6, x \in R$

R: $y \neq 0, y \in R$

10. $x = -5$ and $x = 4$

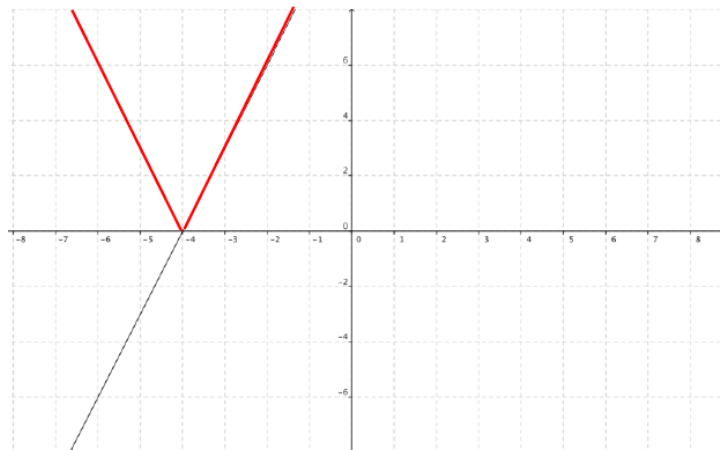
11.



12. 391

13. (4.5, 1) and (3.5, -1)

14. a)



b) D: $x \in R$

R: $y \geq 0$

c) $|3x + 12| = 3x + 12, x \geq -4$

$-3x - 12, x < -4$

15. $x = \frac{4}{3}$ and $-\frac{14}{3}$

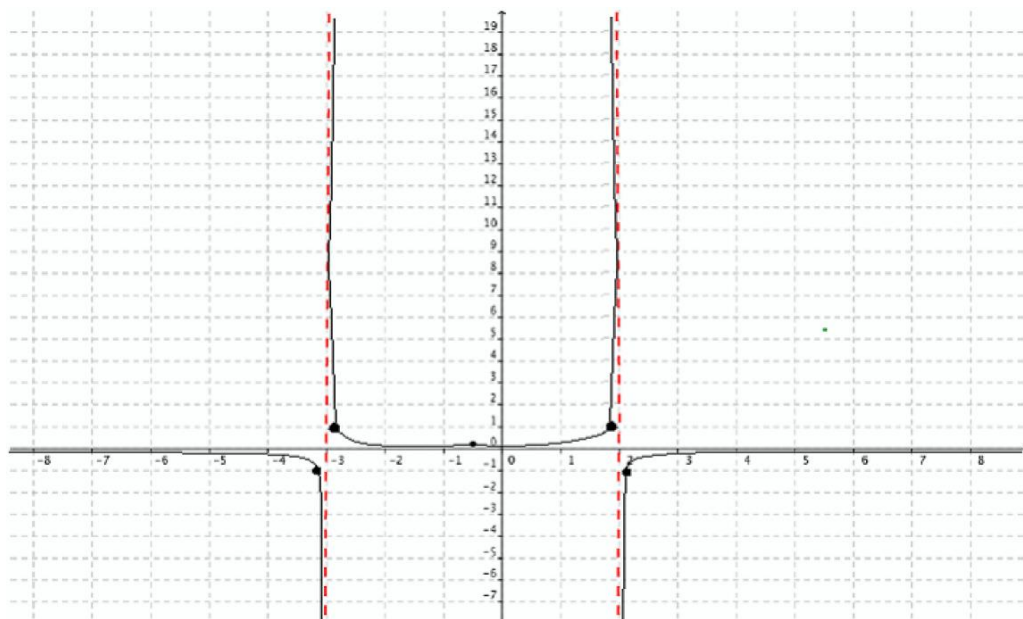
16. $x = 1$ and $\frac{1}{2}$

17. $x = 3$ and -3

18. $x = -1 + 2\sqrt{2}$

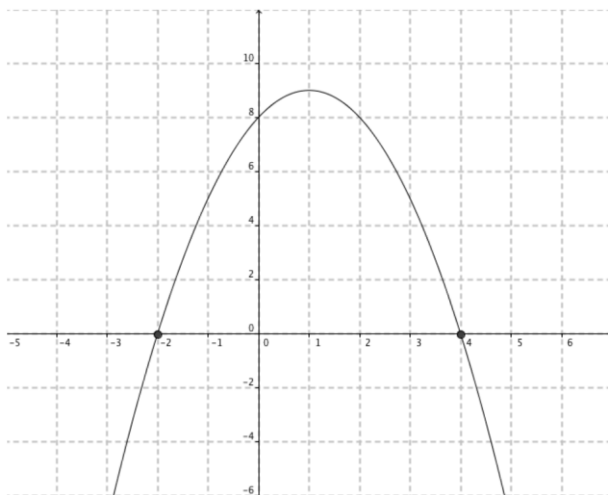
$x = -5 + \sqrt{2}$

19.

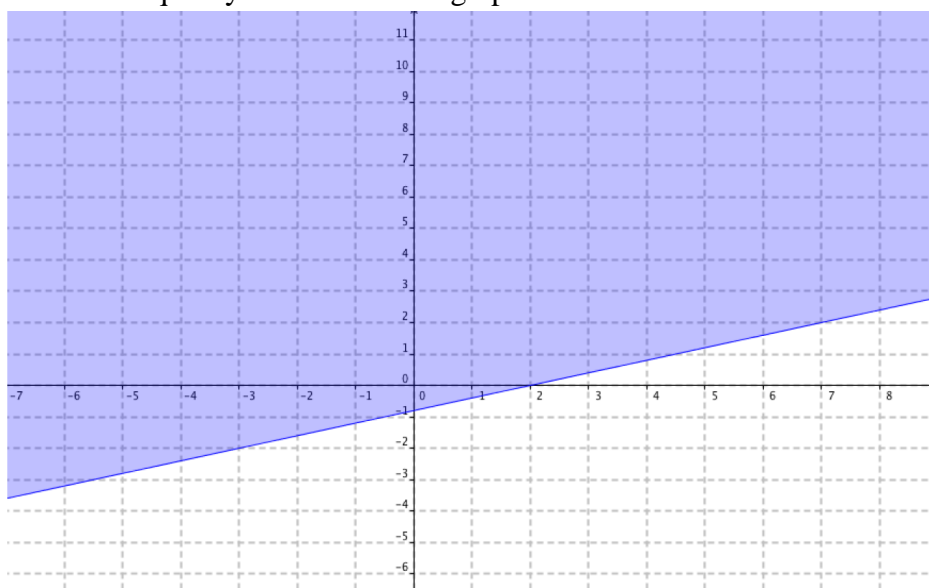


Ch.8 Linear and Quadratic Systems of Equations and Inequalities Final Exam Review

1. Use the graph to write the solution of this quadratic inequality $-x^2 + 2x - 8 \geq 0$:

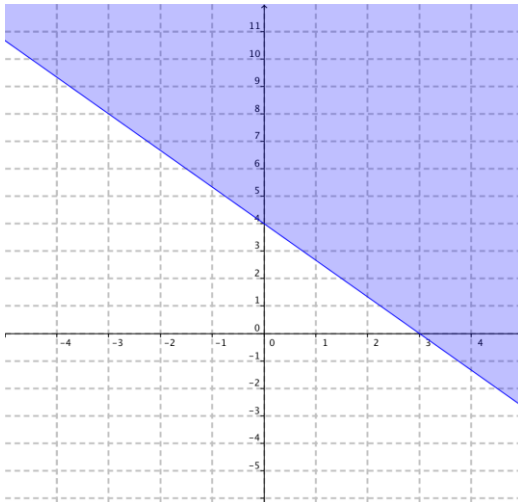


2. Which coordinates are a solution of the inequality $5x + 3y > 7$?
- A. $(-2, -2)$ B. $(1, -4)$ C. $(2, 4)$ D. $(2, -6)$
3. A massage therapist books patients for either 30-min or 60-min appointments. She sees patients a maximum of 40 h each week. Write an inequality that represents the massage therapist's weekly appointments. Let x represent the number of 30-min appointments and y represent the number of 60-min appointments.
4. Write an inequality to describe this graph.

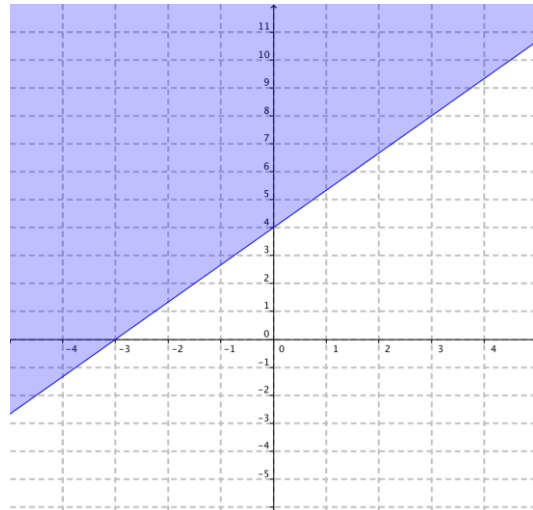


5. Match the inequality $4x + 3y \leq 12$ to its graph.

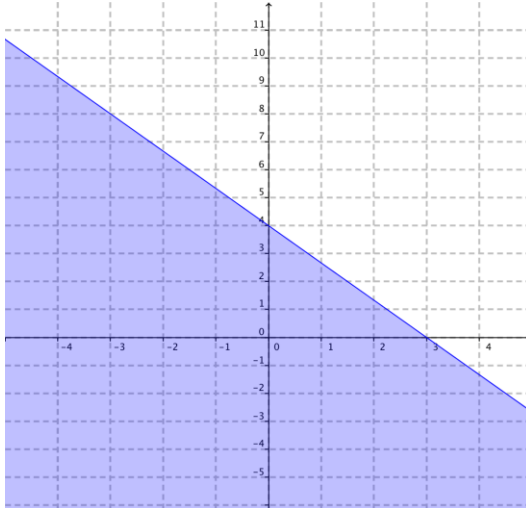
A.



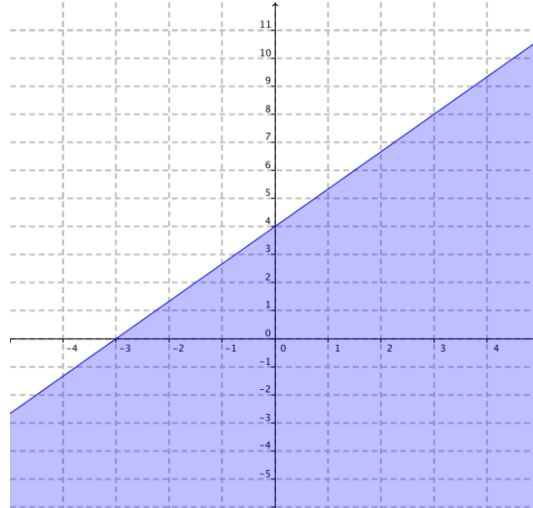
C.



B.



D.



6. Which ordered pair is a solution of the quadratic inequality $y > x^2 - 4$?

A. $(-3, 2)$

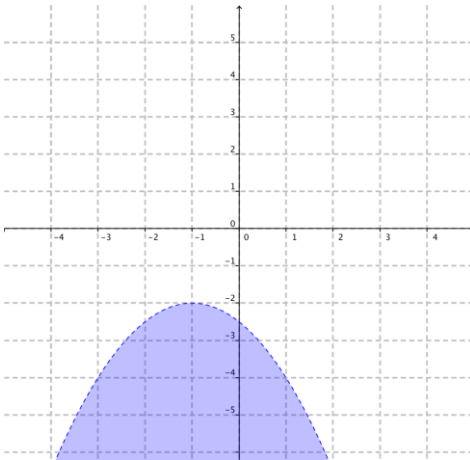
B. $(2, -3)$

C. $(-4, 5)$

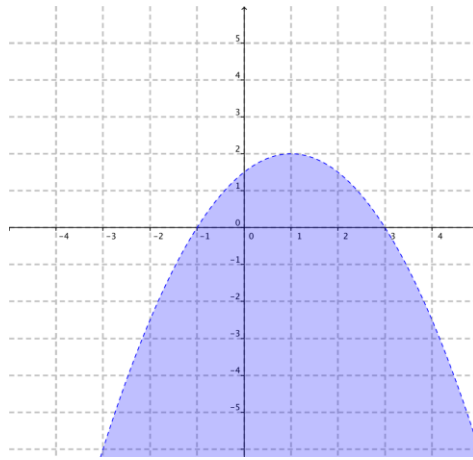
D. $(1, 5)$

7. Which graph represents the inequality $y > -0.5(x+1)^2 - 2$?

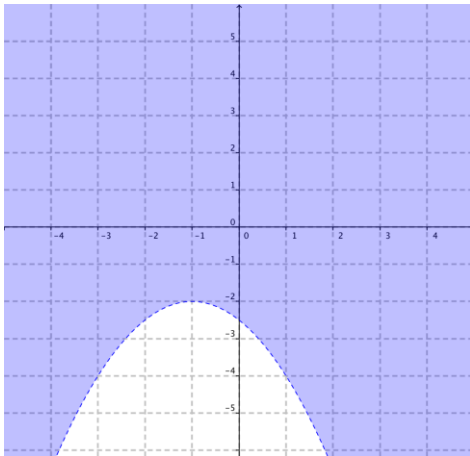
A.



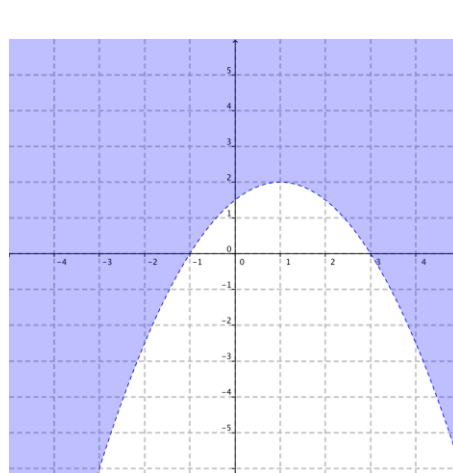
C.



B.



D.



8. Use a graphing calculator to graph this system of equations.

Write the coordinates of the point of intersection to the nearest hundredth.

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

$$-4x + 2y = -9$$

9. A clothing store makes a profit of \$50 on every pair of jeans sold and \$25 on every blouse sold. The manager's goal is to have a profit of at least \$900 a day from the sales of these two items.

If x represents the number of jeans sold and y represents the number of blouses sold, write an inequality that models the combinations of jeans and blouse sales that will meet or exceed the daily profit goal.

Numerical Response

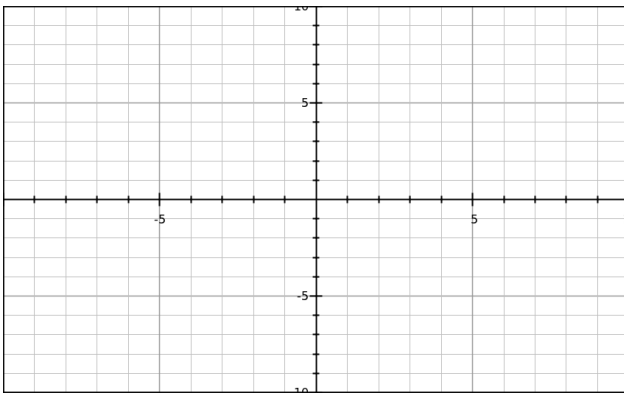
10. A boundary line that is solid is represented by the inequality symbol _____.

Written Response: Calculate your answers on a separate sheet of paper. Show all of your work.

11. Solve this quadratic inequality: $5x^2 + 18x > 8$ using test intervals (3 marks).

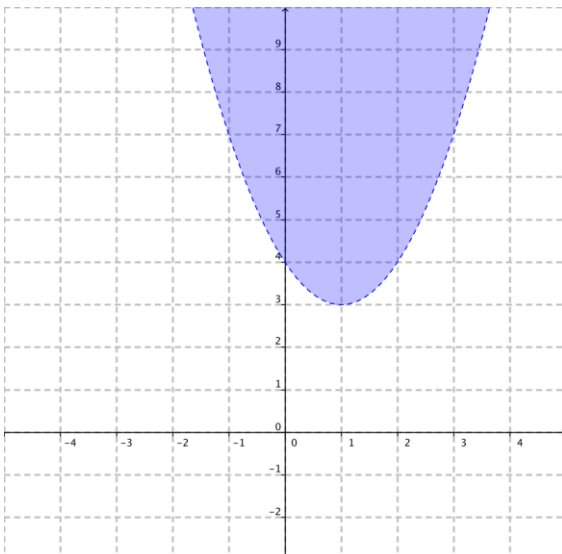
12. For point $(p, -4)$ to be a solution of $4x + 8y < 24$, what must be true about p ? (2 marks)

13. a) Graph the inequality: $y < (x - 3)^2 - 2$ (2 marks)



b) Write the coordinates of a point that satisfy the inequality. (1 mark)

14. Write an inequality to describe this graph. (3 marks)



15. Solve this system algebraically (3 marks)

$$y = x^2 + 3x - 49$$

$$y = 2x + 7$$

16. Solve this linear-quadratic system algebraically. (3 marks)

$$y = -4x^2 - 4x + 20$$

$$4x - y = 12$$

17. Solve this quadratic-quadratic system algebraically. (2 marks)

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

$$y = -4x^2 + 1$$

18. Solve this quadratic-quadratic system algebraically. (3 marks)

$$y = (x - 3)^2$$

$$y = -2x^2 - 15x + 39$$

19. **Solve the following algebraically.** A toy rocket is fired and follows the path defined by $h = -16t^2 + 177t + 4$. A hot air balloon is travelling along the path defined by $h = 80t + 150$. Determine the coordinates of the point when the toy rocket first hits the balloon, if h is the height in metres and t is the time in seconds. (2 marks)

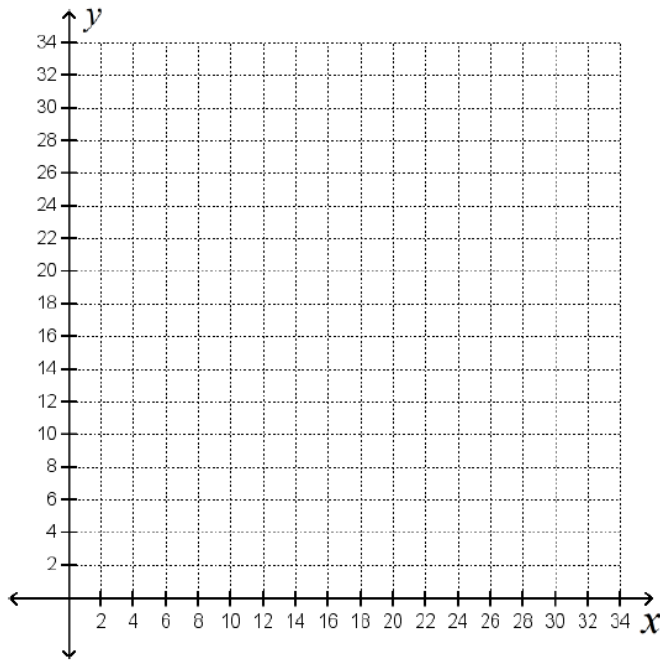
a) How many seconds after the rocket was fired did it first hit the balloon? (1 mark)

b) How high above the ground was the rocket when it first hit the balloon? (1 mark)

20. A men's clothing store makes an average profit of \$25 on each pair of shoes sold and \$20 on each tie. The manager's target is to make at least \$600 a day on sales from shoes and ties.

a) What inequality represents the numbers of shoes and ties that can be sold each day to reach the target? (1 mark)

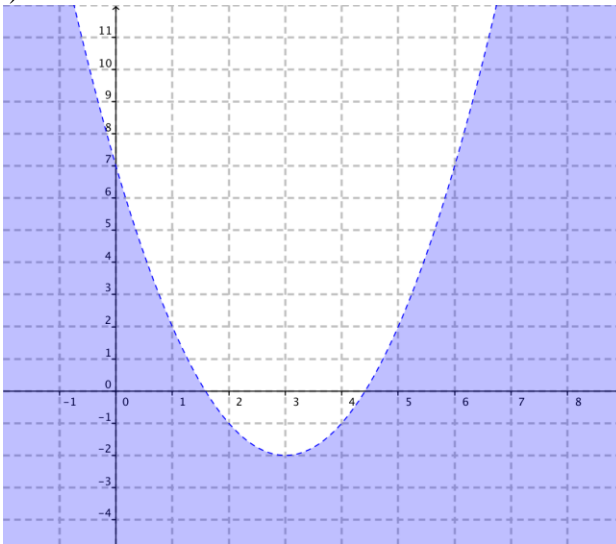
b) Graph the inequality. (2 marks)



c) If an equal numbers of shoes and ties are sold, what is the minimum number needed to reach the target? (1 mark)

Ch.8 Linear and Quadratic Systems of Equations and Inequalities **Final Exam Review Key**

1. $-2 \leq x \leq 4$
2. $(2, 4)$
3. $30x + 60y \leq 2400$
4. $5y \geq 2x - 4$
5. B
6. $(1, 5)$
7. B
8. $(-0.91, -6.33)$ and $(1.91, -0.67)$
9. $50x + 25y \geq 900$
10. \geq or \leq
11. $x < -4$ and $x > \frac{2}{5}$
12. $p < 14$
13. a)



b) $(0, 0)$

14. $y > (x - 1)^2 + 3$
15. $(-8, -9)$ and $(7, 21)$
16. $(-4, -28)$ and $(2, -4)$
17. $(0.93, -2.43)$ and $(-0.93, -2.43)$
18. $(-5, 64)$ and $(2, 1)$
19. $(2.78, 372.3)$
 - a) 2.78 sec
 - b) 372.3 m
20. a) $25x + 20y \geq 600$
- b) graph to the right
- c) 14 of each

