

Foundations 11 January Exam Review

Chapter 1 - Logical Reasoning

1. Determine the number that should be in the centre of Figure 4.

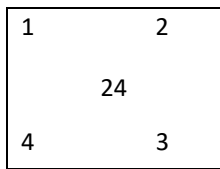


Figure 1

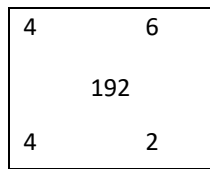


Figure 2

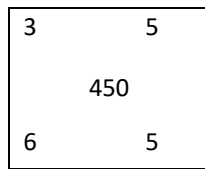


Figure 3

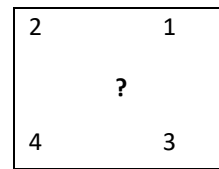


Figure 4

2. a) Write a reasonable conjecture about the sum of three odd integers.
 b) Use deductive reasoning to prove that the sum of two even numbers and one odd number will be an odd number.

3. Find a counterexample for each of the following conjectures.

- When you add a multiple of 6 and a multiple of 9, the sum will be a multiple of 6.
- The square of a number is always greater than the number.

4. The three little pigs built three houses: one of straw, one of sticks, and one of bricks. By reading the six clues, deduce which pig built each house, the size of each house, and the town in which each house was located.

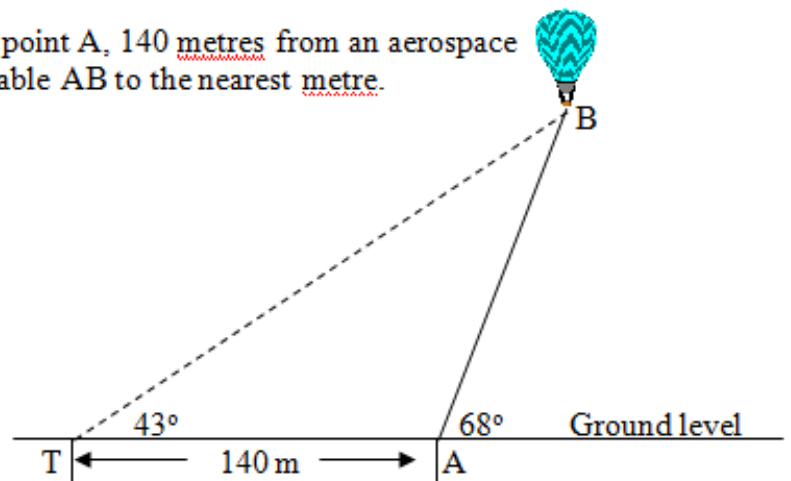
Clues

- Penny Pig did not build a brick house.
- The straw house was not medium in size.
- Peter Pig's house was made of sticks, and it was neither medium nor small in size.
- Patricia Pig built her house in Pleasantville.
- The house in Hillsdale was large.
- One house was in a town called Riverview.

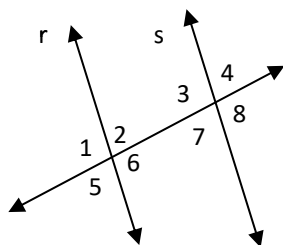
Chapters 2, 3 and 4 – Geometry and Trigonometry

1. A weather balloon is anchored to the ground at point A, 140 metres from an aerospace tracking station at point T. Find the length of the cable AB to the nearest metre.

(value 3)

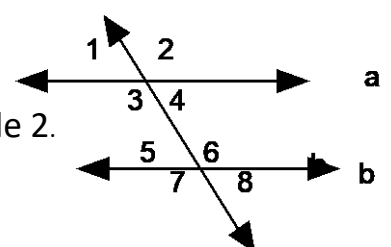


2. Given that line r is parallel to line s. State the angles that may be referred to as:



- corresponding angles
- alternate interior angles
- alternate exterior angles
- co-interior angles
- state the relationship between the angles in a) & d)

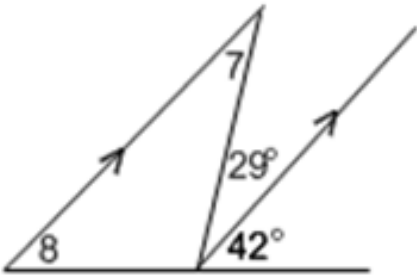
3. a) In the diagram below, if angle 2 is 112° determine the measure of angle 1 and angle 4. Give reasons.



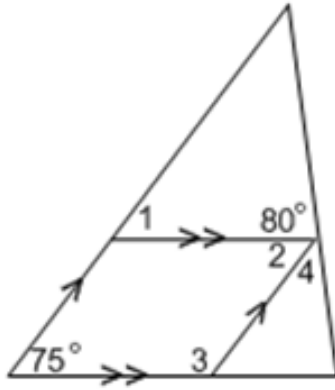
b) In the diagram at right, $a \parallel b$. Prove that angle 3 is equal to angle 2.

4. Find the value of the angle(s) indicated in each of the following diagrams. Be sure to provide valid reasons for each answer.

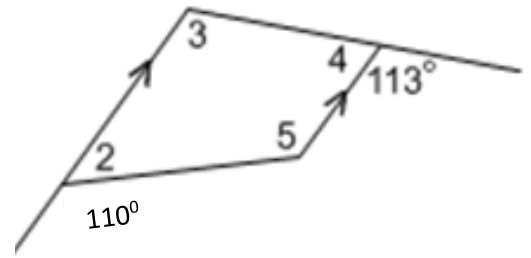
a)



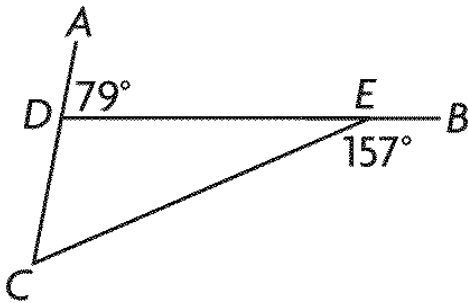
b)



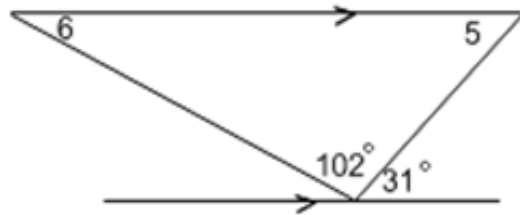
c)



d) Find the measure of all angles in $\triangle CDE$.

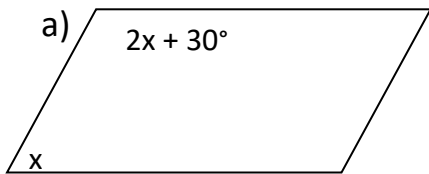


e) Find the measures of angles 5 & 6

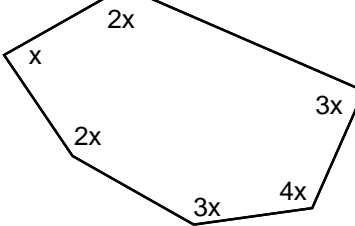


5. Solve for x in each of the following. Provide clear reasons for your answers.

a)

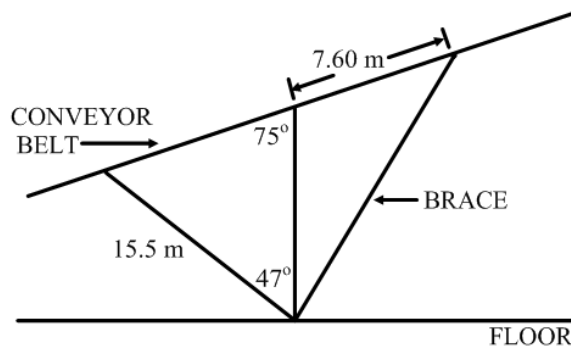


b)



6. A swimmer leaves the dock and swims toward a raft 80 m away. After reaching the raft, she changes direction and swims another 55 m. She then stops and treads water. As measured from the raft, the angle between the line of sight to the dock and the line of sight to the swimmer's current position is 32° . Draw a diagram and determine the *shortest* possible distance, to the nearest tenth of a metre, between the dock and where the swimmer is treading water.

7. An engineer is working with a cross-section diagram that represents a conveyor belt used to move pulp into the plant, as shown below. The brace indicated on the diagram has to be replaced. Determine the length of the brace to the nearest tenth of a metre.



8. Charlie has been driving his ATV for 3.2 km in a compass direction of N54°E. He then changes his direction

to S5°W and continues for 4.6 km. If Charlie wants to return directly to his starting point,

- How far must he travel, to the nearest tenth of a km?
- In which direction should he travel, to the nearest degree?

Chapter 5 – Linear Inequalities

Things to note:

Dashed lines will represent $<$ or $>$ signs

Solid lines will represent \leq or \geq signs

All points in the shaded region, if plugged into the equation will be TRUE

All points in the non-shaded region, if plugged into the equation will be FALSE

1. Given the inequality $2x + 4y \geq 16$. a) Dashed line or solid line? b) Rewrite the inequality into slope-intercept form. ($y = mx + b$) c) Graph the boundary line. d) Shade above or below the line? (Test point). **Try to use (0,0) where possible.**

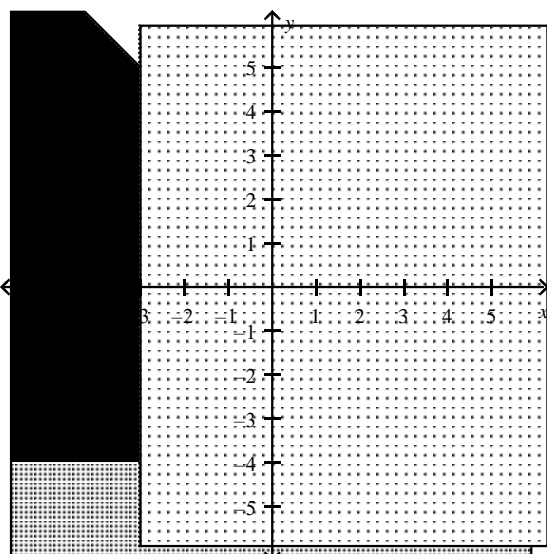
2. Determine the solution set for the following system of inequalities:

$$y \geq 2x - 1 \text{ and } y < x + 5$$

3. Determine the solution set for: $\{(x, y) \mid y \geq -\frac{3}{2}x + 3, x \in R, y \in R\}$ and $\{(x, y) \mid y \geq 6x + 1, x \in R, y \in R\}$

4. On a flight between Calgary and Thunder Bay, there are business and economy seats. At capacity, the airplane can hold no more than 133 passengers. Also, no fewer than 124 economy seats are sold and no more than 5 business class seats are sold. The airliner charges \$624 for each business class seat and \$239 for each economy seat. Let B represent the number of business class seats sold. Let E represent the number of economy seats sold. Provide 4 constraints for this problem as inequalities.

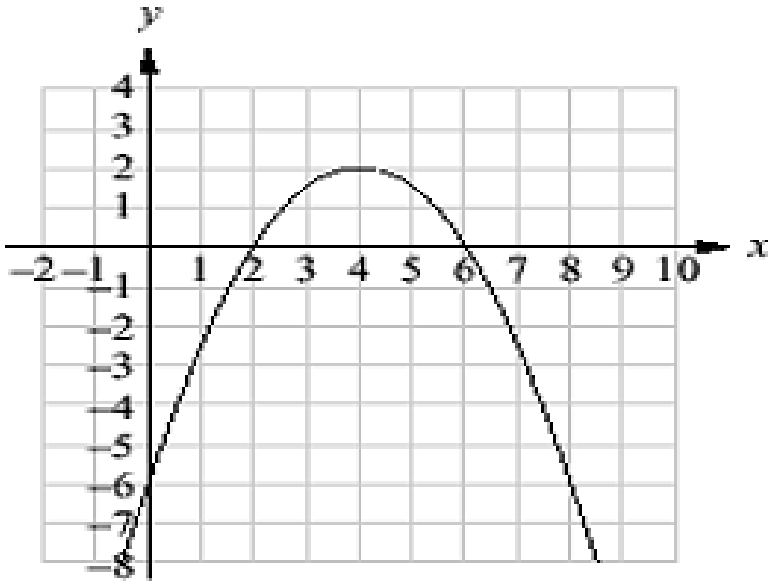
5. What system of linear inequalities is shown here? Write your answer in set notation.



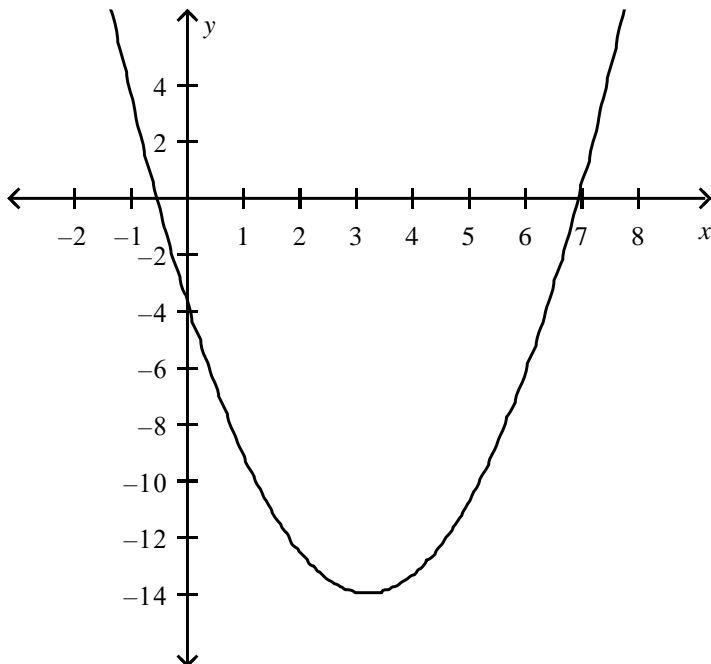
Chapter 6 – Quadratic Functions and Equations

- Does the parabola $y = -2x^2 + 6x - 5$ open up or down? How do you know?
- For each function below: i) State the direction of opening ii) Determine the x and y-intercepts (**factor**) iii) Axis of Symmetry
iv) Find the vertex v) Graph
 - $y = x^2 - 3x - 4$
 - $y = x^2 - 10x + 16$
- For the function $y = -x^2 + 6x - 3$:
 - Use partial factoring to find two points on the parabola
 - Find the vertex
 - Draw the graph of the quadratic function
 - Use the Discriminant to determine the number of roots
- A flare is often used as a signal to attract rescue personnel in an emergency. When a flare is shot into the air, its height, $h(t)$, in meters, over time, t , in seconds can be modeled by $h(t) = -5t^2 + 120t$
 - Identify the x and y intercepts of the parabola
 - When did the flare reach its maximum height? What was the maximum height?
 - What was the height of the flare after 15s?
 - State the domain and range of the function.
- Use the quadratic formula to solve: $2x^2 - 5x - 3 = 0$
- Show how partial factoring can be used to find the vertex of the function:
 $f(x) = x^2 - 8x + 13$
- A cannon fires a ball which travels in a trajectory modeled by the function
 $h(x) = -0.5x^2 + 15x + 2$ where $h(x)$ is the ball's height in meters, and x is the horizontal distance travelled in meters. a) How high is the end of the barrel of the cannon? b) What's the horizontal distance of the ball when the ball hits the ground?
- Graph the equation $y = 5x^2 - 10x - 15$ by finding the **x-intercepts**, **y-intercepts** and the **vertex**. Also, determine the domain and the range for the function.

9. Given the parabola below, determine the **factored form** and **standard form** that represents the quadratic.



10. Given the parabola below, determine the **factored form** and **standard form** that represents the quadratic when the y-int is -3.5



Chapters 8 Financial Mathematics – Investing Money

1. Estimate the amount of time it will take for a \$700 investment to double if it is invested at 1.7%, compounded weekly.
2. Determine the interest earned on a 15-year investment with an interest rate of 3.88%, compounded semi-annually, if the future value is \$120 000.
3. Determine the initial amount invested in an 8-year GIC with an interest rate of 6.4%, compounded monthly, if the future value is \$12 000.
4. Determine the future value of monthly payments of \$800 into an account that pays 2.03% interest, compounded monthly, for 10 years.