

MPM2DU Mock Exam

Chapter 1

1. Solve $\begin{cases} \frac{3}{2}x - 5y = 8 \\ 2x + y = 3 \end{cases}$ by substitution.

2. Solve $\begin{cases} 5x - 3y = 9 \\ 2x - 5y = -4 \end{cases}$ by elimination

3. A hockey player is offered two options for a contract: either a base salary of \$50 000 and \$1 000 per goal, or a base salary of \$40 000 and \$1500 per goal. How many goals must he score in order to make the same amount of money for each contract?

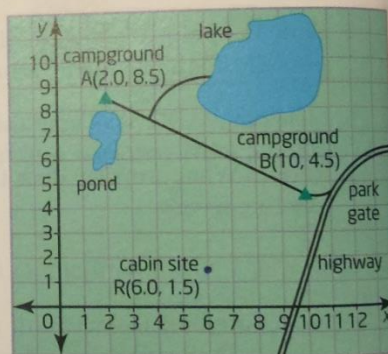
Chapter 2

All of the questions are based on the triangle whose vertices are $A(3,5)$, $B(-2,0)$, $C(2,-4)$.

1. Calculate the exact length of AC .
2. Determine the coordinates of the midpoint of AB .
3. What is the equation of the circle centred on the origin that passes through C ?
4. Is point A inside, outside or on the circle in question #3?
5. $C(4,-3)$ is the midpoint of a line segment with endpoints $A(7,5)$ and B . Determine the coordinates of B ?
6. Using the information below, find the length and the coordinates of the shortest distance to get to the existing road.

Example 1 Find the Shortest Route

A ranger cabin is to be built in a flat wooded area near the straight road that connects the two campgrounds in a park. A new side road will connect the cabin to the campground road. On the park map, the campgrounds have coordinates $A(2.0, 8.5)$ and $B(10.0, 4.5)$, while the site for the cabin is at $R(6.0, 1.5)$. Each unit on the map grid represents 500 m.



Chapter 5

1. Expand and simplify: a) $(x + 3)^2$ b) $(2x - 5)^2$ c) $(4x + y)^2$ d) $(3x + 2)(3x - 2)$

2. Factor: a) $4a^2 + 6ab + 12abc$ b) $xy + 12 + 4x + 3y$

3. Factor: a) $x^2 - 3x - 4$ b) $10x^2 - 17x + 3$ c) $8d^2 + 18d + 12$

Chapter 6

1. Complete the square. Determine direction of opening, max or min, AOS, and vertex

a) $y = x^2 - 14x + 20$ b) $y = -4x^2 + 24x - 3$

2. Solve by factoring

a) $x^2 + 4x - 5 = 0$ b) $10x^2 + 19x + 6 = 0$

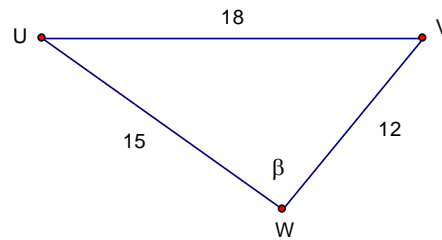
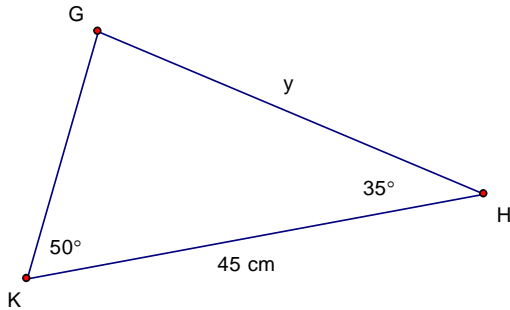
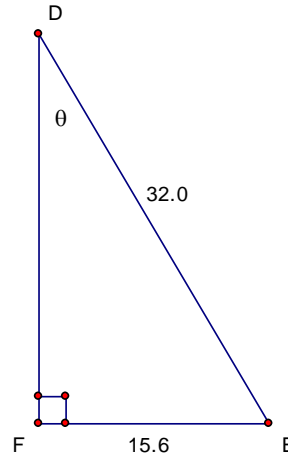
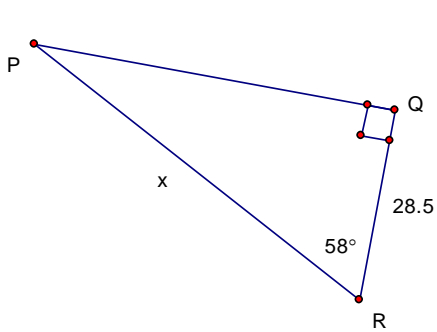
3. A ball is thrown up into the air, its height h , in metres, after t seconds is $h = -4.9t^2 + 38t + 1.75$.

- a) What is the height of the ball after 3s
- b) For what length of time is the ball above 50m?
- c) When does the ball strike the ground?
- d)

4. Mr. Singh jumps off a building that is 17m above the ground. The height above the ground is h , in metres, after t seconds is modelled by $h = -4.9t^2 + 1.5t + 17$. How long is Mr. Singh in the air?

Chapter 7

1. Solve for the unknown angles



2. Amanda places a mirror on the ground 7.5 m in front of the base of a flagpole. If she stands back 1.2 m from the mirror, she can see the reflection of the top of the pole in the mirror. If Amanda is 1.6 m tall, how tall is the flagpole?

3. From the edge of the roof of a building, the angle of depression of the base of a neighboring building is 28° . If the two buildings are 50 m apart, how tall is the building from which the angle was measured?

4. A helicopter is hovering above a spot between Ben and Vanessa, who are standing on level ground 600 m apart. The angles of elevation as measured by Ben and Vanessa are 35° and 42° respectively. How far is the helicopter from Ben?

Answers:

Chapter 1

1. $x = 2, y = -1$ 2. (3,2) 3. 20

Chapter 2

1. $\sqrt{82}$
2. $\left(\frac{1}{2}, \frac{5}{2}\right)$
3. $x^2 + y^2 = 20$
4. outside
5. B (1,-11)
6. D (8, 5.5) & Shortest distance = 4.5

Chapter 5

1. a) $x^2 + 6x + 9$ b) $4x^2 - 20x + 25$ c) $16x^2 + 8xy + y^2$ d) $9x^2 - 4b^2$
2. a) $2a(2a + 3b + 6bc)$ b) $(y + 4)(x + 3)$
3. a) $(x + 1)(x - 4)$ b) $(2x - 3)(5x - 1)$ c) Not Factorable

Chapter 6

1. a) $y = (x - 7)^2 - 29 \rightarrow V(7, -29)$, AOS $-x = 7$, Opens up, min
b) $y = -4(x - 3)^2 + 33 \rightarrow v(3, 33)$, AOS $x + 3$, opens down, max
2. a) $x = -5, x = 1$ b) $x = -2/5, x = -3/2$
3. a) 71.65m b) 4.6s c) 7.8s
4. 2.02 seconds

Chapter 7

1. $x \approx 53.8$, $y \approx 34.6$
 $\theta \approx 29^\circ$, $\beta \approx 83^\circ$

2. 10m

3. 27m

4. 412m