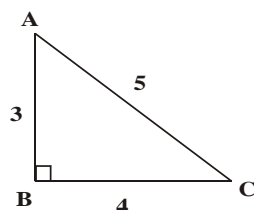


- For the line segment with endpoints $(-3, 7)$ and $(1, -3)$ determine,
 - the slope
 - the length
 - the midpoint
- For a circle with equation $x^2 + y^2 = 81$ determine,
 - the location of the centre
 - the radius
 - the y -intercepts
- For the relation $y = (x + 3)(x - 5)$ determine,
 - the zeros
 - the x -intercepts
 - the equation of the axis of symmetry
 - the direction of opening
- For the relation $y = -3(x + 2)^2 - 5$ determine,
 - the vertex
 - the equation of the axis of symmetry
 - the y -intercept
 - the direction of opening
 - the number of zeros
- For $\triangle ABC$ determine,
 - $\cos A$
 - $\sin A$
 - $\tan A$
 - $\angle A$ to the nearest degree
 - $\angle C$ to the nearest degree
- Determine the value of $\sin 32^\circ$ to four decimal places.
- Examine the pair of triangles shown to the right.***

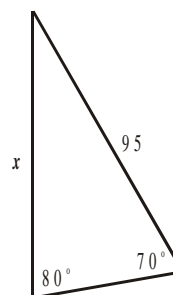
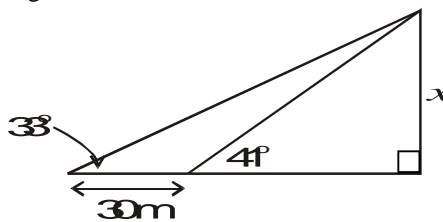
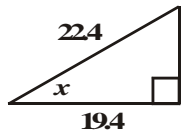


- Solve $y = -2x + 8$ and $3x - 4y = 12$ using the method of **SUBSTITUTION** and verify using **ELIMINATION**.
- Plot the triangle $A(-3,4)$, $B(5, 8)$ and $C(7, 0)$. What type of triangle is $\triangle ABC$ (classify the triangle by the lengths of the sides and the slopes)?
- Determine if the data listed can be modeled using a quadratic relationship. Explain.

x	1	2	3	4	5	6
y	49	88.2	117.6	137.2	147	147

- Expand and simplify.
 - $(2x - 3)(5x - 2)$
 - $3(x - 2)(3x - 4)$
- Factor each expression.
 - $x^2 - 3x - 70$
 - $49x^2 - 16$
 - $25x^2 - 20x$
 - $4x^2 - 14x - 8$
- Describe the transformations applied to the graph of $y = x^2$ to obtain the graph of $y = 2(x + 3)^2 - 6$. Sketch the graph of the relation (show the transformations).
- Determine the quadratic relation in vertex form that is defined by $y = 2x^2 + 14x - 10$.
- Determine the quadratic relation in factored form that has zeros -3 and 2 and passes through the point $(1, -8)$.

16. Solve for x to the nearest degree.



17. In $\triangle ABC$, $\angle B = 90^\circ$, $\angle A = 35^\circ$ and $AC = 10$ cm. Determine BC .
18. The point $B(6, 8)$ is on the circle with centre at the origin $A(0, 0)$.
- Determine the radius of the circle.
 - Determine the angle line segment AB makes with the positive x -axis.
19. Two cars leave Woodstock at the same time and place. One travels at 100 km/h and the other at 115 km/h. Their paths diverge (go or extend in different directions from a common point) at a 48° angle. How far apart are the cars after 2 hours? Include a diagram.
20. A ticket to the school dance is \$4.50 and usually 300 students attend. The dance committee knows that for every \$0.50 increase in the price of a ticket, 20 fewer students attend the dance. What ticket price maximizes the revenue?
OR
Mark is building a fence at the side of his warehouse. He has 80 m of fencing and plans to use the side of the warehouse as one side of the rectangular fenced area. What are the dimensions of the maximum area Mark can enclose?
21. A model rocket is equipped with a motion detector that measures the height of the rocket at 2 s intervals. On a recent flight, the detector recorded the following data.

Time (s)	0	2	4	6	8
Height (m)	0	60	80	60	0

- Create a scatter plot of the data and graph the line or curve of best fit.
 - Determine the equation of the axis of symmetry and the maximum height reached by the rocket.
 - Determine the quadratic relation in vertex form, factored form and standard form.
 - At what point in time is the rocket 75 m above the ground (Explain and verify your answer).
22. Two cyclists each traveling at 20 km/h, are on a straight path heading towards each other. Their locations can be identified by the points $A(-5, 10)$ and $B(10, -20)$ with the units in kilometers.
- How far apart are the cyclists?
 - At what point will the cyclists pass each other?

MPM2D – PRACTICE EXAM ANSWERS

- $m = \frac{-5}{2}$
 - $d = \sqrt{116} \approx 10.77$
 - $M = (-1, 2)$
- $(x, y) = (0, 0)$
 - $r = 9$
 - $(x, y) = (0, -9), (0, 9)$
- $x_1 = -3$ and $x_2 = 5$
 - $(x, y) = (-3, 0), (5, 0)$
 - $x = 1$
 - opens up
- $(x, y) = (-2, -5)$
 - $x = -2$
 - $(x, y) = (0, -17)$
 - opens down
 - no zeros
- $3/5$
 - $4/5$
 - $4/3$
 - 53°
 - 37°

6. 0.5299

7. (a) congruent (b) $\angle A = \angle Z$, $\angle C = \angle X$ and $AC = AZ \therefore \triangle ABC \cong \triangle ZYX$

8. $(x, y) = (4, 0)$

9. $\triangle ABC$ is a scalene non-right triangle

10. Since the second differences are all -9.8 , the data represents a quadratic relation.

11. (a) $10x^2 - 19x + 6$ (b) $9x^2 - 30x + 24$

12. (a) $(x-10)(x+7)$ (b) $(7x-4)(7x+4)$ (c) $5x(5x-4)$ (d) $2(2x+1)(x-4)$

13. Horizontal translation 3 units to the left, vertical stretch by a factor of 2 and vertical translation 6 units down.

14. $y = 2\left(x + \frac{7}{2}\right)^2 - \frac{69}{2}$ or $y = 2(x+3.5)^2 - 34.5$

15. $y = 2(x+3)(x-2)$

16. (a) $x = 30^\circ$ (b) $x = 77.0$ m (c) $x = 90.6$

17. $BC = 8.2$

18. (a) $r = 10$ (b) $\angle A = 53^\circ$

19. 177 km

20. (a) \$6 (b) 20m \times 40m

21. (a) ? (b) $x = 4$, max height is 80m (c) $y = -5(x-4)^2 + 80$ (d) at 3s and 5s

22. (a) $d = 33.54$ km (b) $(x, y) = (2.5, -5)$