

MPM 2D1 - Final Examination Review

This review will cover the material on the:

Summative Assessment, to be held in class, on _____

Written Examination to be held on _____

For the summative assessment you are permitted to use a summary sheet.

This summary sheet:

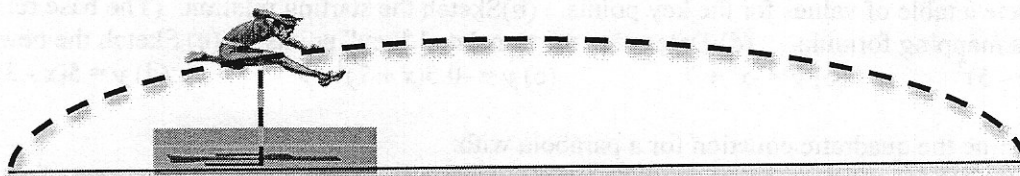
1. Can use a maximum space of 8.5 x 11 inch sheet of paper, double sided. The paper may be lined "binder" style paper, or blank.
2. Must be hand written, in your writing.
3. Cannot be photocopied. You are required to use the one that you created, not a photocopy of a friend's.
4. It may contain formulas or sample questions . . . it's up to you!!

You are not permitted to use a summary sheet at the final exam.

Part 1: "Summative Assessment-Type" Questions. Complete in your notebook - show all your work!

- ① 1. The Math Club at GSS decided to order "MATHLETE" spirit wear. T-shirts cost \$25.00 each and hoodies cost \$40.00 each. In total the club spent \$540.00 on clothing. All 18 members of the Math Club each ordered either a t-shirt or a hoodie. How many of each type of clothing was ordered?
- ② 2. At the GSS Christmas Concert, 400 tickets were sold. Tickets for adults cost \$8 but students were only charged \$6 per ticket. If \$2700.00 was collected the night of the concert, determine how many adults and how many students attended the concert.
- ③ 3. The students in Data Management class are making games to study probability. One group of students creates a game based on flipping a coin. Two people play, taking turns flipping a quarter. They receive points based on which side of the coin is facing upward. Tyler won the game with 45 points; he flipped heads 7 times and tails 5 times. Dan ended the game with 33 points; he flipped 3 heads and 9 tails. Determine the number of points players receive for flipping heads and how many points they receive for flipping tails in this game.
- ④ 4. A theatre company has 300 season ticket subscribers. The board of directors has decided to raise the price of a season ticket from the current price of \$400. A survey of the subscribers has determined that, for every \$20 increase in price, 10 subscribers would not renew their season tickets. What price would maximize the revenue from season tickets?
- ⑤ 5. The Environmental Club sells sweatshirts as a fundraiser. They sell 1200 shirts a year at \$20 each. They are planning to increase the price. A survey indicates that, for every \$2 increase in price, there will be a drop of 60 sales a year. What should the selling price be in order to maximize the revenue?
- ⑥ 6. Myrna and Ravinder went out in two separate boats to place markers for a boat race. Their paths formed an angle of 85° . Myrna rowed 85m and Ravinder rowed 102m to place their markers. How far apart are the markers?

- ⑦⑧ 12. A flagpole stands on top of a building that is 27m high. From a point on the ground, the angle of elevation to the top of the flagpole is 43° . The angle of elevation to the bottom of the flagpole is 32° .
- (a) How far is the point on the ground from the base of the building?
 (b) How tall is the flagpole?
13. A radar operator on a ship discovers a large sunken vessel lying on the ocean floor, 200m directly below the ship. The radar operator measures the angles of depression to the front and the back of the sunken ship to be 56° and 62° . How long is the sunken ship?
- ⑤⑥ 14. A soccer ball is kicked from a point 23 m to the left of the halfway line and lands at a point 17 m to the right of the halfway line. It reaches a maximum height 10 m during its parabolic flight.
- (a) Sketch a graph to show the flight of the soccer ball if the halfway line passes through the origin.
 (b) Determine an equation to represent the path of the soccer ball.
- ⑤⑥ 15. In Spartacus, Ian is practicing hurdles. A hurdle is 0.75m high. Ian leaves the ground to jump over the hurdle when he is 0.2m in front of it, and he lands 1m beyond the hurdle. His path as jumps the hurdle is parabolic. Determine the maximum height that Ian reaches when he jumps over the hurdle.

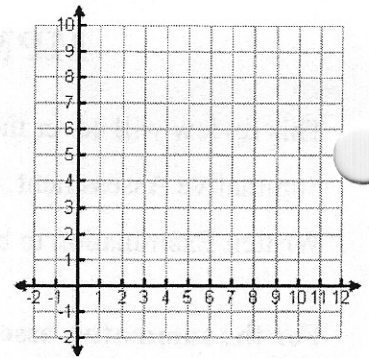


- ② 16. Three friends live in the same neighbourhood. Jane lives at $D(4, 2)$, John lives at $E(-6, 4)$ and Jacob lives at $F(-2, -4)$. They want to meet at the point that is an equal distance for them all to walk to. What would the coordinates of their meeting place be?

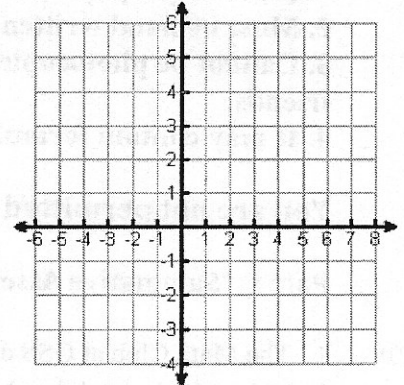
Part 2 – “Exam-Type” Questions!!

- ① 1. Solve the following systems of equations:
- (a) $3x + 4y = -10$ (b) $x = -2y + 3$ (c) $2x - 3y = 1$ (d) $x - 3y = 6$
 $5x - 2y = 18$ $x = 3y - 7$ $x = y + 1$ $3(x - 2) = 4 + 2(y - 3)$
 (e) $x - \frac{1}{3}y = -1$
 $\frac{2}{3}x - \frac{1}{4}y = -1$
- ② 2. For each pair of points, calculate:
- (i) The slope of the line joining the points
 (ii) the midpoint of the line joining the points
 (iii) the length of the line joining the points
- (a) $(2, 5)$ and $(5, 13)$ (b) $(3, -5)$ and $(-2, 5)$ (c) $\left(\frac{3}{4}, \frac{-2}{5}\right)$ and $\left(\frac{-1}{4}, 0\right)$ (d) $(3, 4)$ and $(3, -5)$
- ② 3. Show that the triangle with vertex coordinates $A(1, 2)$, $B(-3, -1)$ and $C(0, -5)$ is isosceles.
- ② 4. Quadrilateral JKLM has vertex coordinates $J(2, 4)$, $K(6, 1)$, $L(2, -2)$ and $M(-2, 1)$. What type of quadrilateral is JKLM?
5. For each circle:
- (i) State the value of the radius; (ii) Sketch the circle on a set of axis.; (iii) State the x and y intercepts
- (a) $x^2 + y^2 = 25$ (b) $x^2 + y^2 = 289$

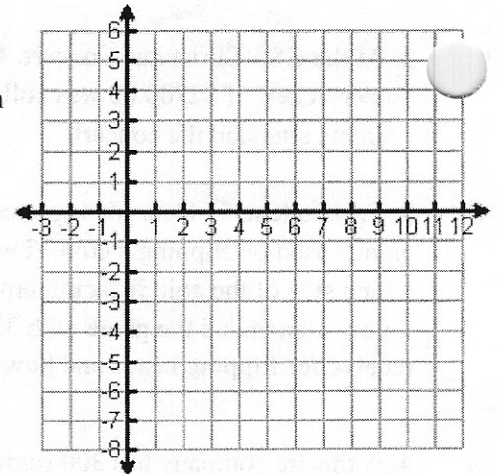
- ② 7. Three communities in Northern Ontario are located at points A(2, 2), B(10, 6) and C(4, 8). An airport is to be built an equal distance from each of the three communities.
- (a) What is the geometric name given to the desired point(centre)?
- (b) Using the appropriate calculations, determine the coordinates of the airport.



- ② 8. A triangular computer component needs to have a small hole drilled in its centre of mass. The computer component has vertices at (-2, 4), (6, 2) and (-4, -2).
- (a) What geometric name is given to the desired centre?
- (b) Using the appropriate calculations, find the coordinates of this centre.

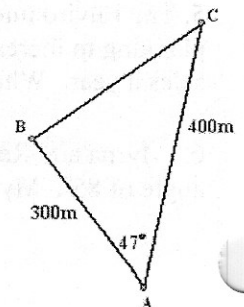


- ① 9. An air traffic controller is plotting the course of two planes that are getting ready to land. One path is defined by the equation $y = \frac{1}{2}x - 5$ and the other path is defined by $x - 2y = 4$. The Air Canada plane is located at (-8, -6) and the West Jet plane is at (16, 3).
- (a) Determine which plane is on which path.
- (b) Is it necessary for the air traffic controller to change the course of one of the planes? Give reasons for your answer.
- You may use the grid if you'd like to – it's not necessary.



- ⑦⑧ 10. Two support wires are fastened to the top of a TV satellite dish tower from two points on the ground, A and B on either side of the tower. One wire is 18m long and the other is 12m long. The angle of elevation of the longer wire is 28° .
- (a) How far apart are A and B.
- (b) How tall is the satellite dish tower?

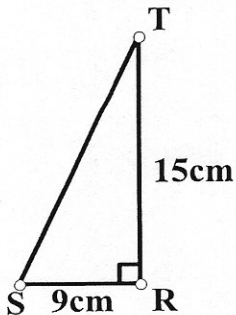
- ⑧ 11. The Points B and C are located at each end of a small lake. Point A is on land. The distances from A to B and A to C, and the measurement of $\angle BAC$, as shown. Find the length of the lake, BC, to the nearest meter.



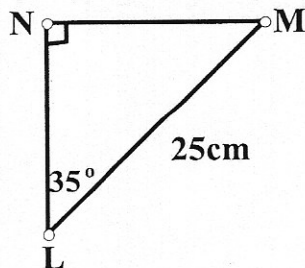
- ② 6. Find the equation of the circle with centre $(0, 0)$ that passes through the point $(4, -9)$
- ② 7. Does the point $(6, -3)$ live on, outside or inside the circle defined by $x^2 + y^2 = 49$. Explain your answer.
- ④ 8. Expand and simplify:
 (a) $(3x + 5)(2x - 9)$ (b) $(m - 1)(5m - 4)$ (c) $(3k + 4)^2$ (d) $3(2x + 5)(x - 3) + 2(x - 4)^2$
- ④ 9. Factor each of the following completely:
 (a) $x^2 + 2x - 15$ (b) $3x^2 + 15x + 18$ (c) $81 - 16p^2$ (d) $9x^2 - 12x + 4$ (e) $12x^2 - 5x - 2$
- ⑥ 10. State the quadratic formula.
- ⑥ 11. Solve for the variable. Round decimal answers to 2 decimal places.
 (a) $x^2 + 6x = 72$ (b) $(2x + 1)(3x - 5) = 15$ (c) $x^2 - 4x - 1 = 0$ (d) $5x^2 - 6x - 2 = 0$
 (e) $3m^2 + 10m = 7$
- ⑤ 12. For each of the following:
 (a) Complete a table of values for the key points. (b) Sketch the starting relation. (The base relation $y = x^2$.)
 (c) Write a mapping formula. (d) Determine the translated "key" points. (e) Sketch the new graph.
 (a) $y = 2(x - 5)^2$ (b) $y = -x^2 + 7$ (c) $y = -0.5(x + 7)^2 - 9$ (d) $y = 5(x - 3)^2 + 3$
- ③⑤ 13. Determine the quadratic equation for a parabola with:
 (a) zeros at -3 and 7 and an optimal value of 4 ; (b) zeros at -6 and 2 and a y -intercept of -9
 (c) has its vertex at $(3, 7)$ and passes through $(-1, -17)$; (d) has its vertex at $(-4, -2)$ and has a y -intercept of -8
- ⑤ 14. Find the coordinates of the vertex and write the equation in vertex form:
 (a) $y = 2(x - 3)(x + 7)$ (b) $y = x^2 - 6x - 4$ (c) $y = 2x^2 - 4x + 7$ (d) $y = 5x^2 + 20x - 11$
 (e) $y = 4x^2 - 11x - 55$

- ⑦⑧ 15. Solve each triangle completely:

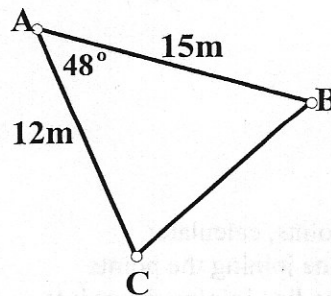
(a)



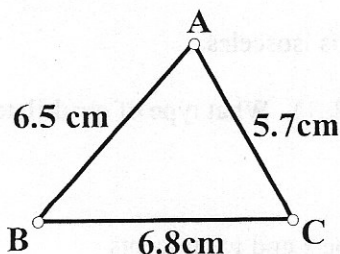
(b)



(c)



(d)



(e)

