MPM 2D EXAM REVIEW Name:

Chapter. 1:

1. Solve by graphing. a) 3x + 2y = 8 b) 4y + 8 = x c) x = 2y + 10 d) 2x – 3y = -6

 x – y = 1 2x + y = -2 3x + y = 2 y = x + 1

2. Solve by substitution. a) x – 3y = 7 b) 2x = 3y + 13

 4x + 5y = 11 x + 4y = 1

c) 3x – 2y = 30 d) 6x – 9 = 7y

5x + y = 24 4x + y = -11

3. Solve by elimination. a) 5x + 2y = 14 b) 5x + 4y = 26 c) 6x + 7y = 44 d) 3x + 2y = 14

 3x + 7y = 20 2x = 9 – 3y 4x – 5y = 10 5y = 2x – 22

e) 2(x – 1) + 5(y – 2) = -24 f) 5(x – 4) + 2(y – 3) = –26 g) 3(x – 2) + 4y + 21 = 0 h) 5(m – 4) – (n + 2) = –2

 3(x + 8) – 4(y + 1) = 25 3(x + 8) – 4y = –2 2(x + 7) – 6(y + 3) = 12 3(m + 1) = 2(n – 6) + 34

i) $\frac{x}{3}-\frac{y}{2}=1$ j)  k)  l) 

 $x-\frac{7y}{4}=\frac{5}{2}$   

Solve questions 4-13 using two equations in two variables.

4. One hundred coins, consisting of nickels and dimes, total $6.90 . How many of each type of coin are there?

5. A box has twice as many dimes as quarters. The total is $5.40 . How many of each type of coin are there?

6. A register has 17 more loonies than quarters. The total is $44.50 . How many of each type of coin are there?

7. Al travels 600 km in 11h, partly by car at 60 km/h and the rest by train at 50km/h. How long did he travel by each mode?

8. Andy travels 315 km, half as much time by car at 60 km/h as by train at 75 km/h. How long did he travel by each mode?

9. Amy travels 4700 km, 2 h less by bus at 50 km/h than by plane at 750 km/h. How long did she travel by each mode?

10. Carl invests $10000, partly in a secure GIC at 5% and the rest in a mutual fund that he thinks will earn 7.5%.

If he expects to earn the same amount of interest in both, how much did he invest at each rate?

11. Jon makes a mix of salad that costs $15 using as much apples that cost $4/kg as oranges that cost $6/kg.

How much of each fruit is in the salad?

12. A bag of peanuts that costs $2.50/kg is mixed with a bag of pecans that costs $3.00/kg to form a 10 kg mix that costs

$28. How much of each nut is there?

13. Barb ran 200 m with the wind in 20 s and against the wind in 25 s. Find Barb’s running speed and the wind speed.

1. If a system of two linear equations does not have a solution, what does this mean graphically?

Chapter 3:

1. Expand and simplify

a) 4u3(2u2 + 5u) b) 4mn2(3m2 – 7mn + n3) c) 3m2(2m2 – 5m + 4)

d) -2a(4a2 – 6b3) e) (m – n)(m + 5n) f) (6x + 5)(3x – 1)

g) (x + 4y)(x – 7y) h) (5x + 2y)(3x – 4) i) 3(x – 4)2 – 2(x + 8)(x – 1)

j) (2y – 3)2 + 8(y + 2) k) 3(y – z)2 + 4y(y – 6z)

l) 2(x – 6y) – 3(x + y)(x – y)

2. Factor.

a) 4m2 – 9b2 b) 3w2 – 11w + 6 c) uv + 2u – 5v – 10

d) 10c2 – 60cd + 80d2 e) m2 – 6m + 9 f) 2t2 + 13t + 15

g) a2 – a – 12 h) 3 – 12r2 i) 8a3b + 12a2b – 20ab j) (a + 3b)2 – 25

k) x4 – 8x2 – 20 l) 6a3 – 15a2 + 9a m) 5mx + 10m – 7x – 14

n) 64m2 – 9n2 o) c2 – 12cd + 36d2 p) w2 + 3w - 40

q) 3t2 + 13t + 10 r) 6a2 – ab – b2 s) 4a3b + 2a2b2 – 10ab3

t) 11 – 44r2 u) a4 – 16 v) x4 – 6x2 – 16

w) 3a3 – 30a2 + 48a x) 4m2 – 49n2  y) 4mx + 12m – 5x – 15

z) c2 – 10cd + 25d2

3. A box has a length of x centimetres. If the width is 10 cm shorter than the length and the height is half the length,

find the a) volume b) surface area.

4. Find the area between the two rectangles. 5. Find the perimeter and area.

a) 3x + 1 5x + 3

 2x – 5 x + 2

 x – 3 x + 6 4x + 1

 3x + 2

Chapter 5:

1. Find the roots by factoring.

a) 4a2 – 12a + 5 = 0 b) x2 – 3x = 0

c) 16u2 – 9 = 0 d) a2 – 4a – 12 = 0

e) 3m2 + 2m – 8 = 0 f) 7x2 – 12x = 0

g) 9a2 – 49 = 0 h) x2 – 12x + 20 = 0

i) 3u2 + 7u – 6 = 0 j) 16a2 – 25 = 0

k) 4m2 + 7m = 0 l) 4u2 + 3u – 10 = 0

m) x4 + 8x2 – 9 = 0 n) 3x4 – 10x2 = 0

o) 3x4 – 5x2 – 12 = 0 p) x4 – 81 = 0

2. Graph by factoring. a) y = 4x2 + 4x – 3 b) y = -x2 + 4 c) y = -x2 + x d) y = x2 – 6x + 5



3. Solve using the quadratic formula.

a) 3(x – 2)2 + 4(x + 5) = 30 b) (2x – 3)(x + 4) = x2 – 13

c) $\frac{2x^{2}}{3}-\frac{7x}{2}=3$ d) 

4. The height of a baseball in h metres after travelling d metres horizontally is given by h = -0.02d2 + 0.5d + 0.4.

How far does the ball travel before hitting the ground?

5. The height of a soccer ball in h metres after t seconds is given by h = -5t2 + 10t.

How soon does the ball reach a height of 1 m?

6. The height of a right-angled triangle is 2 cm longer than its base. If the area is 10 cm2, find the length of the base.

7. The height of a right-angled triangle is twice as long as its base. If the area is 30 cm2, find the length of the base.

8. An 8 cm by 10 cm rectangular photo has a 30 cm2 uniform border around its edges. Find the width of the border.

9. Within a 5 m by 10 m area is a rectangular pool surrounded by a uniform concrete border of area 10 m2.

Find the width of the border.

10. Find k if 4x2 + 8x + k = 0 has imaginary roots.

Chapter 4:

1. For each parabola state the:

i) axis of symmetry

ii) vertex

iii) domain

iv) range

v) direction of opening

vi) maximum/minimum value

vii) stretch factor

viii) horizontal shift

ix) vertical shift

x) x-intercepts

xi) y-intercept

xii) equation of the parabola.

a) b)

 

2. Graph.

a) y = (x + 2)2 – 8 b) y = 2x2 – 8 c) y = (x – 2)2 + 1 d) y = -3(x + 1)2



3. Find the maximum/minimum value and the value of x when it occurs by completing the square.

a) y = 5x2 – 40x + 81 b) y = 4x2 + 48x + 141

c) y = -3x2 – 30x – 79 d) y = -2x2 + 12x – 11

4. Find the

i) maximum/minimum height in h metres

ii) time when it occurs in t seconds

iii) initial height.

a) h = 0.03t2 – 0.6t + 4. b) h = -5t2 + 20t.

5. Determine the maximum sales and optimal price.

a) Al can sell 200 cars at $20000 each but finds that every $1000 increase in price causes a 5-car drop in sales.

b) Bob can sell 20000 tickets at $5 each but finds that every $2 decrease in price causes a 5000-ticket rise in sales.

6. State the equation of a parabola that is reflected in the x-axis, stretched by a factor of three, shifted one unit to the right and six units down.

Chapter 6:

1. Find the missing sides, angles, and areas of the similar triangles. State the similarity.

a) T 9 km S b) A

 40°

 6 km AreaTSR = 17.4km2 5 m 5.8 m AreaABC = 14 m2

 B C

 R 132°

 105°

 12 km AreaQPR = 10 m AreaADE =

 13.4 km

 60°

 P 18 km Q D 19.2 m E

2. InDEF,E = 90°,d = 15,f = 8. State the values of sin D, cos D, tan D.

3. Solve each triangle:

a)FGH, F = 90°, G = 24°, f = 28 cm. b) $∆$XYZ, x = 15 m, z = 20 m, Z = 40$°$.

c) PQR, p = 12 km, q = 5 km, r = 8 km.

4. A 1.8 m tall person casts a 4 m long shadow. How long a shadow will a 2.4 m tall person cast nearby?

5. Barb stands on a 2.2 m long ladder. Its base is 50 cm from the wall. How steep is the ladder in degrees?

6. A watchman in the room at the top of a 20 m high lighthouse views a boat at a 16$° $angle of depression.

How far away is the boat from the base of the lighthouse?

7. The first hill on the Behemoth roller coaster is 72.5 m long and 70 m high. How steep is the hill in degrees?

8. A kite is flying with a 50$° $angle of elevation. If 12 m of string is let out, how high is the kite?

9. Al is 15 m away from a building and sees its top at a 64° angle of elevation. How tall is the building?

10. Solve for x.

a) J b) Q

 38° x

 16 m

 R

 42° 34° 50 km

 K L M

 x S 116 km T

c) A d)

 19 cm D

 D

 15 cm x 18 m 16 m x

 9 cm

 43°$°$ 39° 24°

 B 22 cm C E F G

1. Two planes leave an airport at noon. One travels 800 km/h S35°E and the other travels 750 km/h S25°W.

How far apart are they at 2:30 pm?

12. Radar tracking station O is 40 km away from a ship at 13. Two people at opposite ends of a bridge see a

point A. The ship travels east 45 km to point C at 30 km/h. boat under the bridge at angles of 32$° $ and 55$° $ each.

How long will the ship be on the radar with a 20 km radius? Find the height of the bridge if it is 200 m long.

 21°

 A B C

 

Chapter 2:

1. Find the equation of the circle with centre (0,0) and

a) with a radius of 7 b) diameter of 12

c) passing through (2,-4) d) having a diameter with endpoints (5,8) and (-5,-8).

2. Is P(6,-3) inside, outside, or on the circle x2 + y2 = 50?

3. If B(5,4) is the midpoint between A(2,-1) and C, find the location of C.

4. For the given points, find the

i) length

ii) midpoint

iii) equation of the line:

a) J(-3,2) and K(0,8) b) A(4,-7) and B(-2,0)

c) E(-5,-8) and F(3,4) d) Q(0,-3) and R(1,-9)

3. For A(-5,7), B(3,1), C(5,-3) and D(-3,3):

a) find the slope for each side of ABCD b) verify that ABCD is a parallelogram.

c) find the midpoint of each diagonal of ABCD. d) show that the diagonals bisect each other.

4. For E(-5,3), F(-7,0), G(-1,-4), and H(1,-1):

a) find the slope for each side of EFGH. b) show that the sides are perpendicular.

c) classify the shape d) find the perimeter and area of EFGH.

5. For J(-5,7), K(3,1), and L(1,-1) plot the given points and draw triangle JKL.

a) classify the triangle as scalene, isosceles, or equilateral. b) find the perimeter of JKL.

c) draw a rectangle around the triangle to find its area.