**ESSENTIAL TECHNIQUES FOR INTERSECTIONS OF GRAPHS TOPIC.**

1. Find the equations of the line and circle graphs and calculate the coordinates of P.



P

***Circle is x2 + y2 = 16 line is y = ½x + 1***

***Subs: x2 + (½x + 1)2 = 16***

 ***x2 + x2 + x + 1 = 16***

 ***4***

 ***1.25x2 + x – 15 = 0***

***Solving on graphics calc x = 3.087 or -3.087***

***Note: if x = -3.087, this refers to the other intersection not shown above.***

***At P, x = 3.087 and y = 2.544***

2. Find the equations of the line and circle graphs and calculate the coordinates of P.



P

***Circle is x2 + y2 = 16 line is y = ½x + 2***

***Subs: x2 + (½x + 2)2 = 16***

 ***x2 + x2 + 2x + 4 = 16***

 ***4***

 ***x2 + x2 + 2x + 4 = 16***

 ***4***

 ***1.25x2 + 2x – 12 = 0 so x = 2.4 (or -4 which is the other intersection)***

***P is at x = 2.4, y = 3.2***

**3.** Find the equations of the line and circle graphs and calculate the coordinates of P..



P

***Circle is x2 + y2 = 25 line is y =* ⅓*x + 1***

***Subs: x2 + (*⅓*x + 1)2 = 25***

 ***x2 + x2 + 2x + 1 = 25***

 ***9 3***

 ***x2 + x2 + 2x – 24 = 0***

 ***9 3***

 ***1.111x2 + .667x – 15 = 0 x = 4.36 (or -4.36 for other intersection)***

***So P is at x = 4.36 , y = 2.45***

4. Find the equations of the line and parabola graphs and calculate the coords of P.

P



***The parabola is of the form y = -b(x – 4)2 + 8 so subs x = 0, y = 6***

***6 = -b(-4)2 + 8 so -2 = 16b and b = -1 producing y = - (x – 4)2 + 8***

 ***8 8***

***The line is y = x + 3***

***Subs: x + 3 = -(x2 – 8x + 16) + 8***

 ***8***

 ***8x + 24 = -x2 + 8x – 16 + 64***

 ***x2 – 8x – 24 = 0 x = 4.90 (or -4.90 for the other intersection not required)***

***So P is at x = 4.90 and y = 7.90***

5. Find the equations of the line and parabola graphs and calculate the coords of P.



P

***The parabola is of the form y = -bx2 + 7 thru (5, 6) so 6 = -25b + 7***

***This means b = 1 and the parab is y = - x2 + 7***

 ***25 25***

***The line is y = 2x + 4***

***Subs: 2x + 4 = -x2 + 7***

 ***25***

|  |  |
| --- | --- |
| ***Either: x2 + 2x – 3 = 0*** ***25******x = 1.46 (or -51.45 which is the other intersection not required.)******P is at x = 1.46, y = 6.92*** | ***Or: 2x – 3 = -x2*** ***25******50x – 75 = -x2 so x2 + 50x – 75 = 0******x = 1.46 (or -51.45 which is the other intersection not required.)******P is at x = 1.46, y = 6.92*** |

6. Find the equations of the line and parabola graphs and calculate the coords of P.



P

 ***The parabola is of the form y = -bx2 + 10 thru (6, 4) so 4 = -36b + 10***

***This means b = 1 and the parab is y = - x2 + 10***

 ***6 6***

***The line is y = ½ x + 3***

***Subs: x + 3 = -x2 + 10 so x2 + x – 7 = 0***

 ***2 6 6 2***

***x = 5.15 (or -8.15 which is the other intersection not required.)***

***P is at x = 5.15, y = 5.58 (NB the above parabola is not accurate)***