ESSENTIAL TECHNIQUES FOR INTERSECTIONS OF GRAPHS TOPIC.

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



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



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





5. Find the equations of the line and parabola graphs and calculate the coords of P. 10 Ty

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

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ESSENTIAL TECHNIQUES FOR INTERSECTIONS OF GRAPHS TOPIC.



Circle is $x^2 + y^2 = 16$ line is $y = \frac{1}{2}x + 1$ $x^2 + (\frac{1}{2}x + 1)^2 = 16$ Subs: $x^2 + x^2 + x + 1 = 16$ $1.25x^2 + x - 15 = 0$

Solving on graphics calc x = 3.087 or -3.087Note: 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.



Circle is $x^2 + y^2 = 16$ line is $y = \frac{1}{2}x + 2$ $x^{2} + (\frac{1}{2}x + 2)^{2} = 16$ Subs: $x^2 + \frac{x^2}{x^2} + 2x + 4 = 16$ $x^2 + \underline{x^2} + 2x + 4 = 16$ $1.25x^2 + 2x - 12 = 0$ 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..



Circle is
$$x^{2} + y^{2} = 25$$
 line is $y = \frac{1}{3}x + 1$
Subs: $x^{2} + (\frac{1}{3}x + 1)^{2} = 25$
 $x^{2} + \frac{x^{2}}{9} + \frac{2}{3}x + 1 = 25$
 $y^{2} + \frac{x^{2}}{9} + \frac{2}{3}x - 24 = 0$
 $1.111x^{2} + .667x - 15 = 0$ $x = 4.36$ (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.



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 $b = -\frac{1}{8}$ producing $y = -\frac{(x-4)^2}{8} + 8$

The line is y = x + 3Subs: $x + 3 = \frac{-(x^2 - 8x + 16)}{8} + 8$ $8x + 24 = -x^2 + 8x - 16 + 64$

 $8x + 24 = -x^2 + 8x - 16 + 64$ $x^2 - 8x - 24 = 0$ 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.

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



The parabola is of the form $y = -bx^2 + 10$ thru (6, 4) so 4 = -36b + 10This means b = 1 and the parab is $y = -\frac{x^2}{6} + 10$

The line is $y = \frac{1}{2}x + 3$ Subs: $\frac{x}{2} + 3 = \frac{-x^2}{6} + 10$ so $\frac{x^2}{6} + \frac{x}{2} - 7 = 0$

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)