Co-ordinate Geometry : Achieved Practice #2

1. Find the distance from point R = (¯1, 2) to point Q = (¯4, 8).

2. Find the equation of the line that passes through both R = (¯1, 2) and Q = (¯4, 8).

3. Find the point midway between A = (¯2, 4) and B = (¯6, ¯1).

4. Find the line perpendicular to $y = 2x + 4$ which passes through (3, 2).

5. Find a line parallel to $3y - x - 6 = 0$, which passes through point P = (1, 4).

6. Show that $3x - y - 6 = 0$ is perpendicular to $x + 3y + 6 = 0$

Answers – Co-ordinate Geometry : Achieved Practice #2

1. Find the distance from point R = (⁻1, 2) to point Q = (⁻4, 8).

Δx = (⁻4 – ⁻1) = ⁻3, Δy = (8 – 2) = 6 *distance apart in x and y directions*

Length = $\sqrt{(-3)^2 + 6^2}$ *Pythagoras. Note* $(⁻3)^2 = 9$, **not** ⁻9

= 6.71 *check with sketch*

2. Find the equation of the line that passes through both R = (⁻1, 2) and Q = (⁻4, 8).

$m = \frac{8-2}{-4--1} = \frac{6}{-3} = ⁻2$ *slope,* $m = \frac{\Delta y}{\Delta x}$

$y – 8 = ⁻2(x – ⁻4)$ *equations found using* $y - y_1 = m(x - x_1)$

y* = ⁻2 *x *check with "Table" in calculator*

3. Find the point mid way between A = (⁻2, 4) and B = (⁻6, ⁻1).

$(\frac{-2+-6}{2}, \frac{4+-1}{2})$ *mid point =* (*average x, average y*)

= (⁻4, 1.5) *check with sketch*

4. Find the line perpendicular to $y = 2x + 4$ which passes through (3, 2).

$m = \frac{-1}{2} = ⁻0.5$ *perpendicular lines have* $m^{\perp} = \frac{-1}{m}$

$y – 2 = ⁻0.5(x – 3)$ *equations found using* $y - y_1 = m(x - x_1)$

***y* = ⁻0.5 *x* + 3.5** *check with sketch and "Table"*

5. Find a line parallel to $3y – x – 6 = 0$, which passes through point P = (1, 4).

$3y – x – 4 = 0$ rearranges to give the more useful form $y = \frac{1}{3}x + 2$

$m = \frac{1}{3}$ *parallel lines have the same slope*

$y – 4 = \frac{1}{3}(x – 1)$ *equations found using* $y - y_1 = m(x - x_1)$

***y* = $\frac{1}{3}$*x* + 3$\frac{2}{3}$** *check with "Table" in calculator*

6. Show that $3x – y – 6 = 0$ is perpendicular to $x + 3y + 6 = 0$

rearranging gives the lines as: $y = 3x – 6$ and $y = ⁻\frac{1}{3}x – 6$

As $\boldsymbol{m^{\perp} = \frac{-1}{m}}$ (or $m_1 \times m_2 = ⁻1$) we can see that the lines are perpendicular