Functions and Graphs Solutions

Here are the solutions to the Functions and Graphs Exercises.

Question 1

Plot each of the following sets of points on the Cartesian plane.

(a) 

(b) 

(c) 

(d)
Question 2

For each of the following equations, substitute in all $x$ values from the set \{-3, -2, -1, 0, 1, 2, 3\} to get a list of $y$ values. Plot the corresponding points.

(a) \hspace{2cm} (c) \hspace{2cm} (e)

(b) \hspace{2cm} (d) \hspace{2cm} (f)

Question 3

For each of the following linear functions, find the gradient $m$ and the $y$-intercept $c$. From this, produce a rough sketch of the function.

(a) $m = 3, c = 2$ \hspace{1cm} (b) $m = 5, c = 3$ \hspace{1cm} (c) $m = 1, c = -8$
(d) \( m = 4, c = -9 \)

(e) \( m = -3, c = 7 \)

(f) \( m = -6, c = -10 \)

(g) \( m = 2, c = 4 \)

(h) \( m = -3, c = 5 \)

(i) \( m = 3, c = -7 \)

(j) \( m = -9, c = -3 \)

(k) \( m = 1/2, c = 3/7 \)

(l) \( m = -2/9, c = 2/8 \)

(m) \( m = 4/5, c = 2/7 \)

(n) \( m = 3/5, c = -2/3 \)

(o) \( m = -3/9, c = 10 \)
Question 4

Deduce whether each of the following are linear functions or not. If it is a linear function, state both the gradient $m$ and the $y$-intercept $c$.

(a) LINEAR, $m = 2, c = -5/2$
(b) LINEAR, $m = 4, c = 0$
(c) NONLINEAR
(d) LINEAR, $m = 2, c = -6$
(e) LINEAR, $m = 2/3, c = 0$
(f) LINEAR, $m = -2/3, c = 1/3$
(g) NONLINEAR
(h) NONLINEAR
(i) LINEAR, $m = 1/2, c = 5/2$
(j) LINEAR, $m = 5, c = 2$
Question 5

For each of the following quadratic functions, state

1. the turning point
2. the line of symmetry
3. the $y$-intercept
4. the $x$-intercept(s) if any
5. whether it is concave up or concave down.

<table>
<thead>
<tr>
<th></th>
<th>TP</th>
<th>LoS</th>
<th>$y$-int</th>
<th>$x$-int(s)</th>
<th>Concavity</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>(1, 0)</td>
<td>$x = 1$</td>
<td>(0, 1)</td>
<td>(1, 0)</td>
<td>UP</td>
</tr>
<tr>
<td>(b)</td>
<td>(−1, −4)</td>
<td>$x = −1$</td>
<td>(0, −5)</td>
<td>none</td>
<td>DOWN</td>
</tr>
<tr>
<td>(c)</td>
<td>(5, −4)</td>
<td>$x = 5$</td>
<td>(0.46)</td>
<td>$(5 + \sqrt{2}, 0), (5 - \sqrt{2}, 0)$</td>
<td>UP</td>
</tr>
<tr>
<td>(d)</td>
<td>(−5, −4)</td>
<td>$x = −5$</td>
<td>(0, −79)</td>
<td>none</td>
<td>DOWN</td>
</tr>
<tr>
<td>(e)</td>
<td>(2, −2)</td>
<td>$x = 2$</td>
<td>(0, −10)</td>
<td>none</td>
<td>DOWN</td>
</tr>
<tr>
<td>(f)</td>
<td>(−4, 5)</td>
<td>$x = −4$</td>
<td>(0.21)</td>
<td>none</td>
<td>UP</td>
</tr>
<tr>
<td>(g)</td>
<td>(4, −1)</td>
<td>$x = 4$</td>
<td>(0.15)</td>
<td>(3, 0), (5, 0)</td>
<td>UP</td>
</tr>
<tr>
<td>(h)</td>
<td>(6, −4)</td>
<td>$x = 6$</td>
<td>(0.32)</td>
<td>(4, 0), (8, 0)</td>
<td>UP</td>
</tr>
<tr>
<td>(i)</td>
<td>(−2, 48)</td>
<td>$x = −2$</td>
<td>(0.36)</td>
<td>(2, 0), (−6, 0)</td>
<td>DOWN</td>
</tr>
<tr>
<td>(j)</td>
<td>$(-\frac{3}{2}, -\frac{1}{2})$</td>
<td>$x = −\frac{3}{2}$</td>
<td>(0.4)</td>
<td>(−1, 0), (−2, 0)</td>
<td>UP</td>
</tr>
<tr>
<td>(k)</td>
<td>(1, 3)</td>
<td>$x = 1$</td>
<td>(0, 0)</td>
<td>(0, 0), (2, 0)</td>
<td>DOWN</td>
</tr>
<tr>
<td>(l)</td>
<td>$(-\frac{7}{2}, -\frac{1183}{4})$</td>
<td>$x = −\frac{7}{2}$</td>
<td>(0, −210)</td>
<td>(3, 0), (−10, 0)</td>
<td>UP</td>
</tr>
<tr>
<td>(m)</td>
<td>$(-\frac{3}{2}, -\frac{1}{2})$</td>
<td>$x = −\frac{3}{2}$</td>
<td>(0.2)</td>
<td>(−2, 0), (−1, 0)</td>
<td>UP</td>
</tr>
<tr>
<td>(n)</td>
<td>$(-\frac{5}{2}, -\frac{1}{2})$</td>
<td>$x = −\frac{5}{2}$</td>
<td>(0.12)</td>
<td>(−3, 0), (−2, 0)</td>
<td>UP</td>
</tr>
<tr>
<td>(o)</td>
<td>$(-\frac{3}{2}, \frac{1}{2})$</td>
<td>$x = −\frac{3}{2}$</td>
<td>(0, −2)</td>
<td>(−2, 0), (−1, 0)</td>
<td>DOWN</td>
</tr>
<tr>
<td>(p)</td>
<td>(2, 0)</td>
<td>$x = 2$</td>
<td>(0, −4)</td>
<td>(2, 0)</td>
<td>DOWN</td>
</tr>
<tr>
<td>(q)</td>
<td>$(-\frac{3}{2}, -\frac{1}{2})$</td>
<td>$x = −\frac{3}{2}$</td>
<td>(0.1)</td>
<td>(−1, 0), (−1, 0)</td>
<td>UP</td>
</tr>
<tr>
<td>(r)</td>
<td>$(\frac{11}{12}, -\frac{35}{24})$</td>
<td>$x = 1\frac{11}{12}$</td>
<td>(0, −10)</td>
<td>$(−\frac{2}{3}, 0), (\frac{2}{3}, 0)$</td>
<td>UP</td>
</tr>
</tbody>
</table>

Using STUDY Smarter Resources

This resource was developed for UWA students by the STUDY Smarter team for the numeracy program. When using our resources, please retain them in their original form with both the STUDY Smarter heading and the UWA crest.