<table>
<tr><td></td><td colspan="2">Direct and Inverse Proportion Mark Scheme</td></tr>
<tr><td>1(a)</td><td>$y = kx$</td><td>[1] Correct proportionality equation</td></tr>
<tr><td></td><td>$36 = 4k \ so \ k = 9$</td><td>[1] Value of k</td></tr>
<tr><td></td><td>$y = 9x$</td><td>[1] Correct final equation</td></tr>
<tr><td>1(b)</td><td>$y = 9 \times 3 = 27$</td><td>[1] Substitute $x = 3$ into the eq. from (a)</td></tr>
<tr><td>2(a)</td><td>$y = kx^2$</td><td>[1] Correct proportionality equation</td></tr>
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<tr><td>2(b)</td><td>$x = \frac{7}{3}$</td><td>[1] Substitute $y = 49$ into the eq. from (a)</td></tr>
<tr><td>3(a)</td><td>$d = kc$</td><td>[1] Correct proportionality equation</td></tr>
<tr><td></td><td>$12 = 3c \ so \ k = 4$</td><td>[1] Value of k</td></tr>
<tr><td></td><td>$d = 4c$</td><td>[1] Correct final equation</td></tr>
<tr><td>3(b)</td><td><table><tr><td>c</td><td>3</td><td>5</td><td>7</td><td>12</td></tr><tr><td>d</td><td>12</td><td>20</td><td>28</td><td>48</td></tr></table></td><td>[1] $c = 7$
[1] $d = 20$
[1] $d = 48$</td></tr>
<tr><td>4(a)</td><td>$y = \frac{k}{x}, \quad 4 = \frac{k}{7}$</td><td>[1] Correct proportionality equation</td></tr>
<tr><td></td><td>$k = 28$</td><td>[1] Value of k</td></tr>
<tr><td></td><td>$So \ y = \frac{28}{x}$</td><td>[1] Correct final equation</td></tr>
<tr><td>4(b)</td><td>$2 = \frac{28}{x}, \quad x = 14$</td><td>[1] Substitute $y = 2$ into the eq. from (a)</td></tr>
<tr><td>5(a)</td><td>$y = \frac{k}{x^2}$</td><td>[1] Correct proportionality equation</td></tr>
<tr><td></td><td>$3 = \frac{k}{4^2}, k = 48$</td><td>[1] Value of k</td></tr>
<tr><td></td><td>$y = \frac{48}{x^2}$</td><td>[1] Correct final equation</td></tr>
<tr><td>5(b)</td><td>$y = \frac{48}{25}$</td><td>[1] Substitute $x = 5$ into the eq. from (a)</td></tr>
</table>

Turn over ►

6(a)	$r \propto \frac{1}{x^2}$, $r = \frac{k}{x^2}$	[1] Correct proportionality equation
	$(4) = \frac{k}{(4)^2}$, $k = 64$	[1] Value of k
	$r = \frac{64}{x^2}$	[1] Correct final equation
6(b)	$r = \frac{64}{(2)^2} = 16$	[1] Substitute $x = 2$ into the eq. from (a)
6(c)	$x^2 = \frac{64}{r} = \frac{64}{2}$	[1] Substitute $x = 2$ into the eq. from (a)
	$x = \sqrt{32} = 4\sqrt{2}$	[1] Correct value of x
7	$a = kb^2 \quad and \quad a = m\sqrt{c}$	[1] Correct proportionality equations using any letters for k and m.
	So $kb^2 = m\sqrt{c}$	[1] Equating the two equations
	So $b^2 = \frac{m}{k}\sqrt{c}$	[1] Rearranging
	So $b^2 \propto \sqrt{c}$, so $b^2 = g\sqrt{c}$	[1] Introducing new proportionality constant g
	$g = \frac{b^2}{\sqrt{c}} = \frac{4.5^2}{\sqrt{2.25}} = 13.5$	[1] Finding g
	$b^2 = 13.5\sqrt{8}$; $b = 6.18$	[1] Correct value of b to 3 s.f.

END