

IGCSE Revision Worksheet 6

- Simplify $2 + \frac{3}{5 + \frac{2}{1 - \frac{7}{3 - 2x}}}$. [Careful about signs] $\frac{15x+20}{7x+7}$
- If $f(x) = x^2 + 3x - 2$, find $f(2x - 1)$. $4x^2 + 2x - 4$
- If $g(x) = \frac{3}{2x-1}$ find $gg(x - 1)$. $\frac{6x-9}{9-2x}$
- Complete the square for $x^2 + 8x - 9$. $(x + 4)^2 - 25$
 - Hence write down the vertex on the curve for $y = x^2 + 8x - 9$. $(-4, -25)$
- F is proportional to the cube of r . If $r = 7$ when $F = 98$, find the relationship between the two variables. $F = \frac{2r^3}{7}$
- If $y = x + \sqrt{x}$ find the equation of the tangent (in the form $y = mx + c$) when
 - $x = 1$, $y = \frac{3}{2}x + \frac{1}{2}$
 - $x = 4$, $y = \frac{5}{24}x + 1$
 - $x = 2$. [Fully simplified; no calculators allowed.] $y = \left(\frac{4+\sqrt{2}}{4}\right)x + \frac{\sqrt{2}}{2}$
- A bag contains 5 yellow, 4 blue and 3 red balls. Three balls are removed at once. Find the probability
 - they are all yellow. $\frac{1}{22}$
 - they are all different colours. $\frac{3}{11}$
 - there are two of one colour and one of another. $\frac{20}{44}$
- In the triangle GHI , $GH = 7$, $GI = 8$ and $HI = 9$ find angle GIH . 48.2°
- If $t(x) = x^2 - 2x + 1$, find the range of $t(x)$ (by completing the square). $t(x) \geq 0$
- The gradient between $(3, 7)$ and $(5, k)$ is m . The gradient between $(3, 7)$ and $(5, k + 1)$ is $2m$. Find k . $k = 8$
- Q is inversely proportional to the square root of y . If $Q = 10$ when $y = 49$, find a relationship between Q and y . $Q = \frac{70}{\sqrt{y}}$
- The length of a race track is 400m (correct to the nearest 10 metres). An athlete can run at 8.1 m/s (correct to 2 sig figs). Find the longest possible time that might be needed for him to run 400m. 50.31 seconds
- A die is rolled repeatedly until the sum of the scores of *all* the rolls exceeds 4. Find the probability that it takes
 - exactly two rolls. $\frac{1}{2}$
 - more than two rolls. $\frac{1}{6}$
- For $m(x) = x^2 + 9x - 2$ the domain is $x < -6$. Find the range of $m(x)$. $m(x) > -20$
- For $p(x) = x^2 - 7x + 1$ the domain is $x > 1$. Find the range of $p(x)$. $p(x) \geq -\frac{45}{4}$
- The domain for $k(x) = \tan x$ is $45 < x < 135$ with $x \neq 90$. Find the range of $k(x)$. $k(x) \geq 1$ or $k(x) \leq -1$

17. A bag contains r red and 4 blue balls. Two balls are removed from the bag simultaneously. The probability that they are different colours is $\frac{28}{55}$. Find the value of r . [Anyone trying trial and improvement will be summarily shot.] $r = 7$