

HSIII — GRADES 11 & 12

EASY

- 1] What is 85^2 ?
- 2] Differentiate $(x + 3)(x - 2)$
- 3] Find the gradient (slope) of the line tangent to $y = x^2 + 5x - 1$ at $x = 3$.
- 4] What is 562^2 ?
- 5] What is the slope of the secant of the curve $y = x^2$ joining points with x coordinates -4 and 8?
- 6] Find the tangent gradient at $x = -4$ on the curve $y = x^2 - 3x - 4$.
- 7] What is the hypotenuse of a right triangle with legs measuring 7 and 24 cm?
- 8] $31^3 =$
- 9] Give a triple for a right triangle with a 45° angle.
- 10] Find the gradient of the curve given by $y = \frac{3}{x^2}$ at the point (1,3).
- 11] What is 996^2 ?
- 12] Find the area under $y = 3x$ between $x = 1$ and $x = 7$.
- 13] One leg of a right triangle with hypotenuse of 85mm is 13mm. How long is the other leg?
- 14] Integrate $5x^4 - 3/x^2$.
- 15] What is $\tan \pi/2$?

- 16] Given two similar right triangles with sides 5, 12, 13 and x, _____, 5 respectively. Find x.
- 17] Given $v = 8t - 3t^2$, find the acceleration when $t = 1$.
- 18] What is the square root of 7921?
- 19] Find four consecutive even numbers that add up to 460.
- 20] Add the triples:

1	0	1
3	4	5

AVERAGE

- 1] Double the angle represented by the triple A) 0, 1, 1.
- 2] Find the minimum value of $y = 3x^2 - 6x + 1$.
- 3] Given an angle represented by the triple A) 12, 5, 13, find the triple for $\frac{dy}{dx}$ (A + 90).
- 4] If $y = 2x + 3$, find y, given that $y = 3$ when $x = 0$.
- 5] Give the measure in degrees of the sum (A+B) represented by the triples A) 3, 4, 5 and B) 4, 3, 5.
- 6] Given angle A) 7, 24, 25, Find a triple for (A + 180)
- 7] One leg of a right triangle with hypotenuse 101 is 99. Find the other leg.
- 8] Find a right triangle with one leg equal to 11.

- 9] Given $\sin A = 5/13$ what is $\cos A$?
- 10] A triangle has sides 6cm, 5cm, 5cm. What is its area?

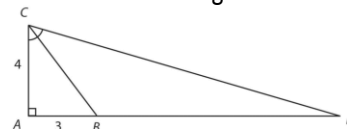
DIFFICULT

- 1] At what point on the parabola $y = 2x^2 + 3x + 4$ is the gradient equal to 3?

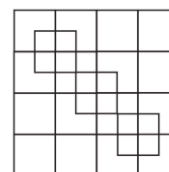
For Numbers 2 and 3, given $\sin B = 3/5$ find

- 2] $\tan 2B =$
- 3] $\cot B/2 =$
- 4] A farmer wishes to fence off a rectangular plot of grass against a long concrete wall. If he has 400 meters of fencing material, what is the maximum area that can be enclosed?
- 5] Find the value of $\tan 37.5^\circ$.
- 6] Two angles of a triangle are A) 3,4,5 and B) 12, 5, 13. Find the 3rd angle.

- 7] Given $\cos A = 3/5$, find $\tan = A/4$
- 8] Angle ACB is equal to angle BCD. Find the area of triangle BCD.



- 9] Count the number of squares in this illustration.



Answers to HSIII – Grades 11&12

EASY (2 Pts each)

- 1) 7225
- 2) $2x + 1$
- 3) 11
- 4) 3,136
- 5) 4
- 6) - 11
- 7) 25
- 8) 29,791
- 9) 1, 1, $\sqrt{2}$
- 10) -6
- 11) 992, 016
- 12) 72
- 13) 84 mm
- 14) $X^5 + 3/x$
- 15) undefined
- 16) 25/13
- 17) $a = 2$
- 18) 7921
- 19) 112, 114, 116, 118
- 20) 3, 4, 5

Average Questions (3 – pts)

- 1) -1, 0, 1
- 2) - 2
- 3) - 5, 12, 13
- 4) $Y = x^2 + 3x + 3$
- 5) 90 degrees
- 6) -7, -24, 25
- 7) 20
- 8) 11, 60, 61
- 9) 12/13
- 10) 12 cm²

Difficult questions (4 points each)

- 1) (0, 4)
- 2) $\tan 2B = 24/7$
- 3) $\cot B/2 = 3$
- 4) Max A = 20,000 m²
- 5) $(\sqrt{3} + 1)/(2\sqrt{2} + \sqrt{3} - 1)$
- 6) - 16, 63, 65
- 7) $(\sqrt{5} - 2)$
- 8) 150/7
- 9) 51