

# Calculus summer assignment answers

①  $\frac{5 \ln(x-2)}{5} = \frac{30}{5}$       ②  $e^{x-3} = 16$       ③  $3x(x-4) \left( \frac{3}{x-4} \right) - 3x(x-4) \left( \frac{2}{3x} \right) = 3x(x-4)(0)$

$\log_e(x-2) = 6$        $\log_e 16 = x-3$        $9x - 2(x-4) = 0$        $x = -\frac{8}{7}$

$e^6 = x-2$        $\ln 16 = x-3$        $9x - 2x + 8 = 0$

$+2 \quad +2$        $+3 \quad +3$        $7x + 8 = 0$        $x \neq 4 \text{ or } 0$

$x = e^6 + 2$        $3 + \ln 16 = x$        $7x = -8$

④  $\tan x = -1$       ⑤  $4 \left( \frac{1}{4} \sin^3 x \cos x \right) = (0)4$       ⑥  $x^2 - 3x - 5 = 0$

$\tan \frac{3\pi}{4} = \frac{\sqrt{2}}{2} / \frac{\sqrt{2}}{2} = -1$        $\sin^3 x \cos x = 0$        $x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(1)(-5)}}{2(1)}$

$x = \frac{3\pi}{4}$        $(\sin^3 x) = (0)^3 \cos x = 0$        $x = \frac{3 \pm \sqrt{9+20}}{2} = \frac{3 \pm \sqrt{29}}{2}$

$\sin x = 0$        $x = \frac{\pi}{2}$        $x = 0 \text{ \& } \pi$

⑦  $\frac{5}{4} \cdot \frac{(x-5)(x+1)}{(x-5)(x+5)} = \frac{x+1}{x+5}$       ⑧  $\frac{x-3 \left( \frac{4}{x} \right)}{x-3} - \frac{x \left( \frac{5x}{x-3} \right)}{x(x-3)} + \frac{x(x-3)(x^3)}{x(x-3)}$

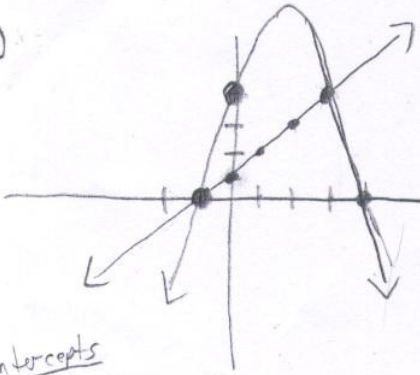
$\frac{4x-12}{x(x-3)} - \frac{5x^2}{x(x-3)} + \frac{x^5-3x^4}{x(x-3)} = \frac{x^5-3x^4-5x^2+4x-12}{x(x-3)}$

⑨  $\frac{\sin x}{\cos x} \cdot \frac{\cos x}{1} = \frac{\sin x}{1} \cdot \frac{\sin x}{1} = \sin^2 x$       ⑩  $\frac{1}{8^{1/3}} = \frac{1}{(2^3)^{1/3}} = \frac{1}{2^{12/3}} = \frac{1}{2^4} = \frac{1}{16}$



⑪  $((27)^{1/6})^4 = (3^3)^{4/6} = 3^{12/6} = 3^2 = 9$       ⑫  $m = \frac{25-5}{-2-3} = \frac{20}{-5} = -4$        $y = mx + b$


$m = \frac{-3-5}{3-3} = \frac{-8}{0} = \text{Undefined slope} = \text{vertical line } x=3$        $5 = -4(3) + b$

$5 = -12 + b$        $b = 17$        $y = -4x + 17$

⑭  $3 = \frac{1}{3}(2) + b$       ⑮ 

$3 = \frac{2}{3} + b$        $b = \frac{7}{3}$        $y = \frac{1}{3}x + \frac{7}{3}$

⑯   $(-1, 0)$       ⑰   $\frac{\sqrt{3}}{2}$

⑱   $(\frac{\sqrt{3}}{2}, \frac{1}{2})$        $(\frac{\sqrt{3}}{2}, \frac{1}{2})$

$\frac{1}{2} \div \frac{\sqrt{3}}{2} = \frac{1}{2} \cdot \frac{2}{\sqrt{3}} = \frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$

Intercepts

$x+1 = 4+3x-x^2$

$x^2-2x-3 = 0$        $x = 3 \text{ \& } -1$

$(x-3)(x+1) = 0$

$\frac{x-\text{int}}{y-\text{int}}$

$0 = -x^2 + 3x + 4(-1)$

$0 = x^2 - 3x - 4$

$0 = (x-4)(x+1)$

$x = 4 \text{ \& } x = -1$

$y = -(0)^2 + 3(0) + 4 = 4$

$$(19) (3(3)+4)^2 - 2(3(3)+4)$$

$$a) (9+4)^2 - 2(9+4)$$

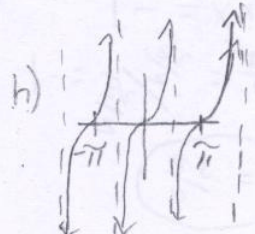
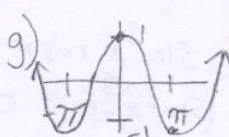
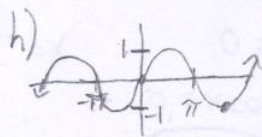
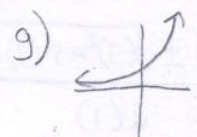
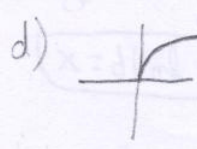
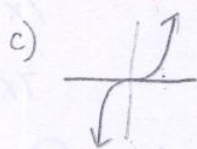
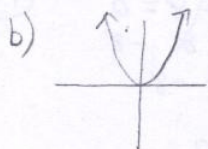
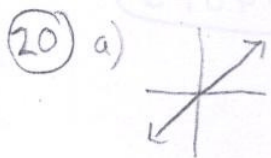
$$(13)^2 - 2(13)$$

$$169 - 26 = \boxed{143}$$

$$b) (3x+4)^2 - 2(3x+4) - (3x+4)$$

$$9x^2 + 24x + 16 - 6x - 8 - 3x - 4$$

$$\boxed{9x^2 + 15x + 4}$$



(21) a)  $\lim_{x \rightarrow 2} x^2 - 4 = (2)^2 - 4 = \boxed{0}$

b)  $\lim_{x \rightarrow 3} \frac{x^2 - 9}{x - 3} = \frac{(3)^2 - 9}{3 - 3} = \frac{0}{0}$  indeterminate

$\lim_{x \rightarrow 3} \frac{(x-3)(x+3)}{x-3} = \lim_{x \rightarrow 3} x+3 = 3+3 = \boxed{6}$

