1-24-18 3rd Trig

① Calculate the derivative of $f(x) = \frac{2}{x^4}$

Rewrite as $f(x) = 2x^{-4}$

$f'(x) = -8x^{-5}$

or

$\frac{-8}{x^5}$

② Give the critical points of

$f(x) = 4x^3 + 6x^2 + 2$

$f'(x) = 12x^2 + 12x$

$12x^2 + 12x = 0$

$12x(x+1) = 0$

$12x = 0 \qquad x+1 = 0$

$x = 0 \qquad x = -1$

$f(x) = 4x^3 + 6x^2 + 2$

$f(0) = 4 \cdot 0^3 + 6 \cdot 0^2 + 2 = 2 \quad (0,2)$

$f(-1) = 4(-1)^3 + 6(-1)^2 + 2 = 4 \quad (-1,4)$

Pt. of Inflection

$f''(x) = 24x + 12$

$24x + 12 = 0$

$x = -\frac{1}{2}$

$f(-\frac{1}{2}) = 4(-\frac{1}{2})^3 + 6(-\frac{1}{2})^2 + 2 = 3$

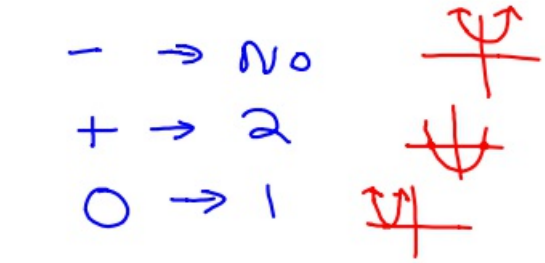
$(-\frac{1}{2}, 3)$

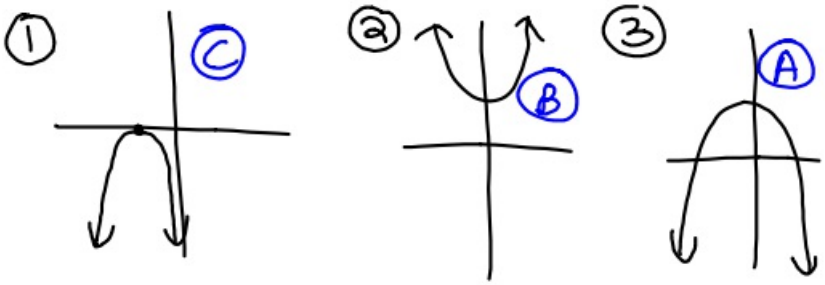
$$\frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

$-$ → No

$+$ → 2

0 → 1





(A) Discriminant was 4

(B) Discriminant was -2

(C) Discriminant was 0.

(4) Give the discriminant value and then tell how many solutions exist.

$f(x) = \underset{a}{2}x^2 \underset{b}{-6}x + \underset{c}{7}$

b^2-4ac

$(-6)^2-4\cdot 2\cdot 7$

$36-56$

-20

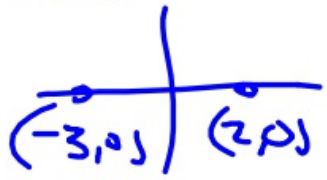
$\therefore$ No solutions

⑤ Give the x & y intercepts for $f(x) = x^2 + 6x + 5$

$y = x^2 + 6x + 5$

X-intercept

$y = 0$



$0 = x^2 + 6x + 5$

$0 = (x+5)(x+1)$

$x+5 = 0$ $\quad$ $x+1 = 0$

$x = -5$ $\quad$ $x = -1$

$(-5,0)$ $\quad$ $(-1,0)$

y-intercept

$x = 0$

$y = 0^2 + 6 \cdot 0 + 5$

$y = 5$

$(0,5)$

1-24-18 4th Trig

Review

① Calculate the derivative of $f(x) = \frac{2}{x^4}$

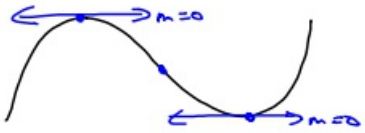
Rewrite $f(x) = 2x^{-4}$

$f'(x) = -8x^{-5}$

or

$\frac{-8}{x^5}$

② Give the critical points for $f(x) = 4x^3 - 6x^2 + 7$



$f'(x) = 12x^2 - 12x$

$12x^2 - 12x = 0$

$12x(x-1) = 0$

$12x = 0$ $\quad x - 1 = 0$

$x = 0$ $\quad x = 1$

$f(x) = 4x^3 - 6x^2 + 7$

$f(0) = 4 \cdot 0^3 - 6 \cdot 0^2 + 7 = 7$ $(0, 7)$

$f(1) = 4 \cdot 1^3 - 6 \cdot 1^2 + 7 = 5$ $(1, 5)$

Pt. of Inflection

$f''(x) = 24x - 12$

$24x - 12 = 0$

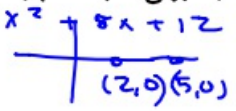
$x = \frac{1}{2}$

$f(\frac{1}{2}) = 4(\frac{1}{2})^3 - 6(\frac{1}{2})^2 + 7 = 6$

$(\frac{1}{2}, 6)$

③ Give the x & y intercept of $f(x) = x^2 + 8x + 12$

$y = x^2 + 8x + 12$



x-intercept

$y = 0$

$0 = x^2 + 8x + 12$

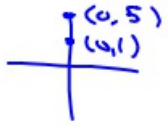
$0 = (x+6)(x+2)$

$x+6=0$ $\quad$ $x+2=0$

$x = -6$ $\quad$ $x = -2$

$(-6,0)$ $\quad$ $(-2,0)$

y-intercept



$x = 0$

$y = 0^2 + 8(0) + 12$

$y = 12$

$(0,12)$

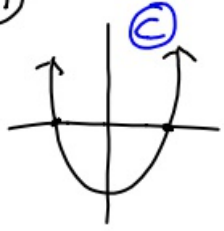
④ $$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$ discriminant

$\sqrt{-}$ No Solution 

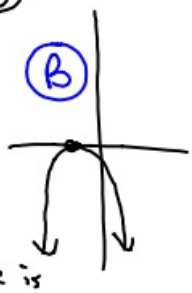
$\sqrt{+}$ 2 solutions 

$\sqrt{0}$ 1 solution 

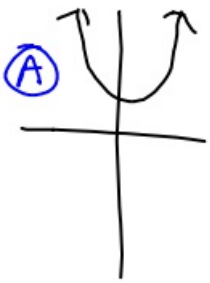
④



⑤



⑥



Discriminant value is

(A) -4

(B) 0

(C) 5