

Assignment 3

①

Q1) A

Q2) B

Q3) A

Q4)

a)

i) Neither

ii) Even

iii) Neither

iv) Odd

v) Neither

vi) Odd

vii) Odd

b)

i) $y = \lfloor x + 3 \rfloor$

ii) $y = 3^x$

iii) $(x-3)^2 + (y-3)^2 = 9$

iv) $y = \lfloor x \rfloor + 3$

v) $y = 3x^3$

vi) $y = \frac{3}{x}$

vii) $y = 3 - x^2$

Q5) (i)

↓

Domain = $(-\infty, 3)$

Range = $[0, 3)$

iv)

↓

Domain = $[1, \infty)$

Range = $[1, 0)$

Q6)

2

a)

i) $f(x) = -x + 2$

$$f(-x)$$

$$= -x(-x + 2)$$

$$y = x + 2$$

ii) $f(x) = -x + 2$

$$-f(x)$$

$$= -(-x + 2)$$

$$y = x - 2$$

iii) $-f(-x)$

$$f(x) = -x + 2$$

$$-f(-x) = -f x - x$$

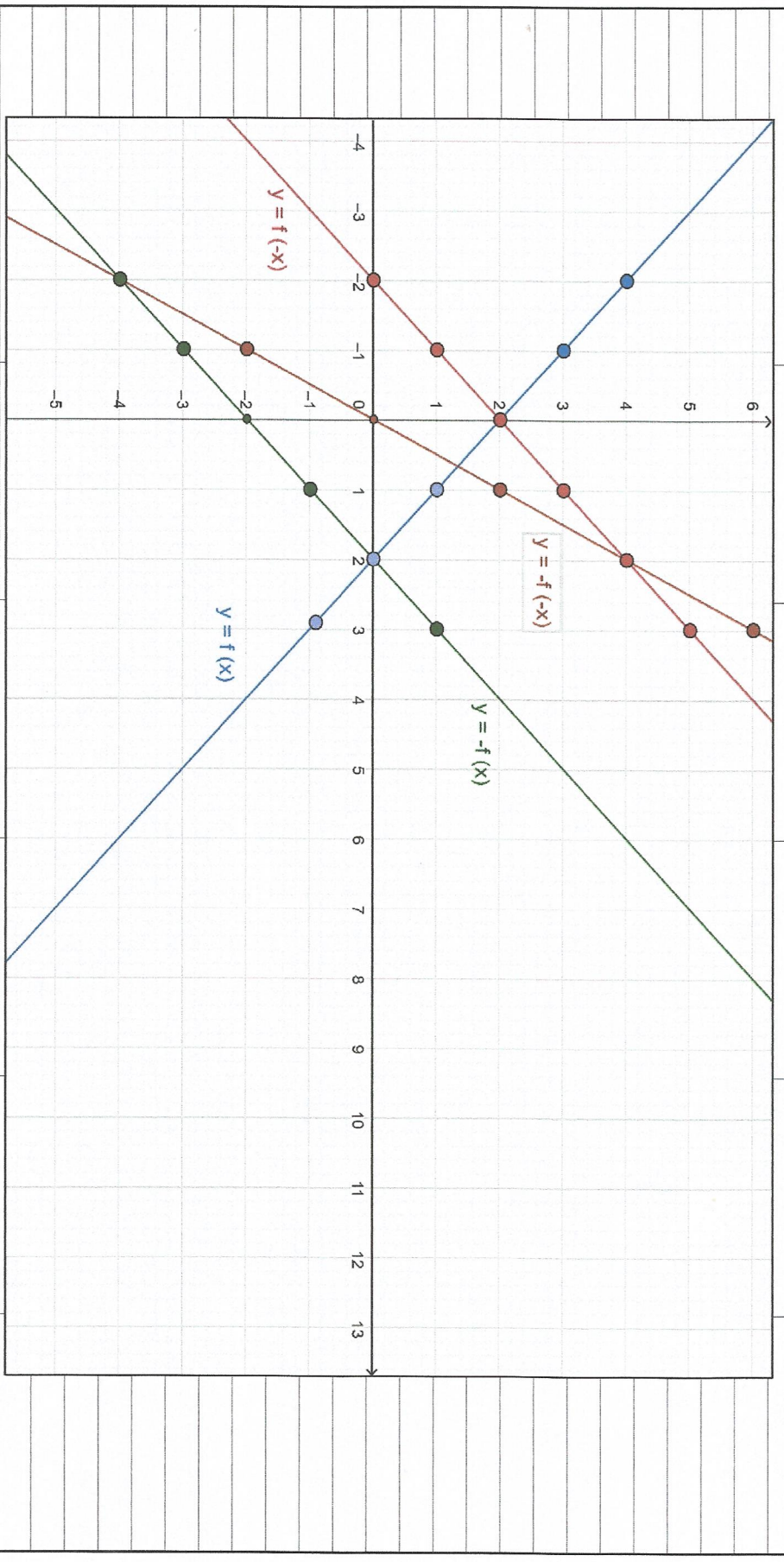
$$= f x$$

$$= x \times 2$$

$$y = 2x$$

Q6) (b) (i), (ii), (iii), (iv)

x	-2	-1	0	1	2	3	
y	0	1	2	3	4	5	$y = f(-x)$
x	-2	-1	0	1	2	3	
y	-4	-3	-2	-1	0	1	$y = -f(x)$
x	-2	-1	0	1	2	3	
y	-2	-1	0	1	2	3	$y = -f(-x)$
x	-2	-1	0	1	2	3	
y	-2	-1	0	1	2	3	$y = f(x)$



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Q7)

$$a) g(t) = \frac{t}{t-1}$$

$$g(5) = \frac{5}{5-1}$$

$$g(5) = \frac{5}{4}$$

$$b) g(t) = \frac{t}{t-1}$$

$$g(x+1) = \frac{x+1}{(x+1)-1}$$

$$c) g(t) = \frac{t}{t-1}$$

$$g(2) = \frac{2}{2-1}$$

$$g(2) = \frac{2}{1}$$
$$= 1$$

~~none~~

$$d) (-\infty, 1)$$

$$e) [5, \infty)$$

$$f) x=2$$
$$y=1$$

(5)

Q8)

$$a) x^2 + y^2 + 2x - 4y - 44 = 0$$

$$x^2 + y^2 + 2x - 4y = 44$$

$$x^2 + y^2 + x - 4y = 44 + 1 \quad \left(\frac{2}{2}\right)^2 = 1^2 = 1$$

$$x^2 + y^2 + x - y \neq 45 + 4 \quad \left(\frac{4}{2}\right)^2 = 2^2 = 4$$

$$(x^2 + y^2) + (x - y) = 49$$

$$(x - x_0)^2 + (y - y_0)^2 = 49 \quad (r^2)$$

$$r^2 = 49$$

b) Radius



$$r^2 = 49$$

$$r = \sqrt{49}$$

$$r = 7 \text{ units}$$

Centre = 3.5 units

Q9)

a)

$$y = 2x^2 - 5$$

$$y = 2 \times 2^2 - 5$$

$$y = (2 \times 4) - 5$$

$$y = 8 - 5$$

$$y = 3$$

$$P = (2, 3)$$

$$y = 2x^2 - 5$$

$$y = 2 \times 3^2 - 5$$

$$y = (2 \times 9) - 5$$

$$y = 18 - 5$$

$$y = 13$$

$$Q = (3, 13)$$

$$b) m = \frac{y^2 - y^1}{x^2 - x^1}$$

$$m = \frac{13 - 3}{3 - 2}$$

$$m = \frac{10}{1}$$

$$m = 10$$

$$c) Q = x + h$$

$$Q = 3 + 13 = 16$$

$$h \rightarrow 0$$

$$\frac{dy}{dx} = \frac{13}{3}$$

$$= 4.\dot{3}\dot{3}$$

Q10) This question has been unanswered as requested in OLS.

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Q11) $P = 20t + 45t^2$

Find $\frac{dP}{dt}$

$$20 + 45 = 65$$

$$= \frac{65t}{20}$$

Q12) $1.5\sqrt{x^3} - \frac{4}{x}$

$$f(x) = 1.5\sqrt{x^3} = 1.5x^{\frac{1}{3}}$$

$$= 1.5 \times \frac{1}{3} x^{\frac{1}{3}}$$

$$= \frac{1.5}{3} x^{-\frac{11}{3}}$$

$$= \frac{1.5}{3} \times \frac{1}{x^{\frac{11}{3}}}$$

$$= \frac{1.5}{3} \times \frac{1}{\sqrt[11]{x^3}}$$

$$= \frac{1.5}{11^3 \sqrt{x^3}}$$

Q13)

$$x \sqrt{x+1}$$

$$y = x \sqrt{x+1}$$

$$\overbrace{x \sqrt{x+1}}$$

$$y = x^2 + x$$

$$\text{Q14)} \quad \frac{x^2 + 3}{2x + 7}$$

$$y = \frac{u}{v}$$

$$\text{where } u = x^2 + 3$$

$$v = 2x + 7$$

$$u' = 2x$$

$$v' = 2$$

$$= \frac{3(x^2 + 3) - 2(2x + 7)}{(2x + 7)^2}$$

$$= \frac{3x^2 + 9 - 4x - 14}{(2x + 7)^2}$$

$$= \frac{3x^2 - 4x - 5}{(2x + 7)^2}$$