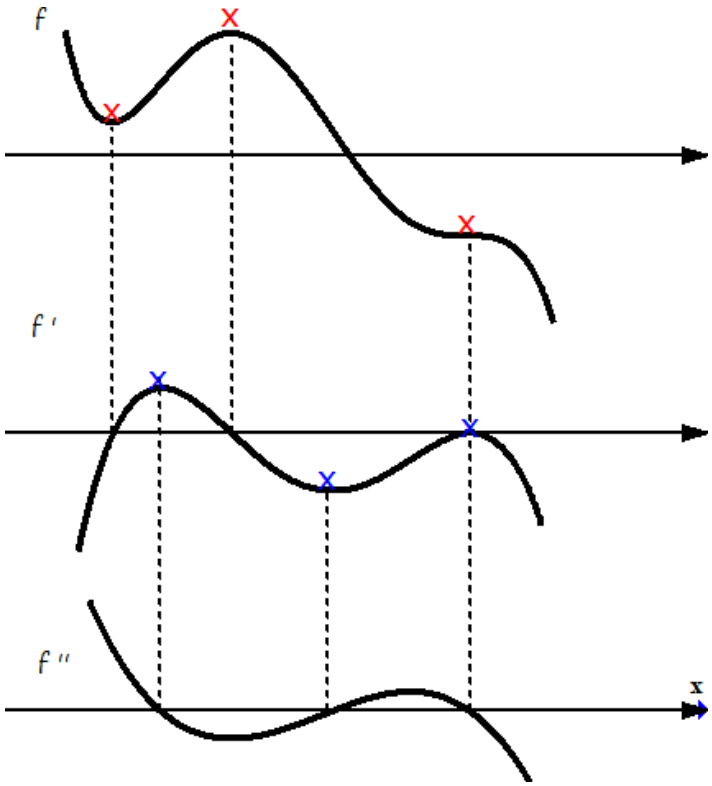
[MAA 5.7] THE GRAPH OF f'

SOLUTIONS

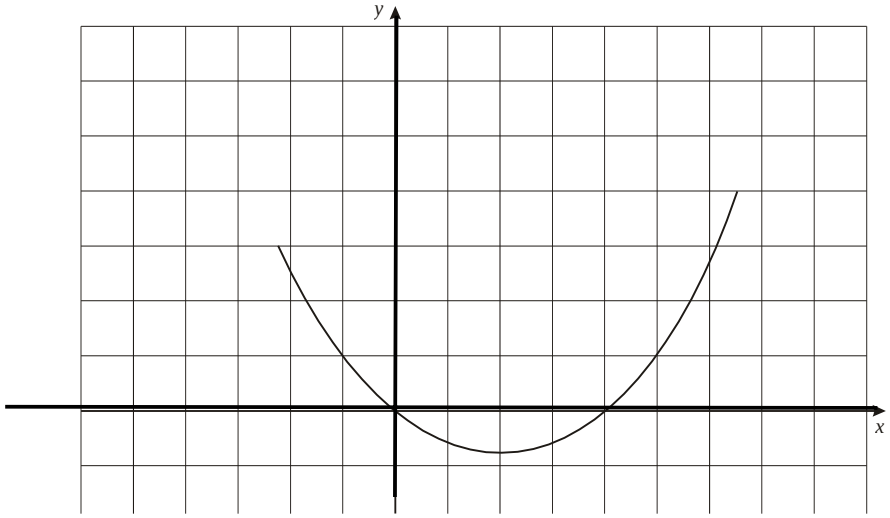
O. Practice questions

1.



A. Exam style questions (SHORT)

2.



Note: *(approximately parabolic), intercepts at 0 and 4, minimum close to x = 2.*

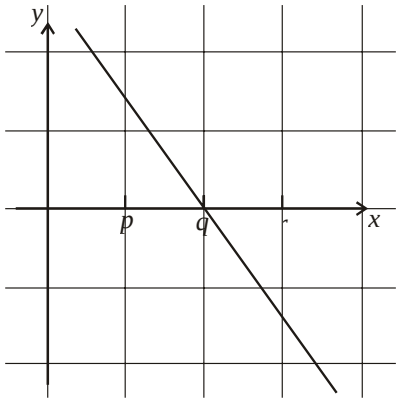
3.

Function	Derivative diagram
f_1	(d)
f_2	(e)
f_3	(b)
f_4	(a)

4.

Graph	$f'(x)$	$f'(x)$
Diagram	I	IV

5. (a)



Note: *negative gradient, x- intercept of q. (It need not be linear)*

(b)

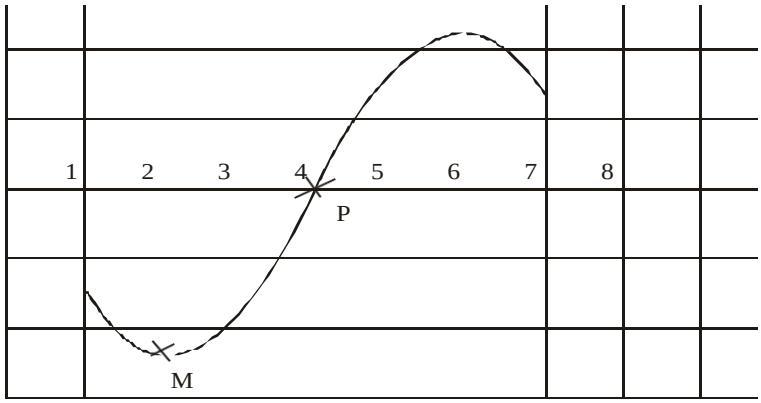
	Maximum point on f	Inflexion point on f
x-coordinate	r	q

(c) **METHOD 1**
Second derivative is zero, second derivative changes sign.
METHOD 2
There is a maximum on the graph of the first derivative.

6. (a) $x = 4$ g' changes sign at $x = 4$ or concavity changes

(b) $x = 2$
EITHER g' goes from negative to positive
OR $g'(2) = 0$ **and** $g'(2)$ is positive

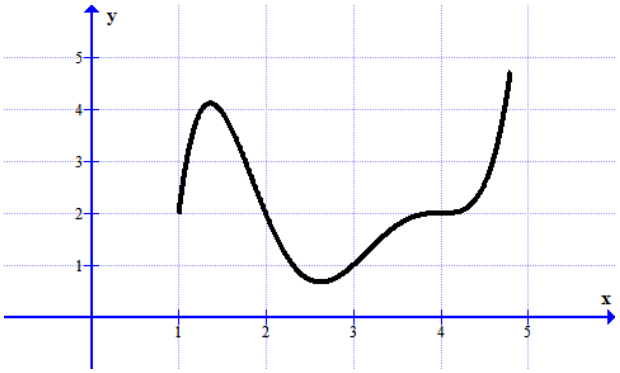
(c)



Note: *a cubic curve through (4,0), M at x=2, P at (4,0).*

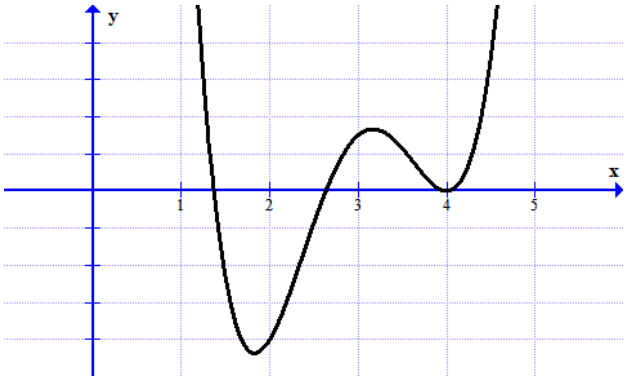
7.

$y = f(x)$



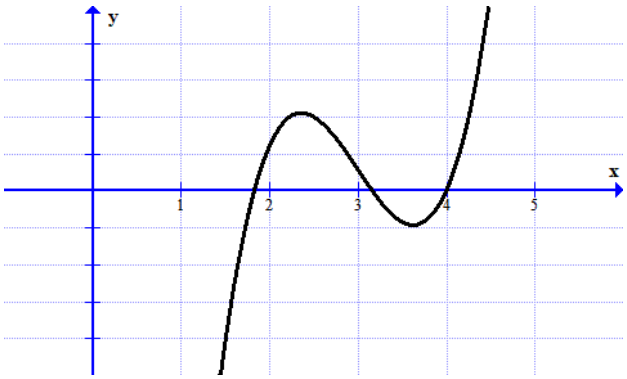
(a)

$y = f'(x)$



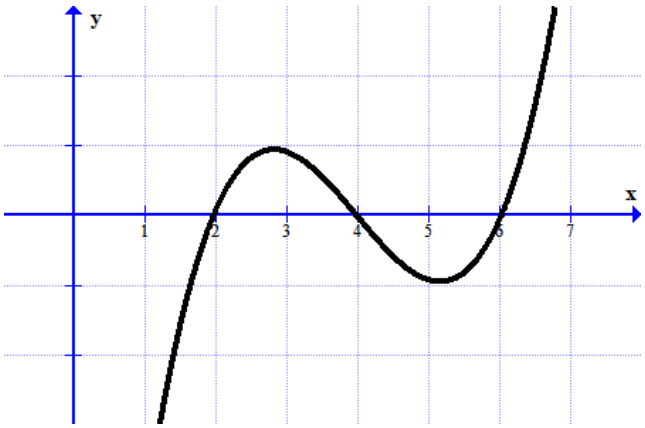
(b)

$y = f''(x)$

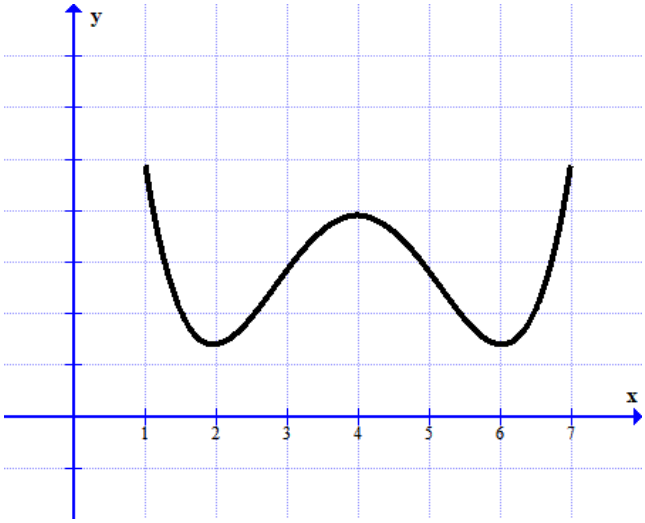


8. The graph of $y = f'(x)$.

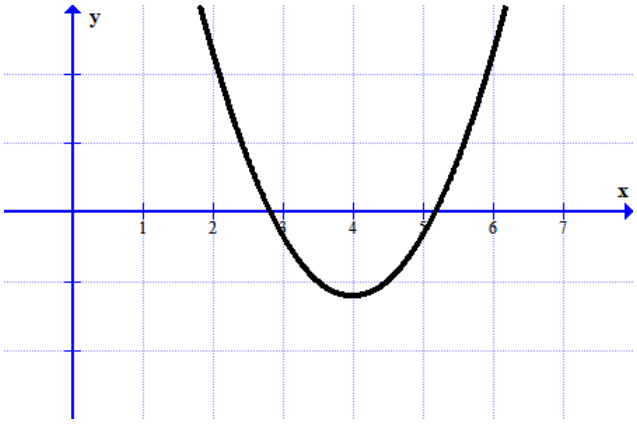
$y = f'(x)$



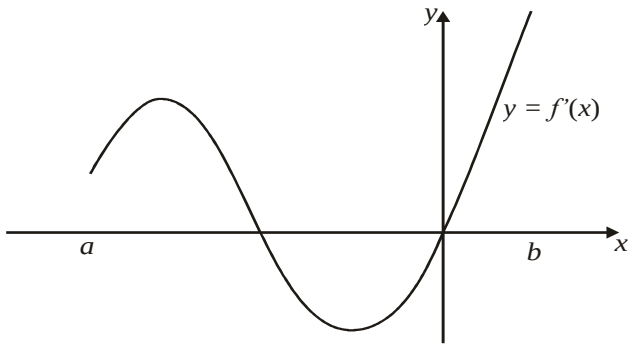
(a) $y = f(x)$, $f(x) > 0$ for any x.

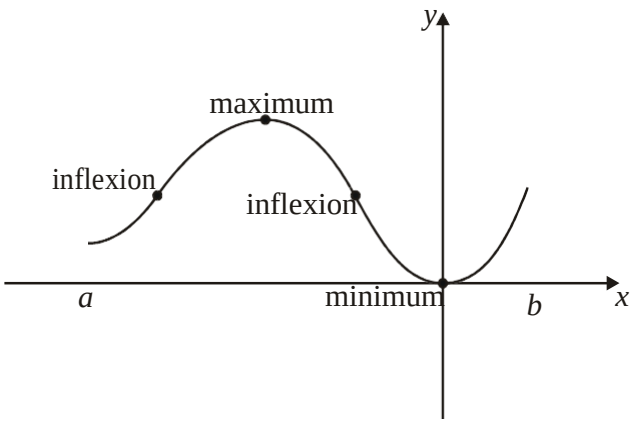


(b) $y = f'(x)$

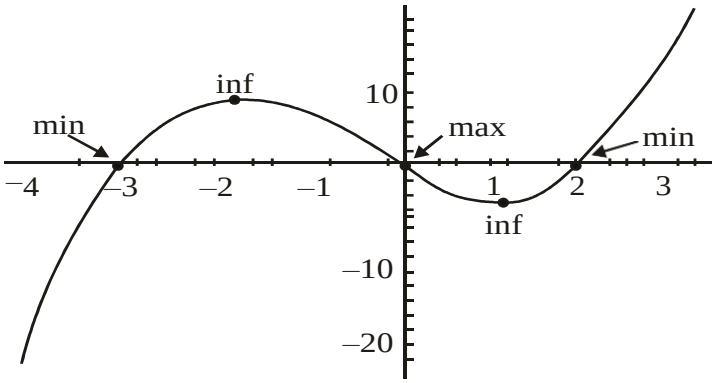


9.

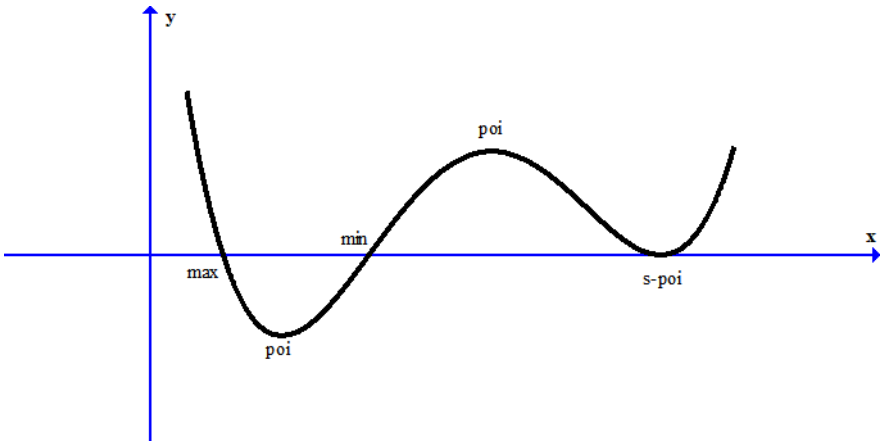

y
y = f'(x)
a
b
x


y
maximum
inflexion
inflexion
a
minimum
b
x

10.


inf
10
min
max
min
−4
−3
−2
−1
1
2
3
inf
−10
−20

11.


y
poi
min
x
max
s-poi
poi

12. (a) x-intercepts at –3, 0, 2

(b) $-3 < x < 0,\ 2 < x < 3$

(c) the graph of f is **concave-down** therefore the second derivative is negative

(d) Points of inflexion approx. at $x = -1.5$ and $x = 1$, they become roots.