Topic test 11 — Graphs

Name:
_____

- Time allowed: 45 minutes
- Part A: 15 multiple-choice questions (30 marks)
- Part B: 10 free-response questions (70 marks)
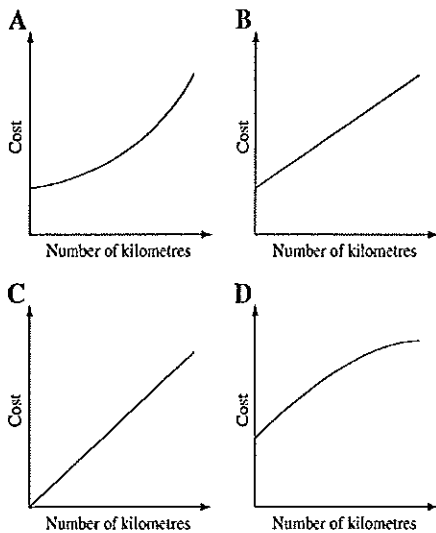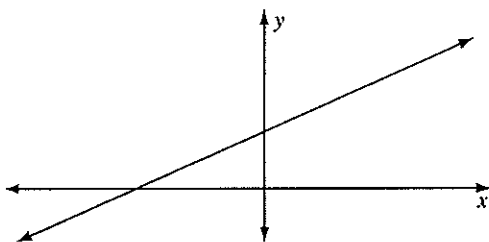
Part A
15 multiple-choice questions
2 marks each: 30 marks
Circle the correct answer.

1 The cost of a journey in a taxi cab consists of a starting charge of $5 plus 80 cents per kilometre. Which one of the these graphs shows this?
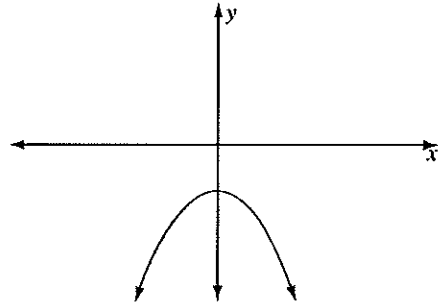

2 What is a possible equation of this graph?

A $y = \frac{1}{2}x + 1$ B $y = \frac{1}{2}x - 1$

C $y = -\frac{1}{2}x + 1$ D $y = -\frac{1}{2}x - 1$

3 Which type of graph has no x-intercept or y-intercept?
A circle with centre (0,0)
B line   C parabola
D hyperbola with axes as asymptotes

4 What is a possible equation of this graph?

A $y = x^2 + 2$ B $y = x^2 - 2$
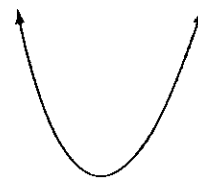C $y = -x^2 + 2$ D $y = -x^2 - 2$

5 Which one of these is *not* the equation of a line?
A $x + y = 1$ B $y = x$
C $xy = 1$ D $y = 1$

6 Which type of graph has two axes of symmetry?
A circle   B hyperbola
C parabola

7 If the equation of this graph is $y = ax^2 + c$, then:

A a is positive   B a is negative
C c is positive   D c is negative

8 The graph of $4x - 2y = 0$ is a:
A cubic curve   B hyperbola
C line   D parabola
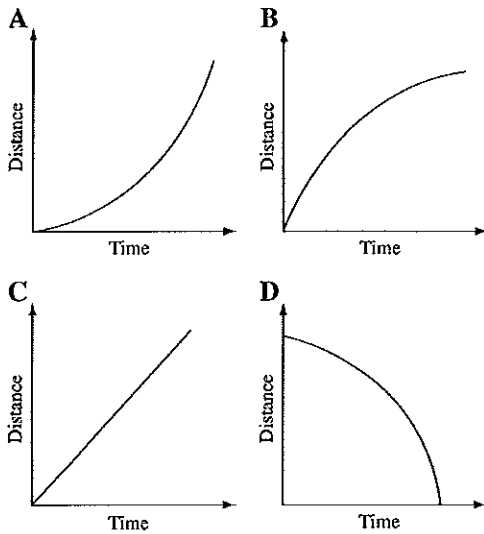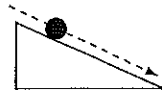
9 The graph of $y = 2x^2 + 1$ is a:
A cubic curve   B hyperbola
C line   D parabola

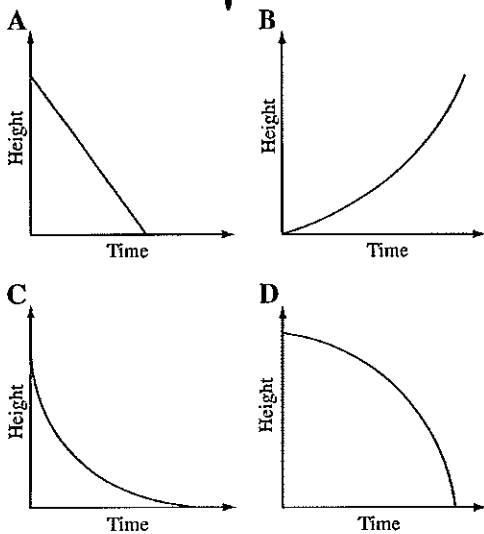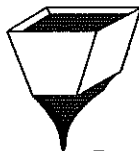**10** The graph of $y = \dfrac{2}{x}$ is a:

   A cubic curve   **B** hyperbola
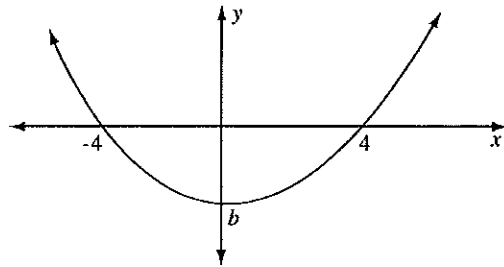
   C line   **D** parabola

11 A ball rolls down a ramp. Which graph correctly shows the distance travelled by the ball?

12 Wheat is emptied from this storage bin. Which graph best shows the height of the grain in the bin as it empties?
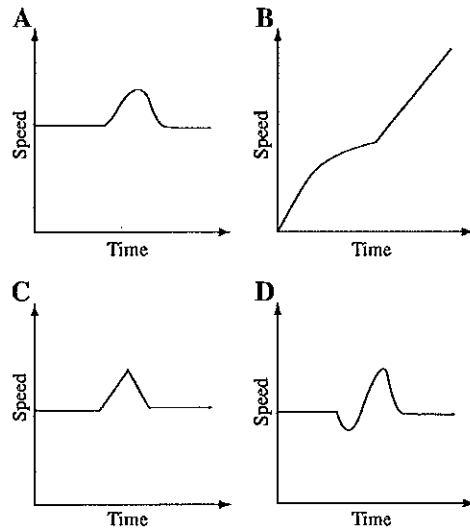

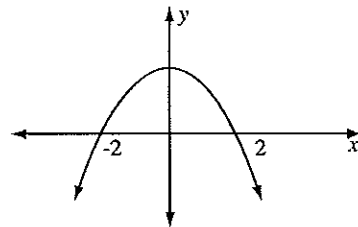**13** If the equation of this graph is $y = \frac{1}{2}x^2 - b$, what is the value of b?

   A 2

   B 4

   C 8

   D 16

14 Which speed graph shows Michael riding his bike along a flat road with a small hill in the middle?

15 What is a possible equation of this graph?

   A $y = -x^2 - 2$

   B $y = -4 + x^2$

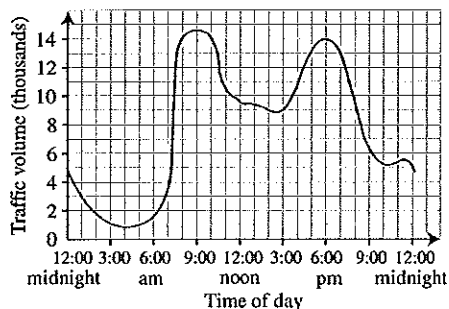   **C** $y = -x^2 + 2$

   D $y = -x^2 + 4$

Part B

**10 free-response questions**
70 marks
Show working where appropriate.

**16** (10 marks) This graph shows the amount of traffic on the Sydney Harbour Bridge over a 24-hour period.

a Name the independent variable.

b What was the lowest traffic volume?

c Name two consecutive hours when the traffic volume was the same.

d Name the hour when the traffic in the afternoon was at its highest.

e At what hour did the traffic volume increase most rapidly?
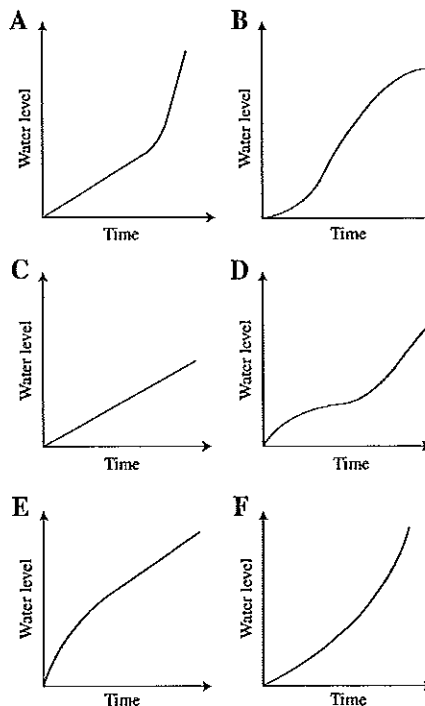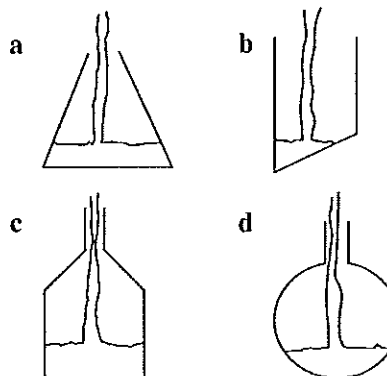
17 (4 marks) Graph $y = \frac{1}{2}x - 4$.
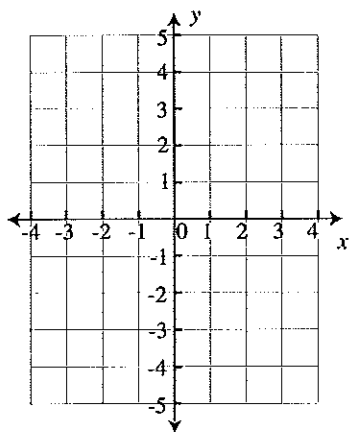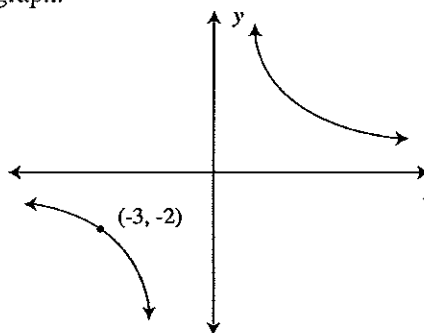
18 (2 marks) Write a possible equation for this graph.

19 (8 marks) Water fills each bottle at a constant rate, and the height level of the water is graphed. Match each bottle to its correct graph.
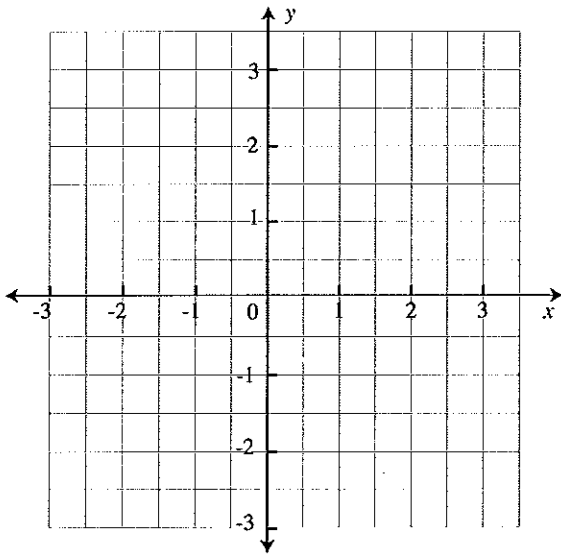
20 (11 marks)

a Complete this table for $y = -\dfrac{1}{x}$.

x	-3	-2	-1	$-\dfrac{1}{2}$	$\dfrac{1}{2}$	1	2	3
y								

b Why is there no value for y when $x = 0$?

c Graph $y = -\dfrac{1}{x}$.

d Find the value of y when:

   i $x = 0.2$

   ii $x = 50$

21 (4 marks) Write a possible equation for this graph.

(3, 3)

22 (8 marks) Match each graph to its equation.

a

(3, -3)

b

(2, -8)

c

d

z

(2, -2)

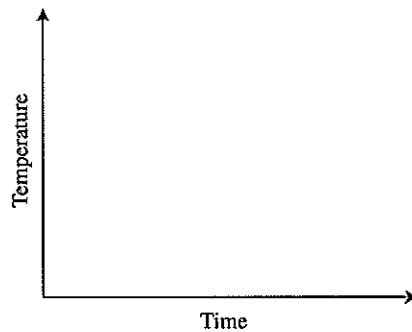**A** $y = x$

B $y = -x$

C $y = -\dfrac{9}{x}$

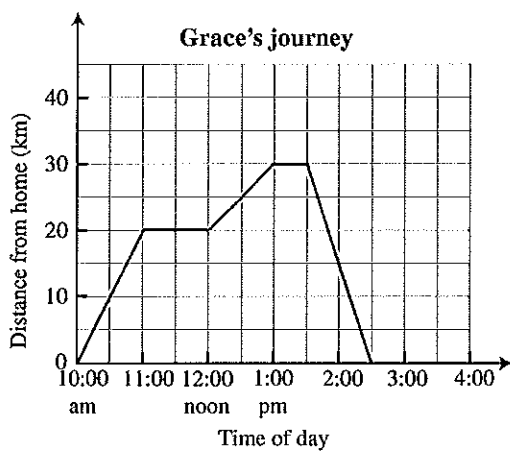**D** $y = \dfrac{9}{x}$

E $y = -2x^2$

F $y = -x^2 + 2$

23 (2 marks) A bowl of hot soup sits on a table cooling. It loses heat quickly at first but as time passes it loses heat slowly. Illustrate this cooling process on the temperature graph below.

Temperature

Time

24 (12 marks) This graph shows Grace's bicycle journey on a training ride.


Grace's journey

a What was Grace's speed at the beginning of the journey?

b At what distance from home did Grace first stop?

c At what time is Grace riding at a speed of 30 km/h?

d What was the total distance travelled during the journey?

e What was the lowest speed at which Grace moved during the journey?

f When did Grace start heading back home?

25 (9 marks)

a Complete this table for $y = \frac{1}{2}x^2$.

x	-3	-2	-1	0	1	2	3
y							

b Graph $y = \frac{1}{2}x^2$.
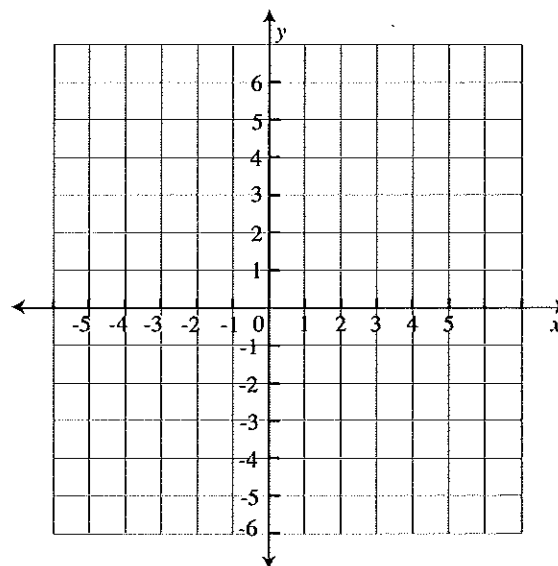
c What are the coordinates of the vertex?

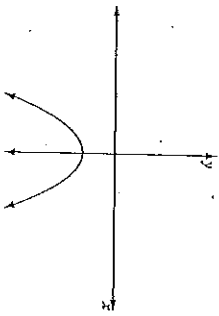**d** How does the graph of $y = \frac{1}{2}x^2$ compare to the graph of $y = x^2$?

END OF TEST.
Use the rest of this page and the back for extra working space.

Topic test 11 Graphs

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- Part B: 10 free-response questions (70 marks)

Part A
15 multiple-choice questions
2 marks each: 30 marks
Circle the correct answer.

Name: _Laura Arnold_

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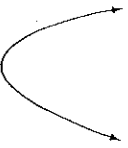
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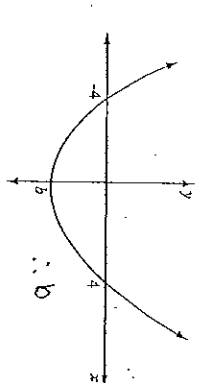**7** If the equation of this graph is $y = ax^2 + c$, then:

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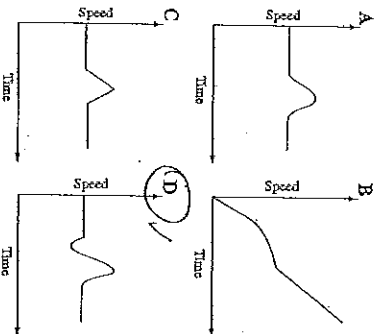
A cubic curve   B hyperbola

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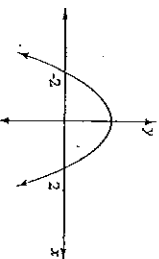**13** If the equation of this graph is $y = \frac{1}{2}x^2 - b$, what is the value of b?

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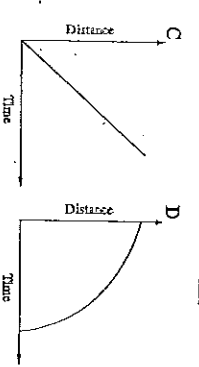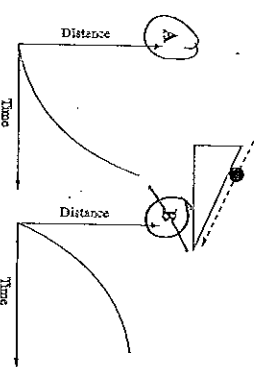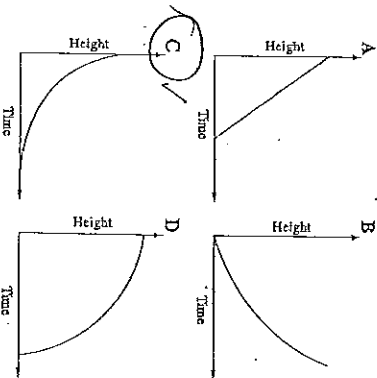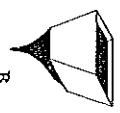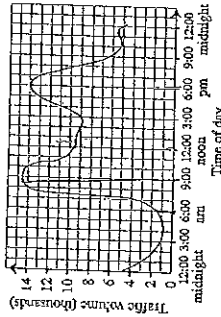

15 What is a possible equation of this graph?

A $y = x^2 - 2$

B $y = 4 + x^2$

C $y = -x^2 + 2$

D $y = -x^2 + 4$

Part B

10 free-response questions

70 marks

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a Name the independent variable.
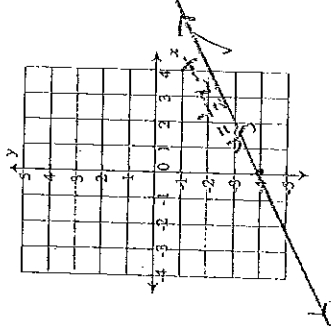~~correct of story~~ Traffic Volume.

b What was the lowest traffic volume?
1 (thousand) ✓

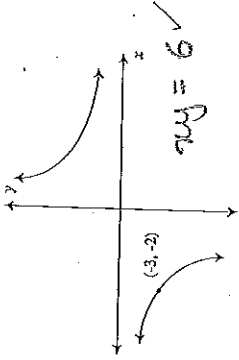c Name two consecutive hours when the traffic volume was the same.
3-4am, 5am ✓

d Name the hour when the traffic in the afternoon was at its highest.
6 pm ✓

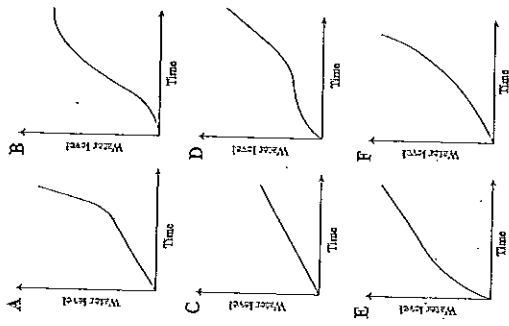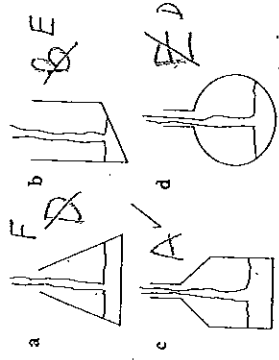e At what hour did the traffic volume increase most rapidly?
7-8am ✓

17 (4 marks) Graph $y = \frac{1}{2}x - 4$.

18 (2 marks) Write a possible equation for this graph.

$xy = 6$ ✓

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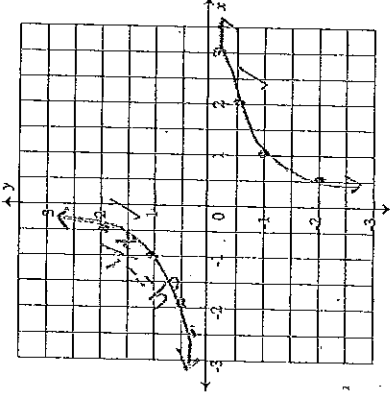
a F ✓

b F ✗

c A ✓

d E ✓

B
D
F
A
C
E

3

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20 (11 marks)

a Complete this table for $y = \frac{1}{x}$.

x	-3	-2	-1	$-\frac{1}{2}$	1	2	3
y	1/3	1/2	1	2	-2	-1	-1/2	-1/3

b Why is there no value for y when x = 0?
because the gradient of line on by 0 is undefined. ✓

c Graph $y = \frac{1}{x}$.

d Find the value of y when:
i x = 0.2 $y = -5$ ✓
ii x = 50 $y = -0.02$ ✓

21 (4 marks) Write a possible equation for this graph.

$y = x^2 - 5$
Try $(3,3)$

22 (8 marks) Match each graph to its equation.

a
b E ✓

c C ✓
d F
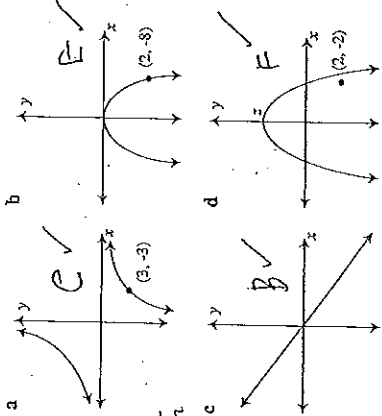
$\cancel{y = x}$
$\cancel{y = -x}$
$\cancel{y = -\frac{9}{x}}$
$y = \frac{9}{x}$
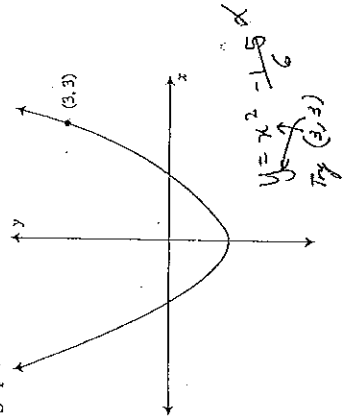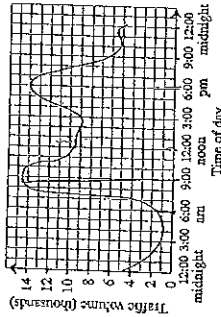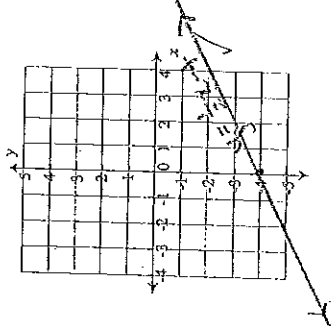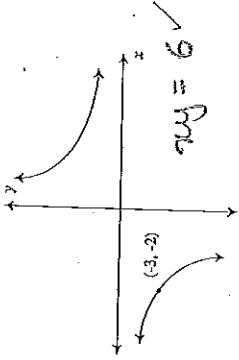$\cancel{y = -2x^2}$
$\cancel{y = -x^2 + 2}$

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4
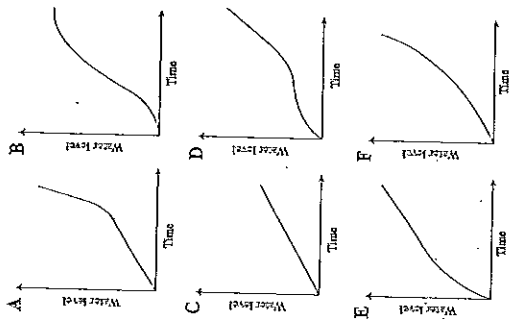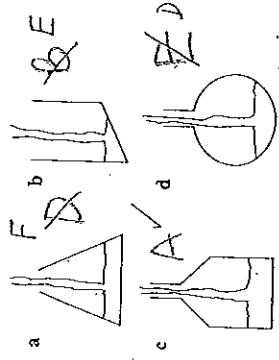
Topic test 11: Graphs *continued*

24 (12 marks) This graph shows Grace's bicycle journey on a training ride.

Grace's journey

Distance from home (km)

Time of day
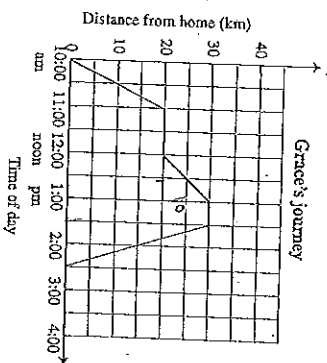
a What was Grace's speed at the beginning of the journey?

 0 km/h ✓

b At what distance from home did Grace first stop?
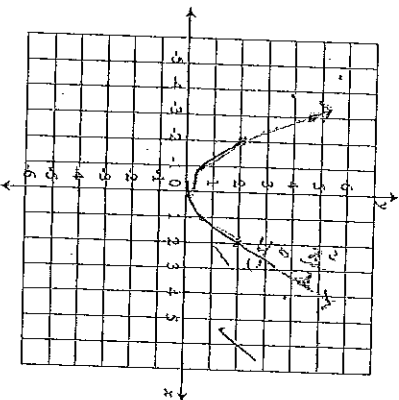
 20 km ✓

c At what time is Grace riding at a speed of 30 km/h?

 [*1.30 – 2.30*] *pm* ✓

d What was the total distance travelled during the journey?

 60 km ✓

e What was the lowest speed at which Grace moved during the journey?

 10 km/h ✓

f When did Grace start heading back home?

 1·30 pm ✓

25 (9 marks)

a Complete this table for $y = \frac{1}{2}x^2$.

x	-3	-2	-1	0	1	2	3
y	4·5	2	½	0	½	2	4·5

b Graph $y = \frac{1}{2}x^2$.

c What are the coordinates of the vertex?

 (0,0) ✓

d How does the graph of $y = \frac{1}{2}x^2$ compare to the graph of $y = x^2$?

 it is wider. ✓

END OF TEST.

Use the rest of this page and the back for extra working space.