

FUNCTIONS & RELATIONS.

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A. Basic Curve Sketching.

Sketch each of the following, clearly showing essential features where appropriate eg intercepts, asymptotes.

State the domain and range in each case.

1. $y = (x+1)^2$

2. $y = (x-2)^2$

3. $x = (y-1)^2$

4. $y = x^2 - 2x - 1$

5. $y = \sqrt{x-1}$

6. $x^2 + (y-1)^2 = 1$

7. $(x+2)^2 + (y-3)^2 = 4$

8. $y = \sqrt{4-x^2}$

9. $x = -\sqrt{9-y}$

10. $y = 2^x - 1$

11. $y = 1 - 3^x$

12. $y = \log_2(x-1)$

13. $y = \frac{1}{x^2}$ $x \neq 0$
 $y \neq 0$

14. $y = \frac{1}{x^2+1}$

15. $y = |x-2|$

16. $y = |x+3|$

17. $y = 1 - |x|$

18. $y = \frac{1}{x+2}$

B. More difficult curve sketching.

Sketch each of the following showing essential features. State the domain and range in each case marked *

1. $y = \frac{x-1}{x+1}$ *

2. $y = \frac{2x-1}{x-1}$ *

3. $y = \frac{x+1}{x}$

4. $y = |x| + x$

5. $y = x^2 + \frac{1}{x}$

6. $y = x^2 -$

7. $|x| + |y| = 1$

8. $|x| - |y| = 1$

9. $y = x + [x]$ where $[x]$ means greatest integer less than or equal to x

10. $y = x + \sin x$ for $0 \leq x \leq 2\pi$.

13. $y = x \cdot \pi$

14. $y = x \cdot 2$

* 15. $x^2 + xy + y^2 =$

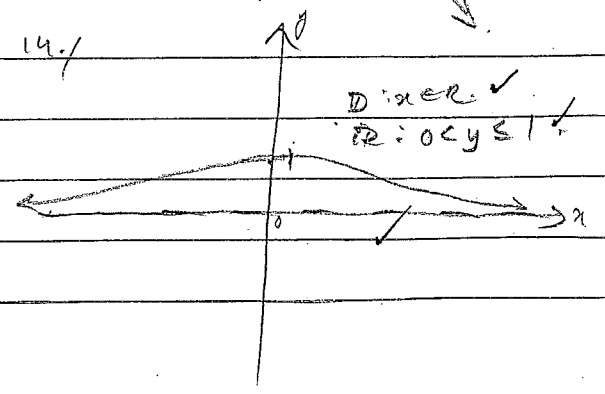
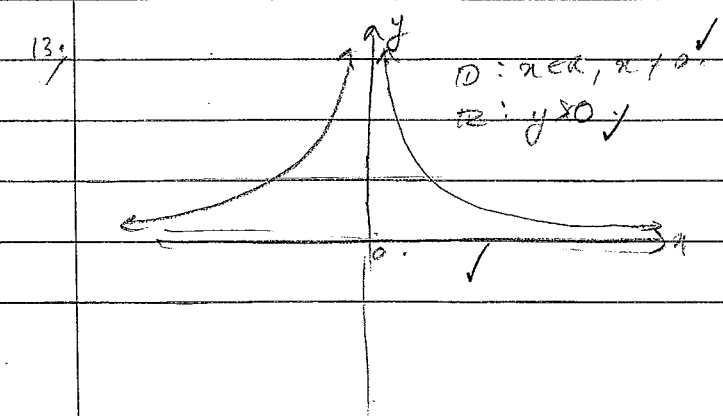
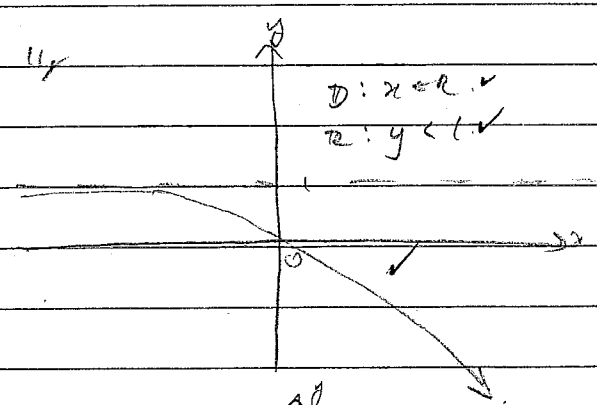
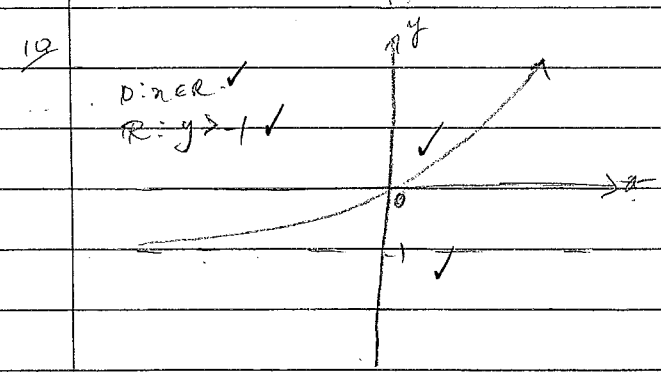
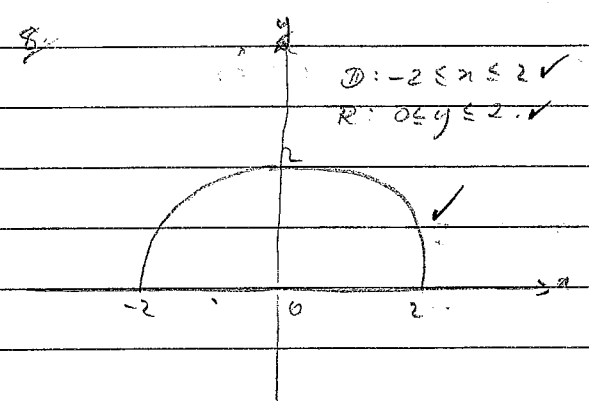
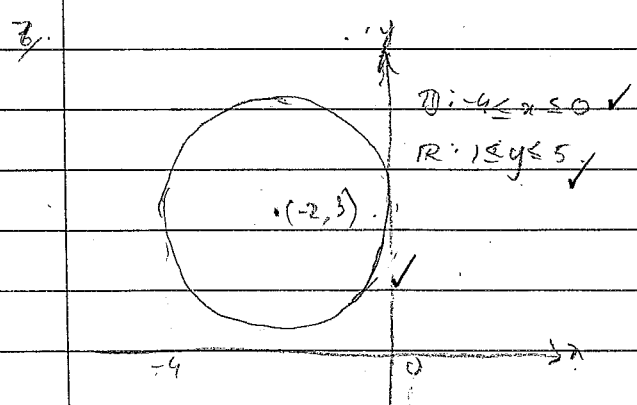
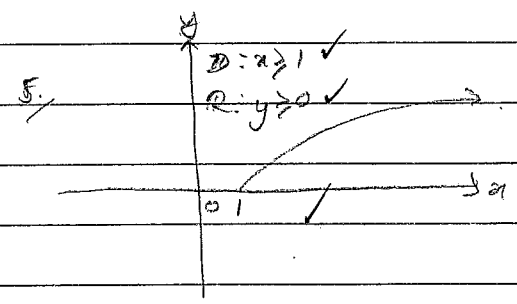
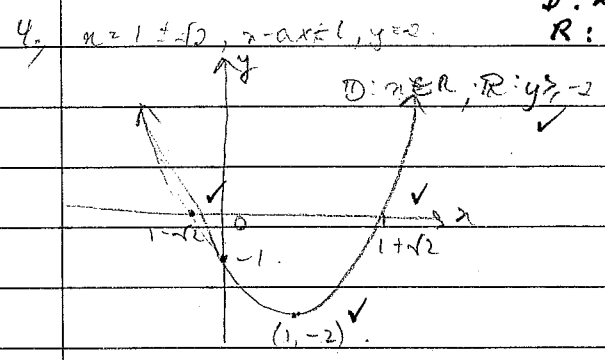
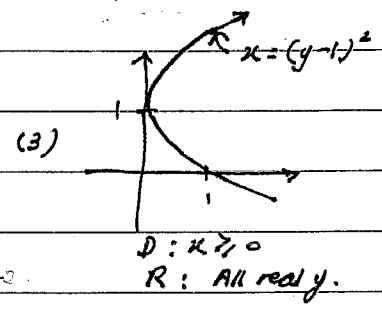
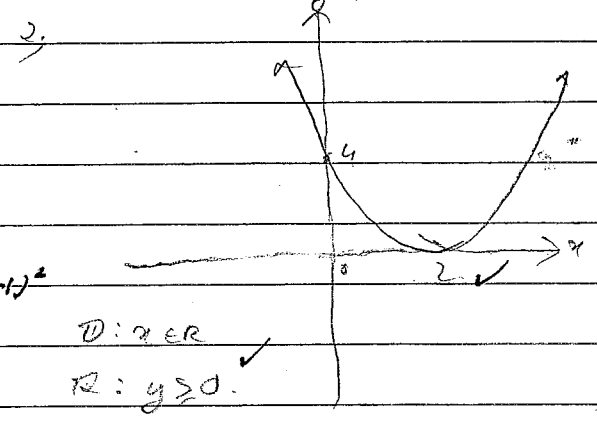
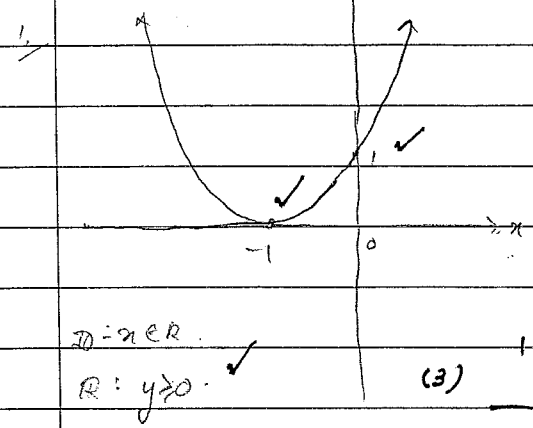
11. $y = x - [x]$

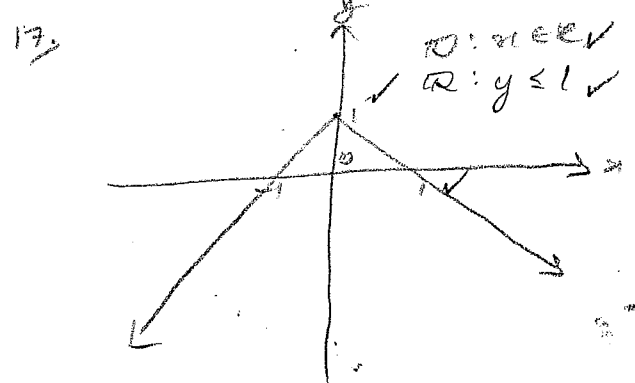
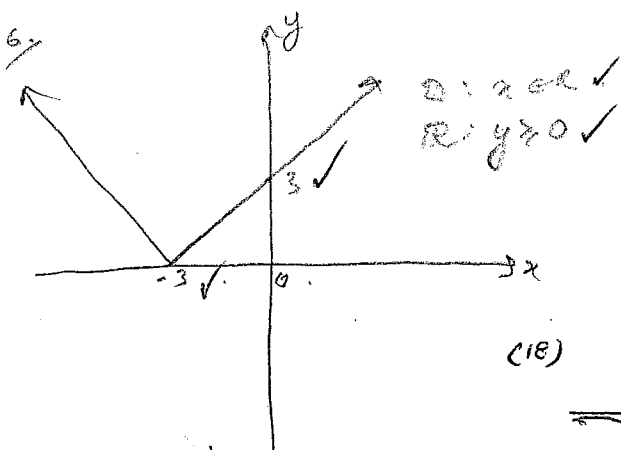
12. $y = x - \sin x$ $0 \leq x \leq 2$



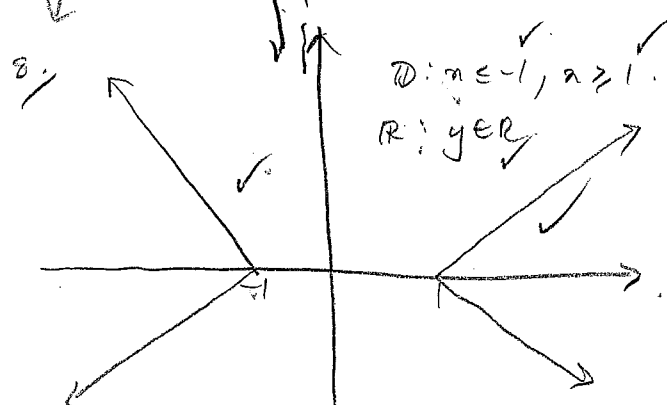
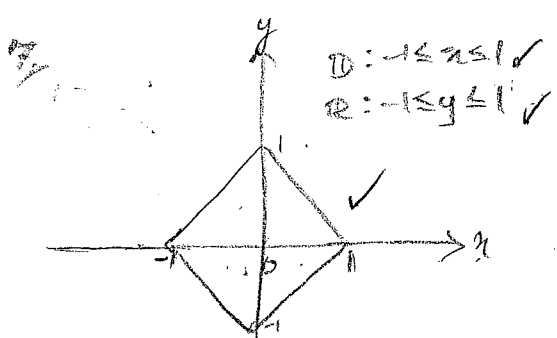
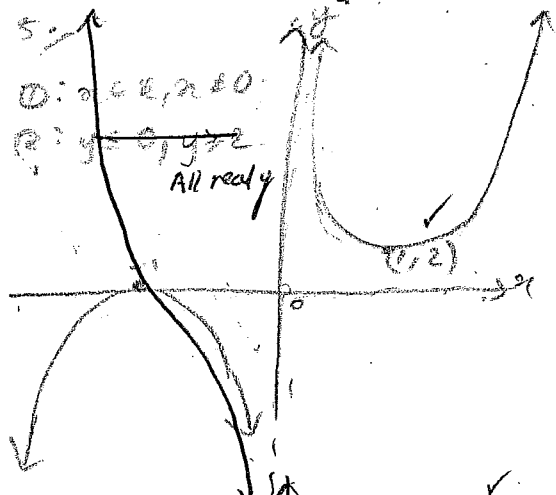
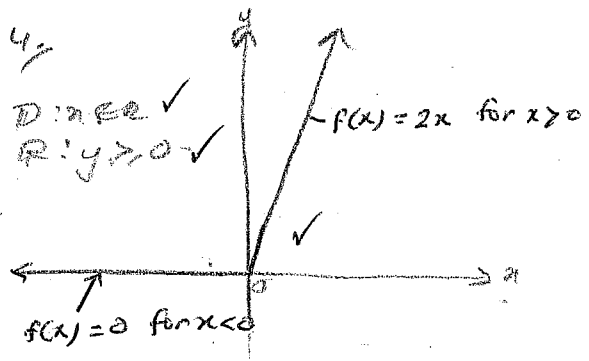
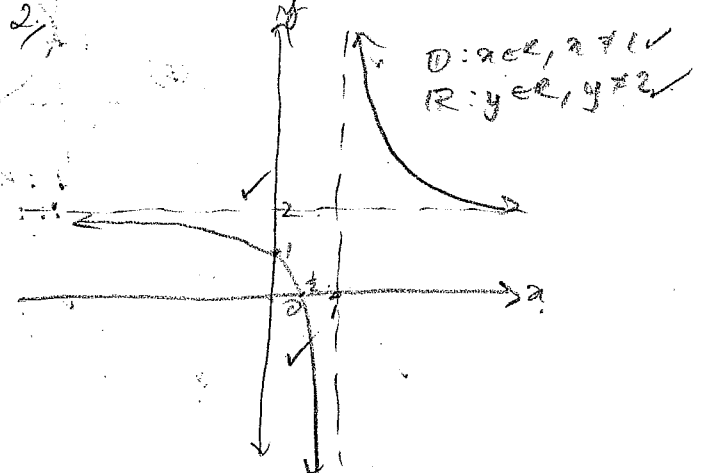
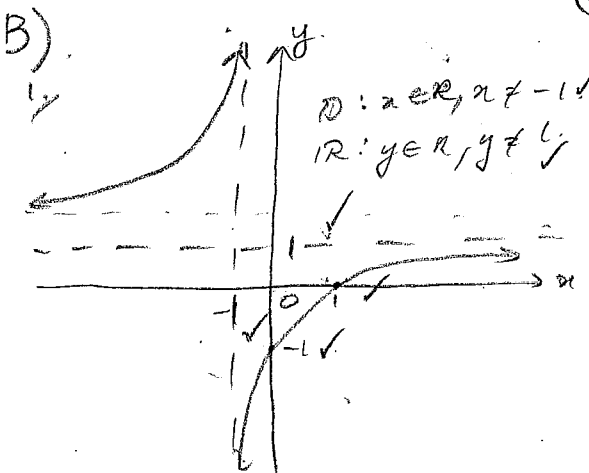
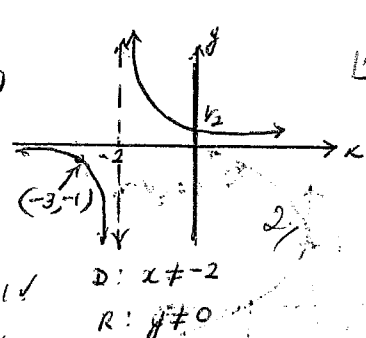
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A)





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when $y \geq 0$
 $y = |x| - 1$
when $x > 0, y = x - 1$
when $x < 0, y = -x - 1$

when $y < 0$
 $y = |x| + 1$
 $y = x + 1$
 $y = -x + 1$

when $y \geq 0$
 $y = |x| - 1$
 $x > 0, y = x - 1$
 $x < 0, y = -x - 1$

when $y < 0$
 $y = |x| + 1$
 $y = x + 1$
 $y = -x + 1$