Preface

Here are a set of problems for my Calculus I notes. These problems do not have any solutions available on this site. These are intended mostly for instructors who might want a set of problems to assign for turning in. I try to put up both practice problems (with solutions available) and these problems at the same time so that both will be available to anyone who wishes to use them.

Vector Functions

For problems 1 – 3 find the domain of the given vector function.

1. \( \vec{r}(t) = \left\{ \frac{1}{t^2 - 1}, \frac{1}{t + 3}, \frac{1}{t - 6} \right\} \)

2. \( \vec{r}(t) = \left\{ \sqrt{t}, \sqrt{t+1}, \sqrt{t+2} \right\} \)

3. \( \vec{r}(t) = \left\{ \ln(t + 7), \ln(t - 3) \right\} \)

For problems 4 – 8 sketch the graph of the given vector function.

4. \( \vec{r}(t) = \left\{ -4, t + 1 \right\} \)

5. \( \vec{r}(t) = \left\{ -2 \cos(t), 5 \sin(t) \right\} \)

6. \( \vec{r}(t) = \left\{ \sqrt{t+2}, 1 - t \right\} \)

7. \( \vec{r}(t) = \left\{ 2t + 1, t^2 - 1 \right\} \)

8. \( \vec{r}(t) = \left\{ t^2 + 4, 6 - t^2 \right\} \)

For problems 9 – 12 identify the graph of the vector function without sketching the graph.

9. \( \vec{r}(t) = \left\{ 6, 2 + 8t, -1 + 10t \right\} \)

10. \( \vec{r}(t) = \left\{ 12t, 6 - 8t, 4 + 7t \right\} \)

11. \( \vec{r}(t) = \left\{ 2, 6 \cos(t), 6 \sin(t) \right\} \)
12. \( \vec{r}(t) = \langle -2t, 6\cos(t), 6\sin(t) \rangle \)

For problems 13 – 16 write down the equation of the line segment between the two points.

13. The line segment starting at \((4, -7)\) and ending at \((2, 0)\).

14. The line segment starting at \((-1, 2)\) and ending at \((7, -2)\).

15. The line segment starting at \((4, 1, -3)\) and ending at \((-1, 2, 6)\).

16. The line segment starting at \((1, -1, 9)\) and ending at \((4, -7, 10)\).