

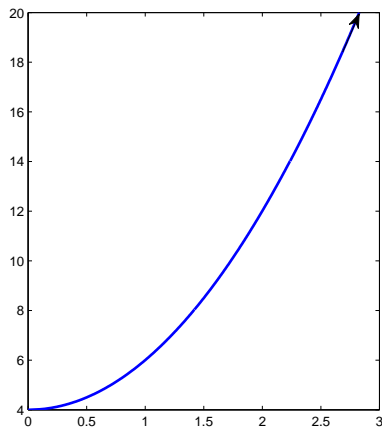
Answers to Week 2

• **Section 1.2**

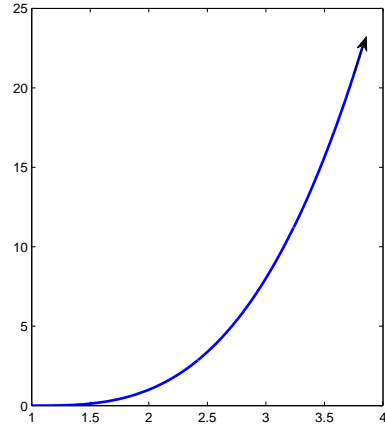
1.  $-1$
2.  $-1$
3.  $\cos^{-1}\left(\frac{-2}{\sqrt{200}}\right) \approx 98.1^\circ$
4.  $x = -1, x = -3$
5. a) scalar:  $\frac{-6}{\sqrt{41}}$ ; vector:  $-\frac{24}{41}\mathbf{i} - \frac{30}{41}\mathbf{j}$   
 b) scalar:  $-\frac{6}{\sqrt{5}}$ ; vector:  $-\frac{6}{5}\mathbf{i} + \frac{12}{5}\mathbf{j}$
6. 490 Joules
7.  $\frac{25}{\sqrt{13}}$

• **Section 1.3**

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



2. a)  $\mathbf{r}(1) = 2\mathbf{i} + 1\mathbf{j}$   
 b) when  $t = 4$   
 c)  $y = (x - 1)^3$



3. The particle starts (when  $t = 0$ ) at the point  $(-4, 0)$  and moves around the ellipse  $\frac{x^2}{16} + \frac{y^2}{9} = 1$  in a clockwise direction.
4. vector:  $\mathbf{r}(t) = \langle -4, 2 \rangle + t \langle 6, 12 \rangle$   
 parametric:  $\mathbf{r}(t) = (-4 + 6t)\mathbf{i} + (2 + 12t)\mathbf{j}$   
 (other answers possible)
5. not parallel or perpendicular; intersect at  $\left(\frac{49}{27}, \frac{44}{9}\right)$ .
6. (approximated on calculator) 19.88m  
 $y = \frac{1}{\sqrt{3}}x - 4.9 \left(\frac{4x^2}{675}\right)$
7. Eliminating the parameter produces the same equation ( $y = (x-1)^3$ ), but there is a restriction on the domain of  $t$  in #2, resulting in a corresponding restriction for  $x$  which produces only part of the graph. The correct equation for #2 should be  $y = (x - 1)^3, x \geq 0$ .

• **Section 2.2**

$x$	$\frac{2^x - 1}{x}$	$x$	$\frac{2^x - 1}{x}$
0.1	0.7177	-0.1	0.6697
0.01	0.6956	-0.01	0.6908
0.001	0.6934	-0.001	0.6929
0.0001	0.6932	-0.0001	0.6931

1.  $\lim_{x \rightarrow 0} \frac{2^x - 1}{x} \approx 0.69315$
2. limit DNE
3.  $\infty$
4.  $x = 1, x = 3, x = 4$