

# Svör

## Svör við verkefnum

### Verkefni 1

1. a)  $l(x) = 7x - 2$     b)  $l(x) = 9x - 6$   
c)  $l(x) = 5x - 6$     d)  $l(x) = 1457x - 5502$

2. a)  $l(x) = 3x - 4$     b)  $l(x) = 4x - 9$   
c)  $l(x) = -\frac{1}{9}x + \frac{5}{9}$     d)  $l(x) = -\frac{1}{3}x + \frac{7}{6}$   
e)  $l(x) = -\frac{1}{4}$     f)  $l(x) = -\frac{17}{49}x + \frac{48}{49}$

3. a)  $l(x) = 6e^4x - 9e^4$   
b)  $l(x) = -\frac{\ln(2)}{4}x + \frac{\ln(4e)}{4}$   
c)  $l(x) = \frac{2\pi}{3}x - \frac{4\pi}{3} + \sqrt{3}$   
d)  $l(x) = 1$   
e)  $l(x) = \frac{1}{\ln(100)}x - \frac{2}{\ln(100)} + 1$   
f)  $l(x) = \frac{27}{2}x$

### 4. Hlutfallslegt frávik er

- a) 0.7506%
- b) 19.1987%
- c) 79.5125%
- d) 97.6645%

5. a)  $df = 3dx$   
b)  $df = 2xdx$   
c)  $df = \frac{-1}{(x+1)^2}dx$   
d)  $df = \frac{-6x}{(x^2+2)^2}dx$   
e)  $df = \frac{4-2x}{(x^2-4x)^2}dx$   
f)  $df = \frac{-1-2x^3}{(x^3-1)^2}dx$

6. a)  $df = 6e^{2x}dx$   
b)  $df = -2^{-x}\ln(2)dx$

c)  $df = \frac{\pi}{6}\left(1 + \tan^2\left(\frac{\pi}{6}x\right)\right)dx$

d)  $df = -\sin(x-2) \cdot dx$

e)  $df = \frac{1}{x\ln(10)}dx$

f)  $df = \frac{3(1+\sqrt{2x})^2}{\sqrt{2x}} \cdot dx$

7. a)  $df = \left(\frac{1}{5}x^{-\frac{4}{5}} + \frac{1}{x\ln(10)}\right)dx$

b)  $df = x^{-\frac{4}{5}}\left(\frac{1}{5}\log(2x) + \frac{1}{\ln(10)}\right)dx$

c)  $df = 7^x x^6 (\ln(7)x + 7)dx$

d)  $df = \frac{-2\cos(x)}{\sin^3(x)}dx$

e)  $df = \frac{3\cos(3x-1) + 1}{3(\sin(3x-1) + x)^{\frac{2}{3}}}dx$

f)  $df = \frac{2x}{\ln(3)(1+x^2)}dx$

8. a)  $df = 0.043301$ ,  $\Delta f = 0.0426584$ ,  
 $\frac{\Delta f - df}{\Delta f} = -0.150711$

b)  $df = 0.300000$ ,  $\Delta f = 0.308477$   
 $\frac{\Delta f - df}{\Delta f} = 0.0274794$

c)  $df = 0.0500000$ ,  $\Delta f = 0.0512711$   
 $\frac{\Delta f - df}{\Delta f} = 0.0247917$

d)  $df = 0.0250000$ ,  $\Delta f = 0.0246926$   
 $\frac{\Delta f - df}{\Delta f} = -0.0124486$

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e)  $df = 0.0250000$ ,  $\Delta f = 0.0239073$

$$\frac{\Delta f - df}{\Delta f} = -0.0457067$$

9. a)  $dV = 4\pi r^2 dr$

b)  $dV = 2\pi r^2 dr$

10.a)  $\frac{dy}{dx} = \frac{3x^{-4} - y}{4y^3 + x}$

b)  $\frac{dy}{dx} = \frac{-y}{\frac{1}{y}\sin\left(\frac{1}{y}\right) + \cos\left(\frac{1}{y}\right) + x}$

c)  $\frac{dy}{dx} = \frac{6y(3xy + 5)}{5 - 6x(3xy + 5)}$

d)  $\frac{dy}{dx} = \frac{y}{x(2y^2 - 1)}$

e)  $\frac{dy}{dx} = \frac{2\cos(2x + y)}{1 - \cos(2x + y)}$

11.a)  $-2$                       b)  $-\frac{\pi}{2}$

c)  $-\frac{89}{9}$                       d)  $0$

12.  $y = 2x - 1$

13.a)  $\frac{dy}{dx} = \frac{3x^2}{\sin(2y) - 2y}$

$$\frac{dx}{dy} = \frac{\sin(2y) - 2y}{3x^2}$$

b)  $\frac{dy}{dx} = -\frac{y(y + 3x^2)}{x(2y + x^2)}$

$$\frac{dx}{dy} = -\frac{x(2y + x^2)}{y(y + 3x^2)}$$

14.a)  $\frac{1}{2}x^3 + k$

b)  $x\sqrt{x} + k$

c)  $\sqrt[3]{x^2} + k$

d)  $\frac{2}{3}x\sqrt{x} + 2\sqrt{x} + k$

e)  $\frac{3}{4}x^{\frac{4}{3}} + \ln(|x|) + 3x^{\frac{2}{3}} + k$

15.a)  $\frac{3}{5}x^5 - \frac{5}{2}x^2 + \ln(|x|) + k$

b)  $\sin^2(x) - \cos(x + 2) + k$

c)  $x \cdot e^{-x} + k$

d)  $-(1 + x) \cdot e^{-x} + k$

16.a)  $x \cdot \sin(x) + k$

b)  $x \cdot \sin(x) + \cos(x) + k$

c)  $-x \cdot \cos(x) + k$

d)  $-x \cdot \cos(x) + \sin(x) + k$

17.a)  $\frac{10^x}{\ln(10)} + k$ ,            b)  $\frac{-10^{-x}}{\ln(10)} + k$

c)  $\frac{-10^{-x}}{\ln(10)} + k$ ,            d)  $\frac{10^x}{\ln(10)} + k$

18.a)  $\frac{x^4}{2} + \frac{1}{4x^2} + k$

b)  $\frac{2(x-1)}{\sqrt{x}} + k$

c)  $\frac{x}{6} + \frac{2}{x} + k$

d)  $\frac{2}{3}(x+1)^{\frac{3}{2}} + k$

19.a)  $\tan(x) + k$

b)  $-\ln(\cos(x)) - \frac{x^2}{2} + k$

c)  $-\cot(x) + k$

d)  $\frac{x^2}{2} + \ln(\sin(x)) + k$

20.  $\frac{40}{3}$

21.  $\frac{17\sqrt{17}}{6}$

22.  $2$

23.  $\sqrt{3} - \frac{\pi}{3}$

24.  $x = 0$  og  $x = 1$ .  $A = \frac{1}{12}$

25.  $A = 1 + e^{-2} = 1.13534$

26.  $A = \ln\left(\frac{9}{4}\right) + 6 = 6.81093$

**Verkefni 2**

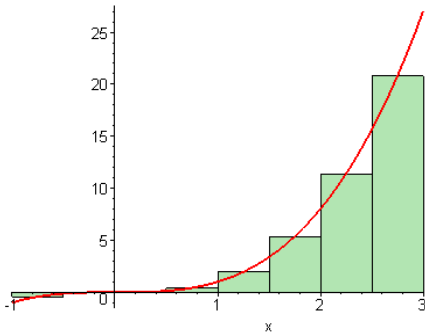
1. a) 99      b) 20      c)  $\frac{31}{32}$   
 d)  $\frac{49}{20}$       e)  $-\ln(100) = -4.60517$   
 f) 15.1044
2. a) 288      b) 1      c) 0  
 d) 0      e)  $-\frac{11}{4}$       f) 0
3. a)  $I = \left\{ \frac{1}{4}, \frac{259}{20}, \frac{513}{20}, 32 \right\}$ . Fjöldi búta er 3

og norm bútnarinnar er  $\frac{127}{10}$ .

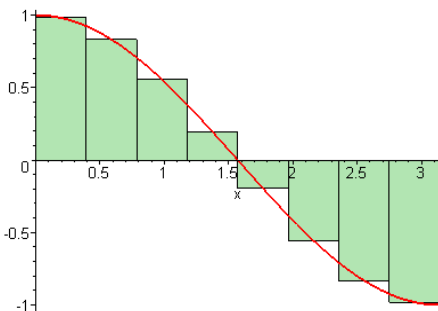
- b)  $I = \left\{ \frac{1}{4}, \frac{1}{2}, 1, 2, 4, 8, 16, 32 \right\}$ . Fjöldi búta er 7 og norm bútnarinnar er 16.

4. Skiptipunktur (ásamt endapunktum) eru  $x_i = 1 + \frac{i}{5}$  ( $i = 0, 1, \dots, 10$ ). Yfirsumma er 0.761924, undirsumma er 0.584146 og meðalsumma er 0.663502. Búturnir þurfa að vera 1778.

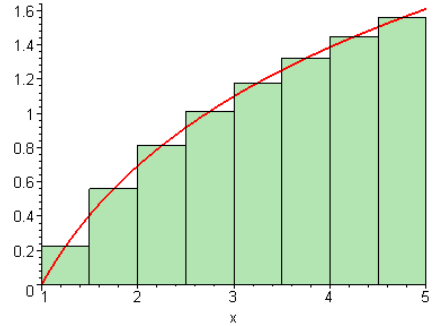
5. a) Yfirsumma = 27.5, undirsumma = 13.5, meðalsumma = 19.75.



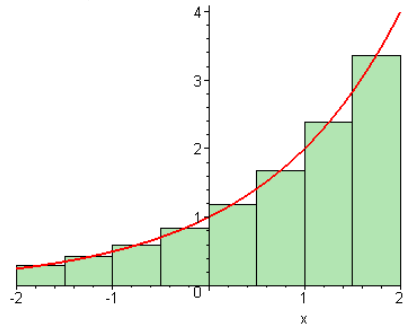
- b) Yfirsumma = 0.392699, undirsumma = -0.392699, meðalsumma = 0.



- c) Yfirsumma = 4.43304, undirsumma = 3.62833, meðalsumma = 4.05538.



- d) Yfirsumma = 6.40165, undirsumma = 4.52665, meðalsumma = 5.38312.



6. a)  $-\frac{5}{2}$       b)  $\frac{657}{64}$       c)  $e - \frac{1}{e}$   
 d)  $1 - \frac{1}{e}$       e)  $10 - \frac{9}{\ln(10)}$       f)  $\frac{24}{5\ln(5)}$
7. a) 0.75      b) 0      c)  $\ln(2) - \frac{\ln(3)}{2}$   
 d) 0      e)  $\frac{\pi}{2}$       f)  $\sqrt{3} - \frac{\pi}{3}$   
 g)  $e - 1$
8. a) 10      b)  $\frac{2}{\pi}$       c)  $\frac{e^2 - 1}{2}$   
 d)  $\frac{4}{3}$       e)  $\frac{1}{3}$

9.  $a = 6$

10. Samkvæmt meðalgildisreglu fyrir heildi er til tala  $c \in [a, b]$  þannig að

$$f(c) = \frac{1}{b-a} \int_a^b f(x) dx = 0$$

11. a) 20      b) 1      c)  $\frac{e^2 - 1}{2}$

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d) 16      e)  $\frac{2}{3}$       f)  $\frac{45}{4}$

12.a)  $\frac{1}{12}$       b)  $\frac{1}{2}$       c)  $\frac{32}{3}$

d)  $\frac{128}{15}$

13.a) 20. Flatarskiki, sem fellur að  $x$ -ás.

b) 0. Þetta er mismunur tveggja jafnstórra flatarskika, sem falla að  $x$ -ás.

c)  $\frac{e^2 - 5}{2}$ . Mismunur tveggja flatarskika,

sem falla að  $x$ -ás, sitt hvoru megin við

$$x = \ln(\sqrt{2})$$

d)  $\frac{16}{3}$ . Mismunur tveggja flatarskika, sem

falla að  $x$ -ás, sitt hvoru megin við

$$x = 1.$$

e)  $\frac{-4}{3}$ . Flatarmál skika neðan  $x$ -ás

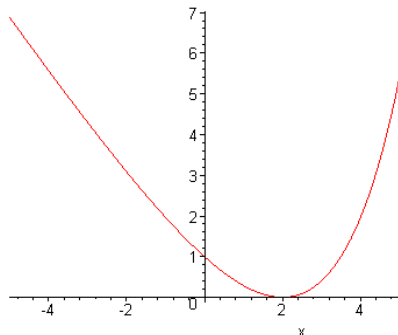
gefið neikvætt formerki.

14. Gerum ráð fyrir að gefin sé bútun á  $[-a, a]$ , og  $s$  og  $S$  séu undir og yfirsumma fyrir  $f$  sem svarar til bútunarinnar. Snúum nú við formerki allra skiptipunkta í þessari bútun, og fáum þannig nýja bútun á  $[-a, a]$ . Sammengi skiptipunkta þessara tveggja bútana gefur bútunina,  $J$ . Norm  $J$  er jöfn eða minni en norm upphaflegu bútunarinnar, en bútarnir í  $J$  eru parvís jafnir og samhverfir um  $x = 0$ . Við getum valið alla millipunktana,  $t_j$ , þannig að þeir séu parvís samhverfir um 0 og tilheyri hvor um sig jafnlöngum bút. Sú millisumma,  $\sigma_j$ , sem þannig verður til er því 0. Þannig er  $s_j \leq 0 \leq S_j$ , en nú er  $s \leq s_j$  og  $S_j \leq S$  og þar með er

$$s \leq 0 \leq S$$

Þannig aðskilur talan, 0, undir og yfirsummu sérhverrar bútunar, og er þá sönnuninni lokið.

15.



$$A = e - 2$$

## Verkefni 3

1. a)  $\frac{3x^2}{1+x^6}$       b)  $\frac{3x^2}{\sqrt{1-x^6}}$

c)  $\frac{3x^3}{1+x^6} + \arctan(x^3)$

d)  $\frac{3x^3}{\sqrt{1-x^6}} + \arcsin(x^3)$

e)  $\frac{3}{1+x^6} - \frac{2 \cdot \arctan(x^3)}{x^3}$

f)  $\frac{3}{\sqrt{1-x^6}} - \frac{2 \cdot \arcsin(x^3)}{x^3}$

2. a)  $\frac{\arcsin(x)}{1+x^2} + \frac{\arctan(x)}{\sqrt{1-x^2}}$

b)  $2 \cdot \arctan(x) \cdot \arcsin(x) \cdot$

$$\left( \frac{\arcsin(x)}{1+x^2} + \frac{\arctan(x)}{\sqrt{1-x^2}} \right)$$

c)  $\frac{-1}{(1+x^2) \cdot (1+(\arccot(x))^2)}$

d)  $\frac{-1}{\sqrt{1-x^2} \cdot \sqrt{1-(\arccot(x))^2}}$

3. a)  $2(\sin(x) - 1) \cdot e^{\sin(x)}$

b)  $(3x^3 + 2x^2 + 2x) \cdot \ln(x)$

$$-(x^3 + x^2 + 2x)$$

4. a)  $2 - \frac{4}{e}$       b)  $\frac{\pi}{4} - \frac{\pi^2}{32} - \ln(\sqrt{2})$       c) 0      d)  $\frac{2^e - 2}{\ln(2)}$
5. a)  $-\ln|\sin(x)| - \frac{1}{2}\cot^2(x)$   
 b)  $\ln|\cos(x)| + \frac{1}{2}\tan^2(x)$   
 c)  $-\ln|\sin(x)| - \frac{1}{2}\cot^2(x)$   
 d)  $\ln|\cos(x)| + \frac{1}{2}\tan^2(x)$
6. a)  $\ln|\sin(x)| + \frac{1}{2}\cot^2(x) - \frac{1}{4}\cot^4(x)$   
 b)  $-\ln|\cos(x)| - \frac{1}{2}\tan^2(x) + \frac{1}{4}\tan^4(x)$   
 c)  $x - \tan(x) + \frac{1}{3}\tan^3(x)$   
 d)  $x + \cot(x) - \frac{1}{3}\cot^3(x)$
7. Diffrið það, sem stendur á hægri hlið jafnaðarmerkisins (ath. veldið á sin á hægri hlið á að vera  $n + 1$  en ekki  $n$ ).
8. a)  $\arctan(e^x)$   
 b)  $3 \cdot (\cos(\sqrt[3]{x}) + \sqrt[3]{x} \sin(\sqrt[3]{x}))$   
 c)  $2\sqrt{x}(\ln(x) - 2)$       d)  $\frac{4^{4^x}}{(\ln(4))^2}$
9. a)  $2(\cos(\sqrt{x}) + \sqrt{x} \sin(\sqrt{x}))$   
 b)  $\frac{\cos(2x)}{4} - \frac{\cos(8x)}{16}$   
 c)  $\frac{5}{6}\sin^2(x)\sqrt[5]{\sin^2(x)}$   
 d)  $\cos^2(x)(1 - \ln(\cos^2(x)))$   
 e)  $\ln(\ln(x))$
- 10 a)  $\frac{16-9\sqrt{3}}{24}$       b)  $6\ln(2) - \frac{9}{4}$   
 c)  $7\left(\arcsin\left(\frac{\pi}{5}\right) - \arcsin\left(\frac{\pi}{6}\right)\right) = 0.89824$   
 d)  $\frac{8}{3}$
- 11 a)  $\frac{\pi}{4}$       b)  $\frac{\pi}{16}$
- 12 a) 0      b)  $\frac{1}{4}$
- 13 a)  $\frac{\sqrt{10}-3}{2}$       b)  $\frac{3-\sqrt{10}}{2}$
- 14 a)  $\frac{25\pi}{4}$       b)  $\frac{\pi}{3}$   
 c) 0.218346      d)  $e^{\sqrt{3}} - e$
- 15 a)  $\frac{1}{4}\ln(x^4 + \sqrt{x^8 - 1})$   
 b)  $-\cos(\tan(x))$
- 16 a)  $\frac{1}{2}\tan^2(x)$       b)  $\frac{1}{3}\tan^3(x)$   
 c)  $\tan(x) + \frac{1}{3}\tan^3(x)$   
 d)  $\tan(x) + \frac{2}{3}\tan^3(x) + \frac{1}{5}\tan^5(x)$
- 17 a)  $\frac{-1}{1+x^2}$       b)  $\frac{1}{\cos(x)}$   
 c)  $\frac{1}{9}(2x^3 - 4)^{\frac{3}{2}}$       d)  $\frac{\arctan(e^{2x})}{2}$   
 e)  $\frac{5}{4}\ln(2x^2 + 5)$
- 18 a)  $\frac{1}{2}((1+x^2)\arctan(x) - x)$   
 b)  $x\arctan(x) - \frac{1}{2}\ln(1+x^2)$   
 c)  $\sqrt{1-x^2} + x\arcsin(x)$   
 d)  $\frac{1}{4}(x\sqrt{1-x^2} + (2x^2-1)\arcsin(x))$
- 19 a)  $\frac{x^2 - \ln(x^2 + 1)}{2} + \arctan(x)$   
 b)  $\frac{3}{7}\ln\left(\frac{x-3}{x+4}\right)$   
 c)  $5\ln(x-3) - \ln(x-2)$   
 d)  $\frac{1}{5}(9\ln(x-3) + \ln(x+2))$
- 20 a)  $\frac{1}{2}(5\ln(x+3) - \ln(x+1))$   
 b)  $\frac{1}{2}x^2 + 4x - 6\ln(x+1)$
- 21 a)  $9\ln(x-4) - 7\ln(x-3)$   
 b)  $\frac{1}{2}\left(\ln(1+x^2) - \arctan(x) - \frac{x}{1+x^2}\right)$

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- 22 a)  $\frac{1}{2}x^2 - 6x + \frac{1}{5}(197\ln(x+6) - 2\ln(x+1))$   
 b)  $\frac{1}{2}x^2 - 2x + \frac{19}{7}\ln(x-2) + \frac{114}{7}\ln(x+5)$   
 c)  $\frac{1}{2}x^2 + x + \frac{1}{2}\ln\left(\frac{x-1}{x+1}\right)$  (ath nefnarinn í dæminu á að vera  $x^2 - 1$ ).

23 a)  $\frac{\pi}{30}$       b)  $2500\pi$       c)  $\frac{128\pi}{7}$

24 a)  $\frac{\pi}{6} + \frac{\sqrt{3}}{4}$       b)  $\frac{\pi}{8}\left(\frac{5\pi}{3} + \frac{7\sqrt{3}}{4}\right)$

c)  $\frac{\pi}{8}\left(\pi + \frac{3\sqrt{3}}{4}\right)$

25.a)  $\pi$       b)  $\pi^3 - 4\pi$

c)  $\frac{3\pi^2}{2}$       d)  $\frac{9\pi^2}{2}$

26 a)  $\frac{\pi}{7}$       b)  $2\pi$       c)  $\frac{\pi^2}{2}$

27 a)  $\frac{4\sqrt{3}}{5}$       b)  $\frac{3}{4}\pi$

28 a)  $\frac{27\sqrt[3]{2}}{7}$       b)  $\frac{486\pi\sqrt[3]{4}}{55}$

### Verkefni 4

1. a)  $-(x^3 + 3x^2 + 6x + 6)e^{-x} + k$

b)  $\left(\frac{1}{3}x^3 + \frac{1}{4}x^4\right)\ln(x) - \frac{1}{9}x^3 - \frac{1}{16}x^4 + k$

c)  $-(x^2 + x - 2)\cos(x) + (2x + 1)\sin(x) + k$

2. a)  $\frac{4}{(k-x^2)^2}$       b)  $\ln(x^2 + k)$

c)  $\pm\sqrt{k \cdot e^{x^2} - 1}$       d)  $\frac{1 + ke^{2x}}{2}$

e)  $\pm\sqrt{\sqrt{x^2 + k} - 1}$

3. a)  $(y-1)^2 + (x+1)^2 + 2\ln((y+1)(x-1)) = k$

b)  $k \cdot 4\sqrt{\frac{x}{x-4}}$

c)  $x = \pm 2\sqrt{2(y + 3\ln(y-3)) + k}$

d)  $y = k\sqrt[3]{x^3 + 1}$

4. a)  $y = \frac{x^{n+1}}{n} + kx$       b)  $y = xe^x + kx$

c)  $y = x(x-1)e^x + kx$

5. a)  $\frac{x^{n+1}}{n+2} + \frac{k}{x}$

b)  $y = \left(x - 2 + \frac{2}{x}\right)e^x + \frac{k}{x}$

c)  $y = \left(x^2 - 3x + 6 - \frac{6}{x}\right)e^x + \frac{k}{x}$

6. a)  $y = x\sin(x) + k \cdot x$

b)  $y = \frac{x^{n+1}(n\ln(x) - 1)}{n^2} + k \cdot x$

7. a)  $y = \frac{(x^2 - 2)\sin(x) + 2x\cos(x) + k}{x}$

b)  $y = \frac{x^{n+1}((n+2)\ln(x) - 1)}{(n+2)^2} + \frac{k}{x}$

8. a)  $y = -\frac{1}{5}\frac{\cos^5(x) + k}{\sin(x)}$

b)  $y = \frac{e^x}{2}(1 + \cot(x)) + \frac{k}{\sin(x)}$

c)  $2^x \frac{1 + \ln(2)\cot(x)}{1 + \ln^2(2)} + \frac{k}{\sin(x)}$

d)  $x + \cot(x) + \frac{k}{\sin(x)}$

9. a)  $\frac{k}{x} - \frac{1}{x \cdot e^x}$       b)  $\frac{1}{\cos(x) + k}$

c)  $\frac{x^3 + k}{3(1-x)}$       d)  $\frac{k - \cos^2(x)}{\sin(x)}$

10 a)  $\frac{1}{3 + \cos(x) + \ln|\cos(x)|}$

b)  $y = \frac{x^3 - 3x + 6}{3(x+1)}$

c)  $y = \frac{e^x}{1 + x + 3e^x}$

11 a)  $y = \sqrt{\frac{2}{3} \sin(3x) + 1}$       b)  $y = \frac{6}{1 + e^x}$

c)  $y = \frac{1}{2} x \ln(x) - \frac{x}{4} + \frac{17}{4x}$

12 a)  $y = \pm \sqrt{\frac{k - 2 \cos(3x)}{3}}$

b)  $y = \frac{k - e^{-x}}{x} - e^{-x}$

c)  $y = 1 + \frac{k}{\sin(x)}$

13 40.54%.

14 7.1066

15 a)  $\frac{mg}{k} = 12.0565 \text{ m} \cdot \text{s}^{-1}$

b) 105.767 m      c) 12.0541 m.

16 a)  $\frac{mg}{k} = 53.2174 \text{ m} \cdot \text{s}^{-1}$  Sé ekki tekið tillit til seiglu andrúmsloftsins, er hæðin 144.200 m. yfir vatnsyfirborðinu.

17 7 mínútur og 41 sekúnda

18 52.68 sekúndur

19 a)  $m = 200 + 50e^{-0.05t}$

b) 32.2 mínútur

### Verkefni 5

1 a) 750      b)  $\frac{1}{2}$       c)  $\frac{35}{3}$

d) 1

2 a) 70      b) 41      c) 144

d) 20

3 a) 109868      b)  $\frac{47}{81}$

4. Þrepanir. Sannprófun fyrir einn lið sleppt!

a)  $2 - \frac{q+2}{2^q} + \frac{q+1}{2^{q+1}} = 2 - \frac{q+3}{2^{q+1}}$

b) Ath. villa er í dæminu. Hægra meginin jafnaðarmerkis á að standa  $n \cdot 3^{n+1}$ .

$$q \cdot 3^{q+1} + (2(q+1)+1)3^{q+1} =$$

$$(3q+3) \cdot 3^{q+1} = (q+1) \cdot 3^{q+2}$$

c)  $\frac{(q+1)}{2q} \cdot \left(1 - \frac{1}{(q+1)^2}\right) = \frac{(q+2)}{2(q+1)}$

d)  $q^2(q+1) + (q+1)(3(q+1)-1) = (q+1)^2(q+2)$

5 Sannanir, svörum sleppt hér.

6 Sönnun, svari sleppt hér.

7. a)  $(1-1)^n = 0$  (1 ef  $n=0$ ) b)  $(1+2)^n = 3^n$

8 Sönnun, svari sleppt hér.

9 a)  $0, \frac{1}{4}, \frac{2}{9}, \frac{3}{16}$       b)  $\frac{1}{4}, \frac{1}{4}, \frac{1}{4}, \frac{1}{4}$

c) 4, 6, 4, 6      d)  $2, 1, \frac{1}{3}, \frac{1}{12}$

10 a)  $1, \frac{1}{2}, \frac{1}{6}, \frac{1}{24}, \frac{1}{120}, \frac{1}{720}, \frac{1}{5040}, \frac{1}{20320}$

b)  $2, -1, -\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, -\frac{1}{16}, -\frac{1}{32}, \frac{1}{64}$

c) 1, 1, 0, -1, -1, 0, 1, 1

d)  $2, -1, -\frac{1}{2}, \frac{1}{2}, -1, -2, 2, -1$

11 Allar runurnar eru takmarkaðar.

a) Saml.      b) Saml.      c) Ósaml.

c) Saml.

12 a) Saml.      b) Saml.      c) Saml.

d) Ósaml.      e) Saml.      f) Ósaml.

13 a) 3      b) 5

14 a)  $\frac{5}{9}$       b) Ósaml.      c) 1

d) Ósaml.

15 a)  $d = -3, a_{15} = -29$

b)  $a_1 = -7$  og  $s_{25} = -475$

c)  $a_1 = -18$  og  $d = 3$

16 a)  $q = \frac{3}{4}, a_1 = \frac{4}{35}$  eða  $q = -\frac{3}{4}, a_1 = \frac{4}{5}$

b)  $a_1 = q = -2$  og  $s_8 = 170$

c)  $a_1 = 64, q = -\frac{1}{2}$  og  $s_{12} - s_3 = \frac{71}{32}$

17 a) 9, 3, 1,  $\frac{1}{3}$

b)  $s_n = \frac{27}{2}(1-3^{-n})$  stefnir á  $\frac{27}{2}$

18  $s_{10} = -341a_1$

19  $a_1 = -1, q = -2$  og  $s_6 = 21$