

General scoring instructions

Correct solution	4 p
Correct principle with small errors	2-3 p
Partly correct solution	1-2 p
Rounding errors	-1 p
Missing or wrong unit	-1 p

1. a) $x = -\frac{1}{2}$ (1 p)
 b) $x = \frac{1}{4}$ (1 p)
 c) $2x^2 - 1 = 0$ (1 p)
 $x = \pm \frac{1}{\sqrt{2}}$ (1 p)
2. a) $-\frac{1}{6}$ (1 p)
 b) $\frac{a}{5}$ (1,5 p)
 c) πr (1,5 p)
3. a) $\frac{3}{2}$ (2 p)
 b) $9x$ (2p)
4. Answer:

A	C	D	B
D	B	A	C
C	D	B	A
B	A	C	D

A	B	D	C
D	C	A	B
C	D	B	A
B	A	C	D

B	A	D	C
D	C	A	B
C	D	B	A
A	B	C	D

A	B	D	C
D	A	C	B
C	D	B	A
B	C	A	D

From each correct arrangement 1 point.
 From each wrong arrangement -1 point.

Minimum of points is always 0.

5. Correctly drawn line (using arcs of circle at corners) (1p)
 Correct calculations based on drawn line (3p)

$$l_{\text{straight}} = 2,0 \text{ m} + 2,0 \text{ m} + 4,0 \text{ m} + 2,8284 \text{ m} = 10,8284 \text{ m}$$

$$l_{\text{circular}} = 2 \cdot \pi \cdot 0,5 \text{ m} = 3,1416 \text{ m}$$

$$l = 14,0 \text{ m or } 14 \text{ m}$$

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6. The area of the base is $7,492 \text{ m}^2$. (2p)
The height of the cone is $3,388 \text{ m}$ (1p)
The volume of the cone is $8,46 \text{ m}^3 \approx 8,5 \text{ m}^3$ (1p)
7. Answer: 60 parts per hour (4p)
8. Equations: $3.4t = 120/3.6 \rightarrow t = 9.8 \text{ s}$ (1p)
 $0.5 \cdot 3.4 \cdot t^2 + 120/3.6 \cdot (T-t) = 75/3.6 \cdot (T+5)$ (1p)
Answers: $T = 21 \text{ s}$; $X = 550 \text{ m}$ (2p)
9. Equation: $G - F = B = \rho \cdot V \cdot g \rightarrow B = 3.5 \text{ N}$ (1p)
Answers: $\rho = 2100 \text{ kg/m}^3$ (3p)
10. Many ways to obtain solution. Not all given information needed.
Answer: $p = 11 \text{ MPa}$ (4p)
11. Equations: $\text{C}_4\text{H}_{10} + 6,5\text{O}_2 \rightarrow 5\text{H}_2\text{O} + 4\text{CO}_2$ (1p)
 $n = m/M$ (1p)
Answer: $m = 1270 \text{ kg}$; $V = 650 \text{ m}^3$ (2p)
12. Answers: 780 g (2p)
Equations: $M_{\text{acid}} = 89 \text{ g}$, $n = 7.95 \text{ mol}$ (1p)
Answers: 9.9 mol/L (1p)

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English test

True/False questions. Each correct answer gives 1 point.

1. F
2. F
3. F
4. F
5. T
6. F
7. T
8. F
9. T
10. F

Multiple choice questions. Each correct answer gives 2 points.

1. c
2. c
3. d
4. b
5. d
6. c
7. c
8. b
9. a
10. c

Essay is graded on a scale 0 – 20.

The English test is passed if total score is 25 or more points.