

Worksheet 10.1: Pressure

Pressure: $P = F/A$ (memorize area of circle, and rectangle)

1. A force of 23,450 N is exerted on a rectangular window that measures 2.30 m by 0.980 m. What is the pressure? (1.04E4 Pa)
2. What is the force of 2100. psi over a circular flange with a radius of 8.5 inches? (476658 lbs \approx 4.8E5 lbs)
3. What is the total area in m^2 of some snowshoes, if a 75 kg person does not exert a pressure greater than 1.2×10^3 Pa? (0.61 m^2)

Pressure conversions

Converting units of pressure.

$$1.00 \text{ atm} = 1.013 \times 10^5 \text{ Pa} = 101.3 \text{ kPa} = 760. \text{ Torr} = 14.7 \text{ psi}$$

4. Convert 450. Torr to Pa. (6.00E4 Pa)
5. Convert 3.20 ATM to Pa. (3.24E5 Pa)
6. Convert 835 Torr to psi (16.2 psi)
7. Convert 35 psi to Pa. (2.4E5 Pa)
8. Convert 16.7 kPa to Pa. (1.67E4 Pa)
9. Convert 2350 Pa to psi (0.341 psi)

Gauge and absolute pressure: $P = P_G + 1 \text{ atm}$

10. What is 0.45 atm gauge in absolute? (1.45 atm)
11. What is 34.0 psi gauge in absolute? (48.7 psi)
12. What is 4.50 psi absolute in gauge? (-10.2 psi)
13. What is 3.415×10^5 Pa in absolute in gauge? (2.402E5 Pa)
14. What is 3.60 atm absolute in gauge? (2.60 atm)
15. What is 45.0 psi absolute in gauge (30.3 psi)
16. What is 34,500 Pa gauge in absolute? (1.358E5 Pa)

Gauge and unit conversions (on the assessments)

17. What is 12.0 psi gauge in Pa absolute? (1.84E5 Pa)
18. What is 78.0 kPa absolute in Torr gauge? (-175 Torr)
19. What is 34.5 psi gauge in atm absolute? (3.35 atm)
20. What is 0.835 atm absolute in Torr gauge? (-125 Torr)
21. What is 8.45 psi gauge in kPa absolute? (160. kPa)
22. What is 34,500 Pa absolute in atm gauge? (-0.659 atm)
23. What is 1.30 atm gauge in kPa absolute? (233 kPa)
24. What is 7810 Pa absolute in kPa gauge? (-93.5 kPa)
25. What is -34.9 kPa gauge in psi absolute? (9.64 psi)
26. What is 512,000 Pa absolute in Torr gauge? (3081 Torr)