

Foundational Mathematics

Problem Set 1

1. Perform the following calculations:

(a) $-6 - 4 + 3$

(d) $6 \times -3 \times 2$

(g) $(-5)^2$

(b) $6 - -4 + 2$

(e) $-6 \times -3 \times -2$

(h) -5^2

(c) $6 + (-3) - 2$

(f) $-22 \div -2$

(i) $(-5)^3$

2. John takes three children ice-skating which costs \$15 per child. They each get an ice cream which costs \$2 each and when they return their skates at the end of the session they get a refund of \$6 per person. Calculate the total cost for John.

3. Perform the following calculations.

(a) $2 + 9 \times 10^2 - (7 \times 3)$

(b) $21 + (-3)^2 \times 2$

(c) $21 - 3^2 \times 2$

(d) $\frac{30}{3+7}$

(e) $5 + 4^2 \div 8 - (3 + 8 \div 2)$

4. Evaluate

(a) $\frac{1}{2} + \frac{2}{3}$

(e) $\frac{2}{3} \div \frac{1}{2}$

(b) $\frac{1}{2} + \frac{3}{8} - \frac{7}{12}$

(f) $\frac{5}{8} \div \frac{3}{4}$

(c) $\frac{2}{3} \times \frac{3}{4}$

(d) $\frac{4}{10} \times \frac{2}{3}$

(g) $\frac{4}{5} \div 2$

5. Find 60 % of \$500.

6. I invest \$1000 in a term deposit. Each year it increases its value by 5.2%.

(a) How much will I have after 1 year?

(b) How much will I have after 2 years?

7. A class has 20 males and 24 females.

(a) Find the ratio of males to females.

(b) Find the ratio of females to males.

(c) Find the proportion of females in the class.

(d) Find the proportion of males in the class.

(e) Find the percentage of males in the class.

8. Convert 20 metres/sec to kilometres per hour.

9. Consider the following questions on surds.

- (a) Simplify $\sqrt{50}$
- (b) Simplify $\sqrt{27}$
- (c) Simplify $\sqrt{8} + \sqrt{2}$
- (d) Expand $\sqrt{2}(4 + \sqrt{3})$
- (e) Find the exact value of $\sqrt{8 - -3 \times 4}$
- (f) Rationalise the denominator in $\frac{4}{\sqrt{3}}$

10. Describe the set of positive real numbers in interval notation and in set notation.

11. Describe $(2, 5]$ in set notation.

12. Write $|1 - \pi|$ without absolute value symbols.

13. Simplify

- (a) $(5^4)^{-2} \times 5^3 \div 5$
- (b) $16^{-\frac{1}{2}}$
- (c) $(16^{\frac{1}{2}})^2$
- (d) $27^{-\frac{2}{3}}$
- (e) $\sqrt{8} \times \sqrt{2}$
- (f) $7^2 \div 7^{-4} \times 3 \times \sqrt{81}$

Extra questions

1. Find the precise value of

- (a) $2 + 5 - (-1) - (2 + 3) \times 4 \div 10 + 4$
- (b) $\sqrt{(-4) \times (2 - 11)}$
- (c) $-\sqrt{5^2 + 12^2}$
- (d) $\frac{3}{4} + \frac{2}{3}$
- (e) $\frac{5}{6} - \frac{1}{12}$
- (f) $\frac{2+3}{4+5} \div \frac{6+7}{8+9}$

2. Simplify $\sqrt{72}$

3. Expand $\sqrt{3}(\frac{\sqrt{3}}{2} + 5)$

4. Simplify $16^{-\frac{3}{4}}$

5. Simplify $(\frac{4}{9})^{-\frac{1}{2}}$

6. Simplify $8^5 \div (5^2 \times 8^{-2})^3$ and leave your answer in index form.

7. Convert 80 grams per metre to pounds (lbs) per feet (ft).
(Hint: 1 foot = 0.3048 metres, 1 pound = 453.592 grams)

Ans to Extra Ques: 1a)10, b)6, c)-13, d) $\frac{17}{12}$, e) $\frac{3}{4}$, f) $\frac{85}{117}$, 2) $6\sqrt{2}$, 3) $\frac{3}{2} + 5\sqrt{3}$, 4) $\frac{1}{8}$, 5) $\frac{3}{2}$, 6) $\frac{81}{56}$, 7)0.054lbs/ft