

**2018 Year 10 math topic test: Expansion and factorisation** © itute 2018

Q1 Consider the expression $10x^2 - 12 + 3 \times \frac{4(1-3x)^2}{2} + 8$ as it is written.

a. State the number of terms in the expression. 1 mark

b. State the maximum number of factors in a term of the expression. 1 mark

Q2 Expand **and then** simplify.

a. $7(-2)(7-2)(7+2)$ 2 marks

b. $a(a-1)(a+2)$ 2 marks

c. $(a-b+c)(b-c+a)$ 2 marks

d. $(x-y)(y-z)(z-x)$ 2 marks

e. $(x-3)^3$ 2 marks



Q3 A rectangle has a width (in cm) of $2x - 5$. The length of the rectangle is 3 times its width.

a. Find the perimeter (in cm) of the rectangle in terms of x in factorised form. 1 mark

b. Find the perimeter (in cm) of the rectangle in terms of x in expanded form. 1 mark

c. Find the area (in cm^2) of the rectangle in terms of x in factorised form. 1 mark

d. Find the area (in cm^2) of the rectangle in terms of x in expanded form. 1 mark

Q4 Factorise each of the following expressions.

a. $abc^3 - ab^2c + abc$ 1 mark

b. $a^2b^2 - 49c^2$ 1 mark

c. $16a^2 + 4b^2$ 1 mark

d. $3x^2 - 12x$ 1 mark

e. $3x^2 - 12x + 12$ 2 marks



f. $3x^2 - 13x + 12$

2 marks

g. $(167x - 155)^2 - (167x + 155)^2$

2 marks

h. $(7x - 17)^2 - (7x - 17) - 2$

2 marks

i. $ab + bc - cd - da$

2 marks

j. $x^2 - y^2 + 2x + 1$

2 marks

Q5 Write the following expressions in simplest factorised form.

a. $\frac{2x}{11x^2}$

1 mark

b. $\frac{2x + 2}{11x^2 + 11x}$

1 mark

c. $\frac{a^2 - 4}{a^2 - a - 2}$

2 marks



d. $\frac{x^3 - x^2}{6(x-1)^2} \times \frac{2-2x}{x}$

3 marks

e. $\frac{1}{(21-7a)(2ab-a)} \div \frac{a}{a+6b-2ab-3}$

3 marks

Q6 Consider the quadratic function of y , $y^2 + 1$ where $y > 0$.

a. Firstly expand $(y + \sqrt{2y} + 1)(y - \sqrt{2y} + 1)$.

2 marks

b. For $y > 0$, $y^2 + 1$ can be factorised. Write $y^2 + 1$ in factorised form.

1 mark

c. For $y > 0$, $y^2 + y + 1$ can also be factorised by completing the square.

Work through the following steps by placing the missing entries inside the brackets:

3 marks

$$\begin{aligned} & y^2 + y + 1 \\ &= y^2 + 2y + 1 - (\quad) \\ &= (\quad)^2 - (\sqrt{\quad})^2 \\ &= (y + \sqrt{y} + 1)(y - \sqrt{y} + 1) \end{aligned}$$

d. Use the result in part c to factorise $x^4 + x^2 + 1$.

2 marks