

Higher tier unit 17-1 check in test

Non-calculator

Q1. Simplify $\frac{x+1}{2} + \frac{x+3}{3}$

Q2. Simplify fully $\frac{4}{2} \frac{3}{x} \frac{3}{x}$

Q3. Write as a single fraction in its simplest form $\frac{2}{y+3} \frac{1}{y-6}$

Q4. Simplify fully $\frac{2x^2+6x}{x^2-2x-15}$

Q5. Simplify fully $\frac{3x^2-6x}{x^2+2x-8}$

Q6. Solve $\frac{4x-1}{5} + \frac{x+4}{2} = 3$

Q7. Solve $\frac{h+7}{3} + \frac{2h-1}{2} = \frac{5}{6}$

Q8. Show that $\frac{3x+6}{x^2-3x-10} \div \frac{x+5}{x^3-25x}$ simplifies to ax where a is an integer.

Q9. Write

$$4 - \left[(x+3) \div \frac{x^2+5x+6}{x-2} \right]$$

as a single fraction in its simplest form.

Q10. Solve $\frac{x+2}{3x} + \frac{x-2}{2x} = 3$

Topics listed in objectives

- Simplify algebraic fractions;
- Multiply and divide algebraic fractions;
- Solve quadratic equations arising from algebraic fraction equations;

Answers

Q1. $\frac{5x+9}{6}$

Q2. $\frac{7x-6}{x(2-x)}$

Q3. $\frac{y-15}{(y+3)(y-6)}$

Q4. $\frac{2x}{x-5}$

Q5. $\frac{3x}{x+4}$

Q6. $x = \frac{12}{13}$

Q7. $h = -0.75$

Q8. $3x$

Q9. $\frac{3x+10}{x+2}$

Q10. $x = \frac{2}{13}$

Higher tier unit 17-2 check in test

Non-calculator

Q1. Rationalise the denominator of $\frac{15}{\sqrt{3}}$

Q2. Make x the subject of $4x - 3 = 2(x + y)$

Q3. $m = \sqrt{\frac{k^3 + 1}{4}}$

Make k the subject of the formula.

Q4. Make u the subject of the formula $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$

Q5. Which of the following represents the inverse of the function $f(x)$?

$-f(x)$ $f^{-1}(x)$ $g(x)$ $f(-x)$

Q6. $f(x) = 4x - 1$

Find $f^{-1}(x)$.

Q7. $f(x) = 3x + 2$

$g(x) = 2x - 2$

Find $f(x) - g(x)$

Q8. $f(x) = x^2 - 6$.

Find $f(3x)$

Q9. $f(x) = 4x - 1$

$g(x) = x^2 + 2$

Find $gf(x)$.

Q10. Prove that $(2n + 3)^2 - (2n - 3)^2$ is a multiple of 8 for all positive integer values of n .

Topics listed in objectives

- Rationalise the denominator involving surds;
- Change the subject of a formula, including cases where the subject occurs on both sides of the formula, or where a power of the subject appears;
- Change the subject of a formula such as $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$, where all variables are in the denominators;
- Solve ‘Show that’ and proof questions using consecutive integers ($n, n + 1$), squares a^2, b^2 , even numbers $2n$, odd numbers $2n + 1$;
- Use function notation;
- Find $f(x) + g(x)$ and $f(x) - g(x)$, $2f(x)$, $f(3x)$ etc algebraically;
- Find the inverse of a linear function;
- Know that $f^{-1}(x)$ refers to the inverse function;
- For two functions $f(x)$ and $g(x)$, find $gf(x)$.

Answers

Q1. $5\sqrt{3}$

Q2. $x = y + 1.5$

Q3. $k = \sqrt[3]{(2m+1)(2m-1)}$

Q4. $u = \frac{fv}{f}$

Q5. $f^{-1}(x)$

Q6. $f^{-1}(x) = \frac{x+1}{4}$

Q7. $f(x) - g(x) = x + 4$

Q8. $9x^2 - 6$

Q9. $gf(x) = 16x^2 - 8x + 3$

Q10. working leading to $8 \times 3n$