A Level Basics Test: Sample Paper 4

Dauntsey's School

No calculators allowed; please answer on file paper.
Pass mark 75%, or 63 marks out of 84.
Each part of a question is worth 2 marks, except for those in Q4, 13 & 18 which are worth 3 marks.

1: Work out the following:

a) $(-50) \div (-10) - (-20) \div 10$ b) $(-3) - (-10) \times (-1)$

2: Work out the following, showing your method and simplifying your answer:

a) $3\frac{2}{9} + 4\frac{1}{2}$ b) $2\frac{1}{4} - 1\frac{7}{10}$

3: Work out the following, showing your method and simplifying your answer:

a) $3\frac{1}{2} \times 3\frac{1}{3}$ b) $1\frac{1}{9} \div 1\frac{1}{2}$

4: Simplify the following:

a) $\dfrac{6w^{13}b^9}{3w^4b^6}$ b) $5k^8u^7 \times 6k^7u^4$ c) $(2s^6x^5)^2$

5: Work out the following:

a) 3^{-1} b) 4^0

6: Work out the following:

a) $729^{-1/3}$ b) $16^{1/2}$

7: Simplify the following surds:

a) $\sqrt{250} - \sqrt{90}$ b) $\sqrt{8} + \sqrt{2}$

8: Simplify the following surds:

$\dfrac{1}{\sqrt{6}}$

9: Simplify the following surds:

$(3 - \sqrt{10})^2$

10: Solve the following:

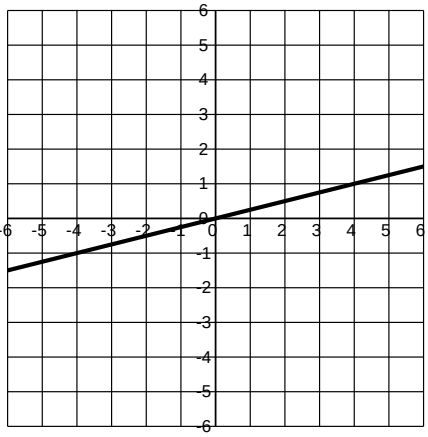
a) $-x - 4 < -14$ b) $-9(x + 7) \leq -81$

11: Solve the following inequalities:

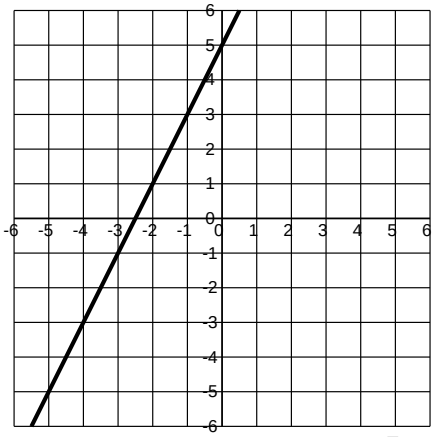
a) $3x^2 + 4 > 112$ b) $2x^2 + 13 \geq 111$

12: Give an equation for the graph:

a)



b)



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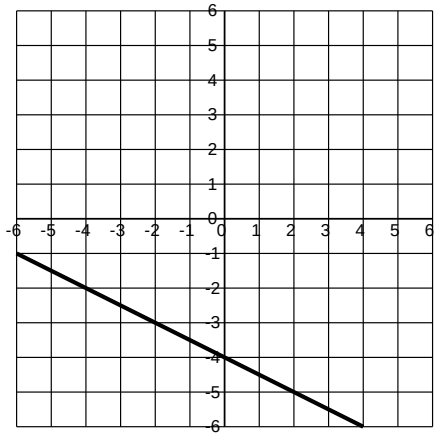
c)



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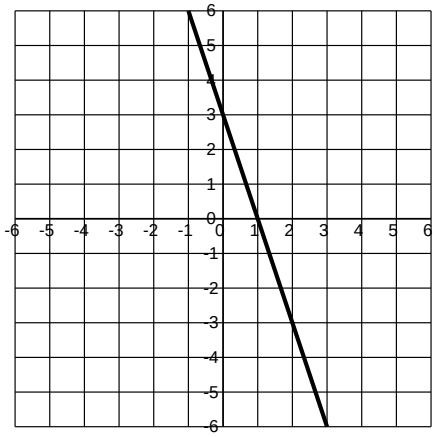

13: Work out the following:

a) A line segment is drawn between (1, 4) and (2, 2). Find its gradient, mid-point and length.

b) A line segment is drawn between (6, 9) and (10, 4). Find its gradient, mid-point and length.

14: Multiply out and simplify the following:

$(5t - 10)(4t + 9)$

15: Solve by factorising:

a) $g^2 + 10g + 25 = 0$

b) $a^2 - 64 = 0$

16: Factorise the following:

$6z^2 + 19z + 10$

17: Solve using the quadratic formula, giving your answer in simplified surd form:

$2m^2 - 5m - 5 = 0$

18: Solve the following simultaneous equations:

$q = f^2 + 7$
$q = -4f + 4$

19: Simplify the following as far as possible:

a) $\dfrac{v^2 + 3v}{v^2 + 2v}$

b) $\dfrac{12n^2 + 4n}{10n}$

20: Simplify the following as far as possible:

a) $\dfrac{3(3p + 2)}{4} - \dfrac{3(3p - 2)}{8}$

b) $\dfrac{2(2r + 3)}{9} + \dfrac{3r - 1}{6}$

21: Simplify the following as far as possible:

a) $\dfrac{4j}{3} \times \dfrac{4j}{7}$

b) $\dfrac{9}{2c} \div \dfrac{3c}{5}$

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Answers: A Level Basics Test: Sample Paper 4

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1: a) $5 - (-2) = 7$ b) $(-3) - 10 = -13$

2: a) $3\frac{4}{18} + 4\frac{9}{18} = 7\frac{13}{18}$ b) $2\frac{5}{20} - 1\frac{14}{20} = \frac{11}{20}$

3: a) $\frac{7}{2} \times \frac{10}{3} = \frac{7}{1} \times \frac{5}{3} = \frac{35}{3} = 11\frac{2}{3}$ b) $\frac{10}{9} \div \frac{3}{2} = \frac{10}{9} \times \frac{2}{3} = \frac{20}{27}$

4: a) $2w^9b^3$ b) $30k^{15}u^{11}$ c) $4s^{12}x^{10}$

5: a) $\frac{1}{3}$ b) 1

6: a) $\frac{1}{9}$ b) 4

7: a) $2\sqrt{10}$ b) $3\sqrt{2}$

8: $\frac{\sqrt{6}}{6}$

9: $19 - 6\sqrt{10}$

10: a) $x > 10$ b) $x \geq 2$

11: a) $x < -6$ or $x > 6$ b) $x \leq -7$ or $x \geq 7$

12: a) $y = \frac{1}{4}x$ b) $y = 2x + 5$ c) $y = -\frac{1}{2}x - 4$ d) $y = -3x + 3$

13: a) Gradient = -2
Mid-point = (1.5, 3)
Length = $\sqrt{5}$

b) Gradient = $-\frac{5}{4}$
Mid-point = (8, 6.5)
Length = $\sqrt{41}$

14: $20t^2 + 5t - 90$

15: a) $g = -5$ b) $a = -8$, $a = 8$

16: $(3z + 2)(2z + 5)$

17: $m = 1\frac{1}{4} \pm \frac{1}{4}\sqrt{65}$

18: $f = -3$ and $q = 16$
$f = -1$ and $q = 8$

19: a) $\frac{v + 3}{v + 2}$ b) $\frac{2(3n + 1)}{5}$

20: a) $\frac{18p + 12}{8} - \frac{9p - 6}{8} = \frac{9p + 18}{8} = \frac{9(p + 2)}{8}$ b) $\frac{8r + 12}{18} + \frac{9r - 3}{18} = \frac{17r + 9}{18}$

21: a) $\frac{4j}{3} \times \frac{4j}{7} = \frac{16j^2}{21}$ b) $\frac{9}{2c} \times \frac{5}{3c} = \frac{45}{6c^2} = \frac{15}{2c^2}$

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