A Level Basics Test: Sample Paper 2

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) $(-9) + 5 \times (-2) + (-5)$ b) $3 + (-2) \times (-7)$

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

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

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

a) $3\frac{1}{3} \times 1\frac{1}{3}$ b) $1\frac{3}{7} \div 3\frac{1}{2}$

4: Simplify the following:

a) $2u^7q^6 \times 5u^{10}q^4$ b) $\frac{30r^3v^{11}}{6r^2v^2}$ c) $(5w^4y^8)^3$

5: Work out the following:

a) 1^{-2} b) 7^0

6: Work out the following:

a) $16^{1/2}$ b) $27^{-1/3}$

7: Simplify the following surds:

a) $\sqrt{90} + \sqrt{250}$ b) $\sqrt{175} - \sqrt{112}$

8: Simplify the following surds:

$\frac{3}{\sqrt{5}}$

9: Simplify the following surds:

$(1 - \sqrt{3})^2$

10: Solve the following:

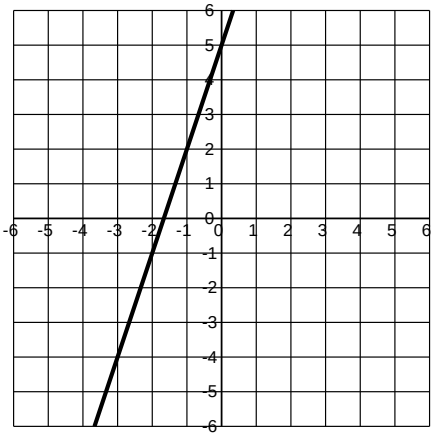
a) $-3(x + 8) < -45$ b) $-8x + 3 > 51$

11: Solve the following inequalities:

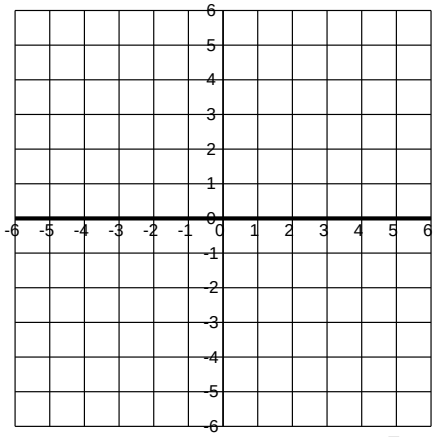
a) $4x^2 - 18 < 382$ b) $3x^2 - 15 \leq 93$

12: Give an equation for the graph:

a)



b)



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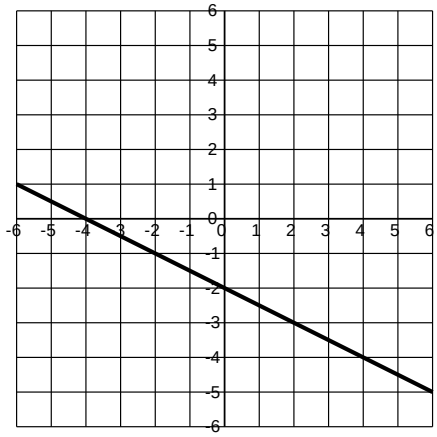
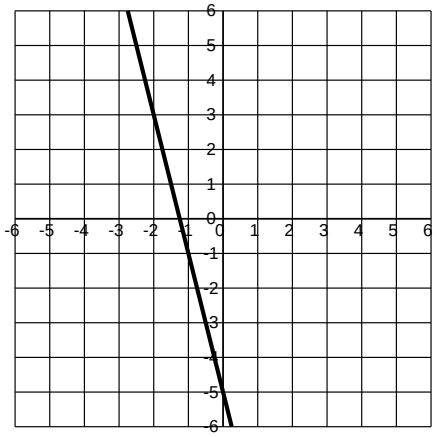


d)



13: Work out the following:

a) A line segment is drawn between (1, 6) and (2, 10). Find its gradient, mid-point and length.

b) A line segment is drawn between (3, 4) and (8, 0). Find its gradient, mid-point and length.

14: Multiply out and simplify the following:

$(2k - 3)(3k + 5)$

15: Solve by factorising:

a) $s^2 + 10s + 24 = 0$

b) $x^2 - 16 = 0$

16: Factorise the following:

$72m^2 - 17m + 1$

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

$5e^2 - 10e - 3 = 0$

18: Solve the following simultaneous equations:

$p = b^2 - 7$
$p = b - 5$

19: Simplify the following as far as possible:

a) $\dfrac{18a^2 + 18a}{12a}$

b) $\dfrac{2z^2 - 3z}{z^2 + 3z}$

20: Simplify the following as far as possible:

a) $\dfrac{5(2g - 1)}{6} - \dfrac{7(g + 2)}{9}$

b) $\dfrac{3(2j + 1)}{8} + \dfrac{j - 3}{2}$

21: Simplify the following as far as possible:

a) $\dfrac{3}{8t} \times \dfrac{10}{9t}$

b) $\dfrac{6f}{7} \div \dfrac{5f}{3}$

Answers: A Level Basics Test: Sample Paper 2

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1: a) $(-9) + (-10) + (-5) = -24$ b) $3 + 14 = 17$

2: a) $1\frac{4}{6} + 2\frac{3}{6} = 4\frac{1}{6}$ b) $4\frac{9}{12} - 3\frac{4}{12} = 1\frac{5}{12}$

3: a) $\frac{10}{3} \times \frac{4}{3} = \frac{40}{9} = 4\frac{4}{9}$ b) $\frac{10}{7} \div \frac{7}{2} = \frac{10}{7} \times \frac{2}{7} = \frac{20}{49}$

4: a) $10u^{17}q^{10}$ b) $5rv^{9}$ c) $125w^{12}y^{24}$

5: a) 1 b) 1

6: a) 4 b) $\frac{1}{3}$

7: a) $8\sqrt{10}$ b) $\sqrt{7}$

8: $\frac{3\sqrt{5}}{5}$

9: $4 - 2\sqrt{3}$

10: a) $x > 7$ b) $x < -6$

11: a) $-10 < x < 10$ b) $-6 \leq x \leq 6$

12: a) $y = 3x + 5$ b) $y = 0$ c) $y = -\frac{1}{2}x - 2$ d) $y = -4x - 5$

13: a) Gradient = 4
Mid-point = (1.5, 8)
Length = $\sqrt{17}$

b) Gradient = $-\frac{4}{5}$
Mid-point = (5.5, 2)
Length = $\sqrt{41}$

14: $6k^2 + k - 15$

15: a) $s = -4$, $s = -6$ b) $x = -4$, $x = 4$

16: $(8m - 1)(9m - 1)$

17: $e = 1 \pm \frac{2}{5}\sqrt{10}$

18: $b = -1$ and $p = -6$
$b = 2$ and $p = -3$

19: a) $\frac{3(a + 1)}{2}$ b) $\frac{2z - 3}{z + 3}$

20: a) $\frac{30g - 15}{18} - \frac{14g + 28}{18} = \frac{16g - 43}{18}$ b) $\frac{6j + 3}{8} + \frac{4j - 12}{8} = \frac{10j - 9}{8}$

21: a) $\frac{3}{8t} \times \frac{10}{9t} = \frac{30}{72t^2} = \frac{5}{12t^2}$ b) $\frac{6f}{7} \times \frac{3}{5f} = \frac{18f}{35f} = \frac{18}{35}$