
1.
$$\begin{aligned}\frac{2}{3} \left(\frac{1}{5} + \frac{3}{4} \right) &= \frac{2}{3} \left(\frac{4}{20} + \frac{15}{20} \right) \\ &= \frac{2}{3} \times \frac{19}{20} \\ &= \frac{1}{3} \times \frac{19}{10} \\ &= \frac{19}{30}\end{aligned}$$

2.
$$\begin{aligned}f(-3) &= (-3)^3 - 2 \\ &= -27 - 2 \\ &= -29\end{aligned}$$

3.
$$\begin{aligned}V &= \frac{1}{3} \pi r^2 h \\ &\approx \frac{1}{3} \times 3.14 \times 10^2 \times 60 \\ &= 3.14 \times 100 \times 20 \\ &= 3.14 \times 2000 \\ &= 6280 \text{ cm}^3\end{aligned}$$

4.
$$\begin{aligned}\angle COE &= 180 - 68 \\ &= 112^\circ \\ \angle OCE &= (180 - 112) \div 2 \\ &= 68 \div 2 \\ &= 34^\circ \\ \angle ACE &= 90 + 34 \\ &= 124^\circ\end{aligned}$$

5. (a) $x^2 + 8x + 15 = (x^2 + 8x + 16) - 16 + 15$
 $= (x + 4)^2 - 1$

(b) $(-4, -1)$

6. $m = \frac{y_2 - y_1}{x_2 - x_1}$
 $= \frac{7 - -1}{-5 - -3}$
 $= \frac{8}{-2}$
 $= -4$

Using $(a, b) = (-5, 7)$:

$$y - b = m(x - a)$$

$$y - 7 = -4(x - -5)$$

$$y - 7 = -4(x + 5)$$

$$y - 7 = -4x - 20$$

$$y = -4x - 13$$

7. $D = \frac{B + 4}{C^2}$
 $DC^2 = B + 4$
 $DC^2 - 4 = B$
 $B = DC^2 - 4$

8. (a) $a = 3$

(b) $b = 8$

9.
$$\begin{aligned}\cos B &= \frac{3^2 + 7^2 - 5^2}{2 \times 3 \times 7} \\ &= \frac{9 + 49 - 25}{42} \\ &= \frac{33}{42} \\ &= \frac{11}{14}\end{aligned}$$

10. $100\% - 30\% = 70\%$
So 70% of the original price = £16.10
10% of the original price = £16.10 \div 7 = £2.30
100% of the original price = £2.30 \times 10 = £23

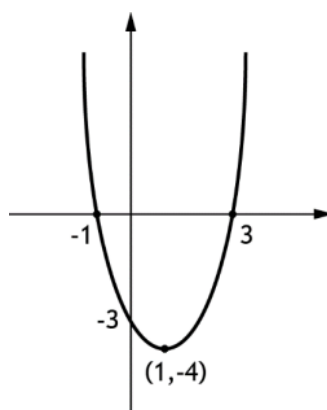
11.
$$\begin{aligned}(m^{-2})^4 \times m^{-5} &= m^{-8} \times m^{-5} \\ &= m^{-13} \\ &= \frac{1}{m^{13}}\end{aligned}$$

12.
$$\begin{aligned}\frac{4}{x+2} \div \frac{5}{(x+2)^2} \\ &= \frac{4}{x+2} \times \frac{(x+2)^2}{5} \\ &= \frac{4}{1} \times \frac{x+2}{5} \\ &= \frac{4(x+2)}{5}\end{aligned}$$

Note: $\frac{4x+8}{5}$ is also an acceptable final answer.

13. $\sqrt{10}(\sqrt{10} - \sqrt{2}) + 8\sqrt{5}$
 $= 10 - \sqrt{20} + 8\sqrt{5}$
 $= 10 - \sqrt{4 \times 5} + 8\sqrt{5}$
 $= 10 - 2\sqrt{5} + 8\sqrt{5}$
 $= 10 + 6\sqrt{5}$

14. roots = -1 and 3
y-intercept = -3
turning point = (1, -4)



15. (a) Area of triangle = $\frac{1}{2}bh$
 $= \frac{1}{2} \times 3 \times (x + 12)$
 $= \frac{3}{2}(x + 12)$

(b) Area of rectangle = lb
 $= 6(8 - x)$
 $= 48 - 6x$

So $\frac{3}{2}(x + 12) = 48 - 6x$
 $3(x + 12) = 2(48 - 6x)$
 $3x + 36 = 96 - 12x$
 $3x + 12x = 96 - 36$
 $15x = 60$
 $x = 4$